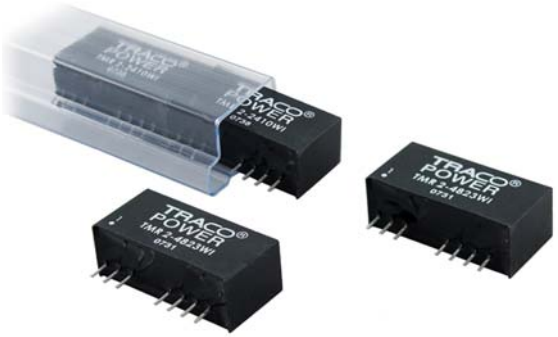
TMR 2WI Series

2W, SIP, Single & Dual Output DC/DC Converters

Features

- High Power Density in SIP-9 Package
- Small Footprint: 26 x 9.2 mm (1.02”x 0.36”)
- Ultra-wide 4:1 Input Range
- Fully Regulated Output
- Operating Temp. Range -40°C to +85°C
- Overload Protection
- I/O-Isolation Voltage 1500 VDC
- Remote On/Off Control
- 3 Years Product Warranty



Applications

- Distributed power architectures
- Workstations
- Computer equipment
- Communications equipment

General Description

The TRACO TMR 2WI series is a range of isolated 2W DC/DC converter modules featuring fully regulated output and ultra-wide 4:1 input voltage ranges.
The product comes in a SIP-9 package with a very small footprint occupying only 2.4 cm^2 (0.36 square in.) on the PCB.
An excellent efficiency allows an operating temperature range of -40°C to +85°C. Further features include remote On/Off control and over load protection. The very compact dimensions of these DC/DC converters make them an ideal solution for many space critical applications in battery-powered equipment and instrumentation.

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Absolute Maximum Rating

Parameter	Model	Min	Max	Unit
Input Voltage				
Input Surge Voltage (1 sec.)	24VDC Input Models	-0.7	50	VDC
	48VDC Input Models	-0.7	100	
Operating Ambient Temperature				
Without Derating	All	-40	+65	℃
With Derating		-40	+85	
Operating Case Temperature	All		+90	℃
Storage Temperature	All	-55	+105	℃

Output Specification

Parameter	Model	Min	Nominal	Max	Unit
Output Regulation					
Line ($V_{in\ min}$ to $V_{in\ max}$ at Full Load)			±0.3	±0.5	%
Output Regulation					
Load (20% to 100% of Full Load)			±0.5	±0.75	%
Output Ripple & Noise					
Peak-to-Peak (5Hz to 20MHz bandwidth)			30	50	mV pk-pk
Temperature Coefficient	All		±0.01	±0.02	%/℃
Output Current	TMR 2-xx10WI	125		500	mA
	TMR 2-xx11WI	100		400	
	TMR 2-xx12WI	42		167	
	TMR 2-xx13WI	33		134	
	TMR 2-xx21WI	±50		±200	
	TMR 2-xx22WI	±21		±83	
	TMR 2-xx23WI	±17		±67	
Output Short Circuit Protection	All	Continuous			

Input Specification

Parameter	Model	Min	Nominal	Max	Unit
Operating Input Voltage	24V Input Models	9	24	36	VDC
	48V Input Models	18	48	75	
Input Current	TMR 2-2410WI		97		mA
(Maximum value at V_{in}= $V_{in\ nom}$;Full Load)	TMR 2-2411WI		110		
	TMR 2-2412WI		106		
	TMR 2-2413WI		105		
	TMR 2-2421WI		114		
	TMR 2-2422WI		108		
	TMR 2-2423WI		106		
	TMR 2-4810WI		49		
	TMR 2-4811WI		58		
	TMR 2-4812WI		54		
	TMR 2-4813WI		54		
	TMR 2-4821WI		60		
	TMR 2-4822WI		55		
	TMR 2-4823WI		55		

Input Specification

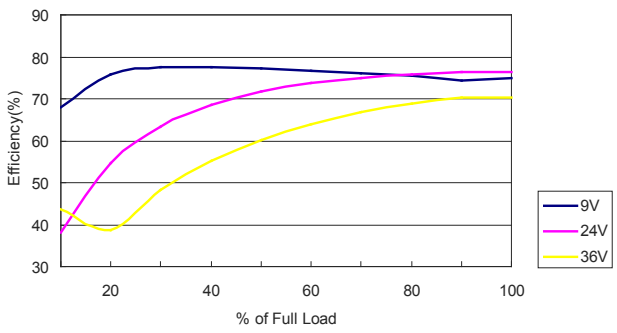
Parameter	Model	Min	Nominal	Max	Unit
Input Standby Current (Typical value at V_{in} = $V_{in\ nom}$; No Load)	TMR 2-2410WI TMR 2-2411WI TMR 2-2412WI TMR 2-2413WI TMR 2-2421WI TMR 2-2422WI TMR 2-2423WI		20		mA
	TMR 2-4810WI TMR 2-4811WI TMR 2-4812WI TMR 2-4813WI TMR 2-4821WI TMR 2-4822WI TMR 2-4823WI		15		

General Specification

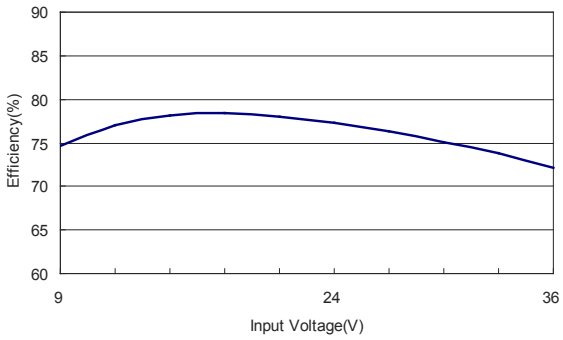
Parameter	Model	Min	Nominal	Max	Unit
Efficiency (V_{in} =$V_{in\ nom}$; Full Load; T_A =25°C)	TMR 2-2410WI		71		%
	TMR 2-2411WI		76		
	TMR 2-2412WI		79		
	TMR 2-2413WI		80		
	TMR 2-2421WI		73		
	TMR 2-2422WI		77		
	TMR 2-2423WI		79		
	TMR 2-4810WI		70		
	TMR 2-4811WI		72		
	TMR 2-4812WI		78		
	TMR 2-4813WI		78		
	TMR 2-4821WI		70		
	TMR 2-4822WI		76		
	TMR 2-4823WI		76		
Isolation Voltage Input to Output (for 60 seconds)		1500			VDC
Isolation Resistance	All	1000			MΩ
Isolation Capacitance			250	500	pF
Switching Frequency			300		KHz
MTBF MIL-STD-217F, TC=25°C		1,000,000			Hours

Characteristic Curves

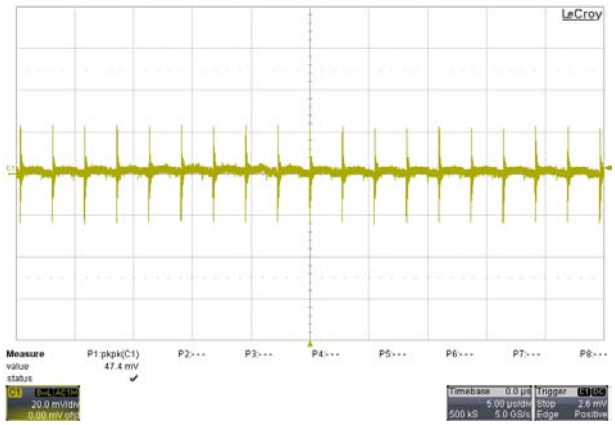
All test conditions are at 25°C The figures are identical for TMR 2-2410WI



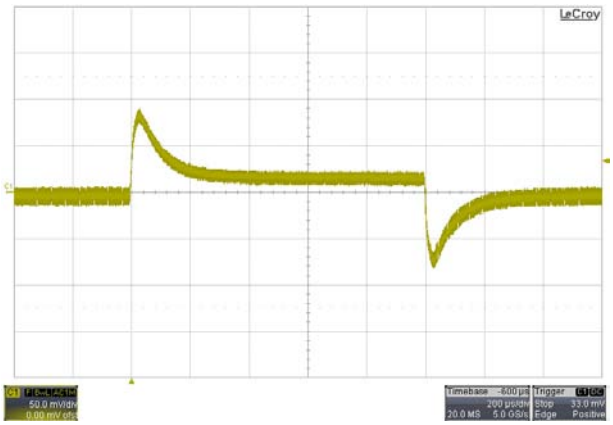
Efficiency Versus Output Current



Efficiency Versus Input Voltage. Full Load



Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



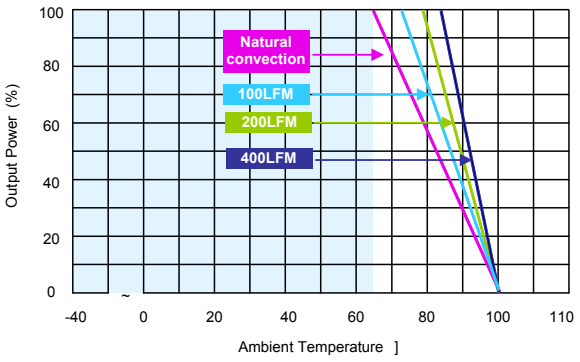
Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$

Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

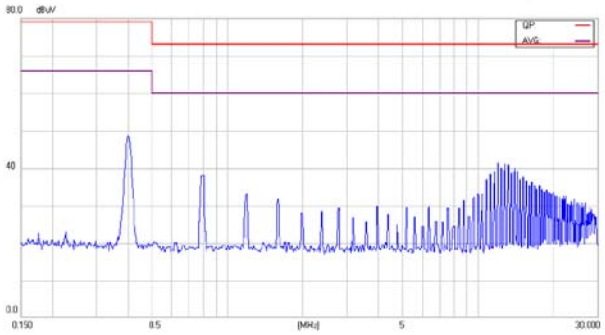
Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-2410WI (Continued)



Derating Output Current Versus Ambient Temperature and Airflow

V_{in} =$V_{in\ nom}$

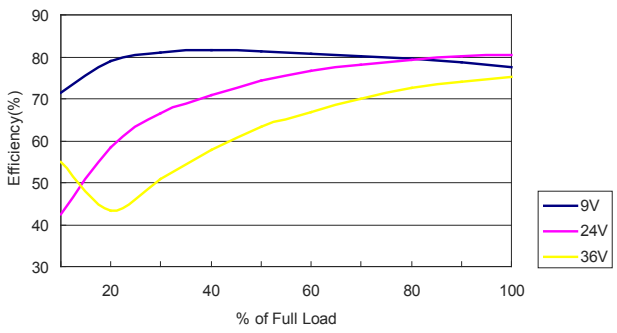


Conduction Emission of EN55022 Class A

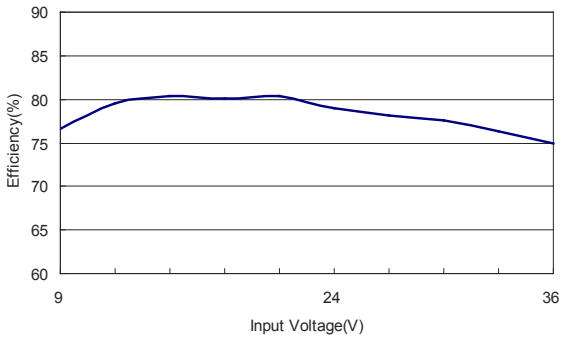
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

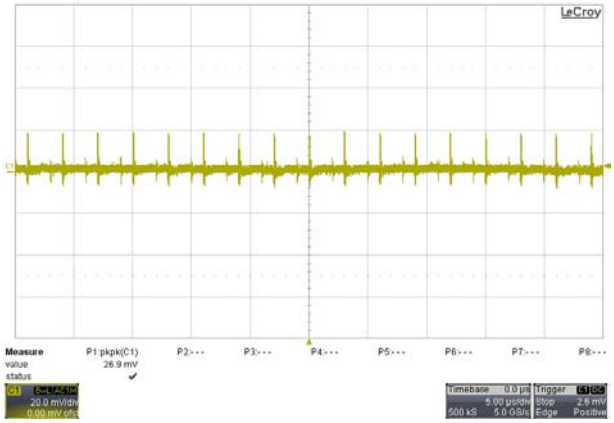
All test conditions are at 25°C The figures are identical for TMR 2-2411WI



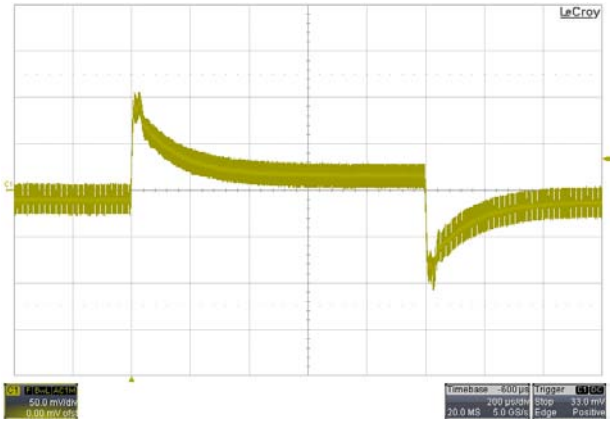
Efficiency Versus Output Current



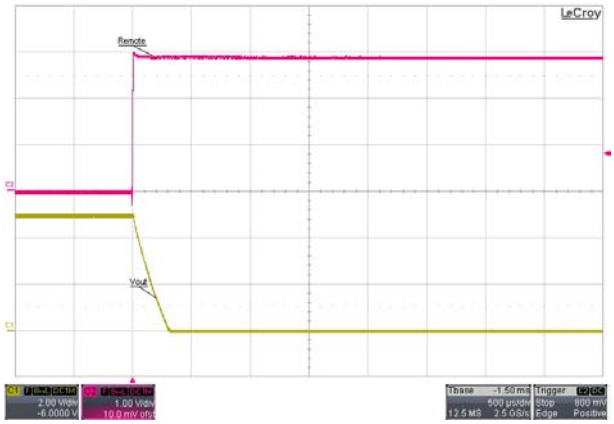
Efficiency Versus Input Voltage. Full Load



Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$

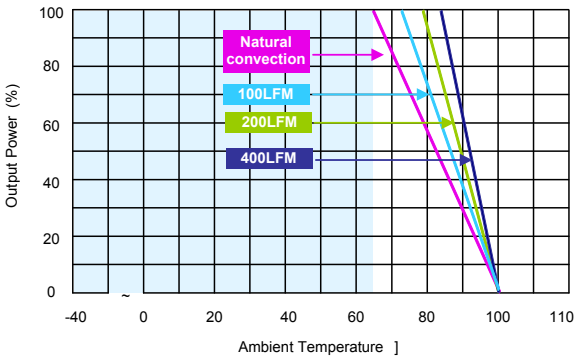


Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

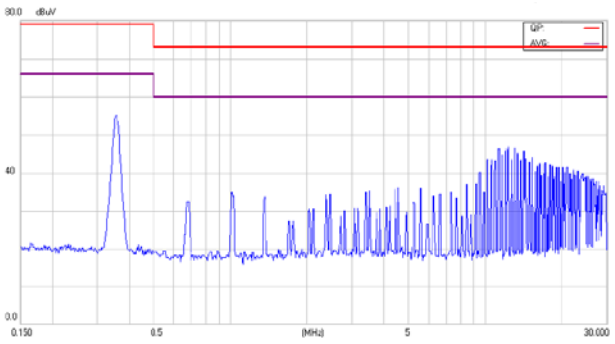
Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-2411WI (Continued)



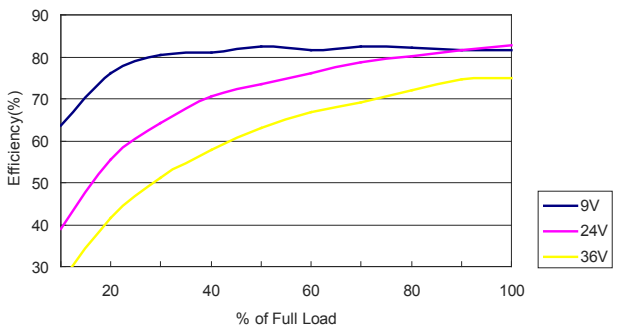
Derating Output Current Versus Ambient Temperature and Airflow
V_{in} =$V_{in\ nom}$



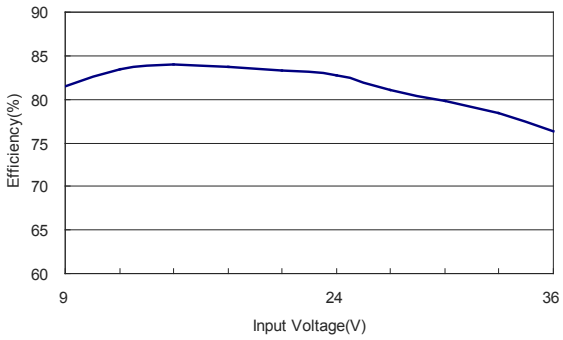
Conduction Emission of EN55022 Class A
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

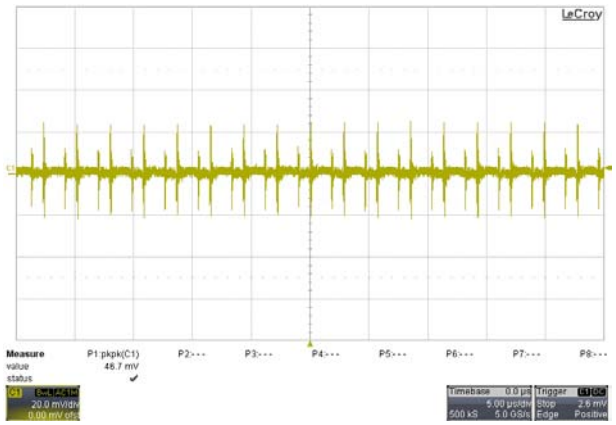
All test conditions are at 25°C The figures are identical for TMR 2-2412WI



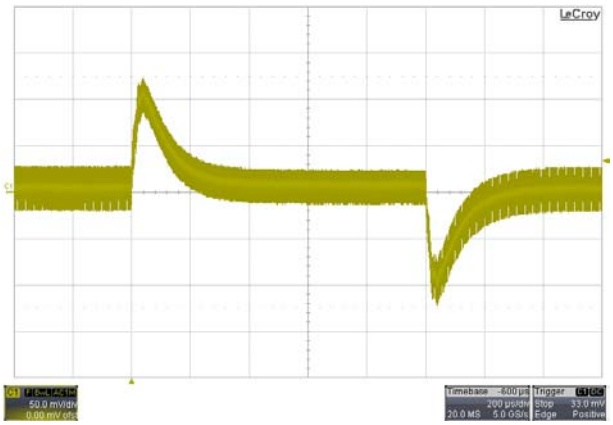
Efficiency Versus Output Current



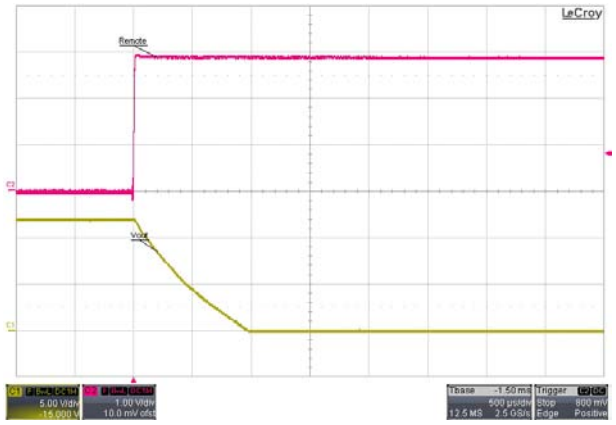
Efficiency Versus Input Voltage. Full Load



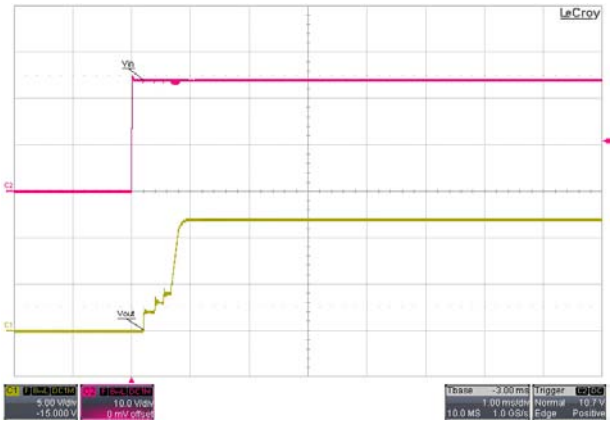
Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$



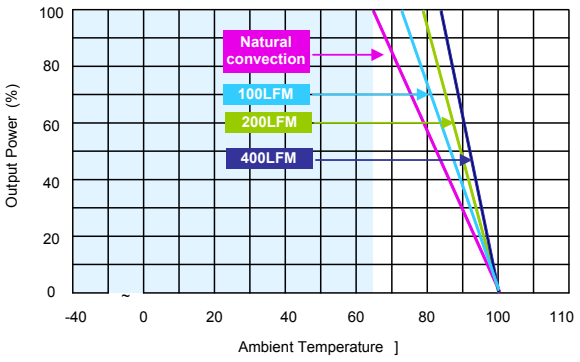
Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load



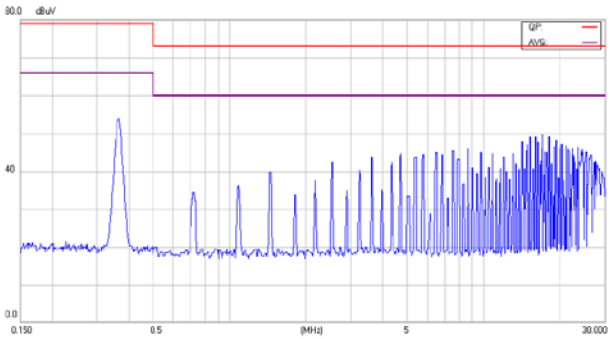
Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-2412WI (Continued)



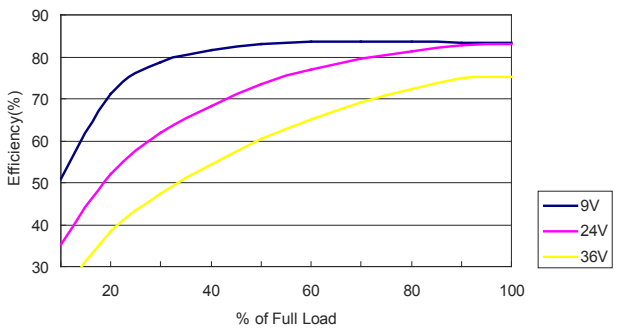
Derating Output Current Versus Ambient Temperature and Airflow
V_{in} =$V_{in\ nom}$



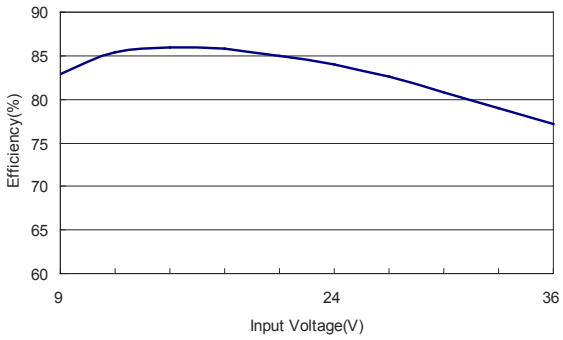
Conduction Emission of EN55022 Class A
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

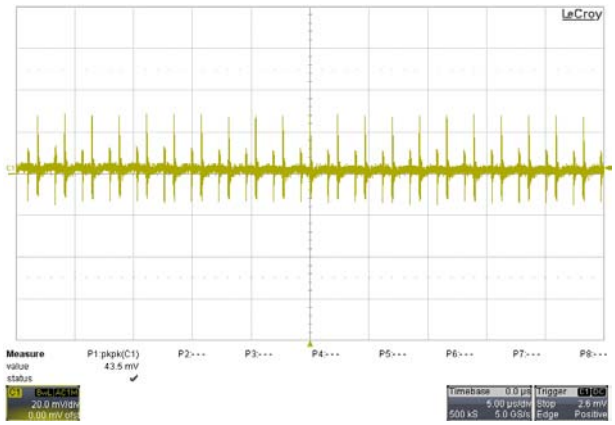
All test conditions are at 25°C The figures are identical for TMR 2-2413WI



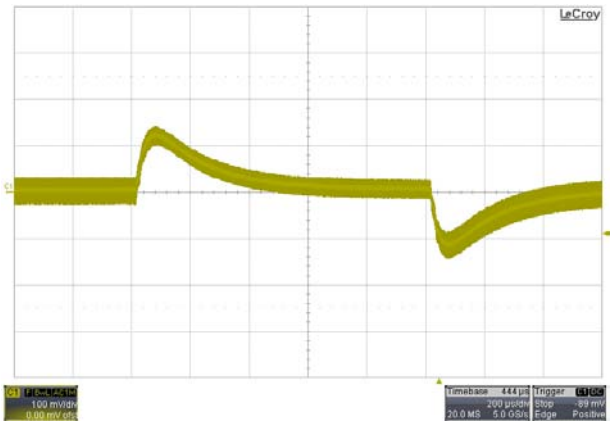
Efficiency Versus Output Current



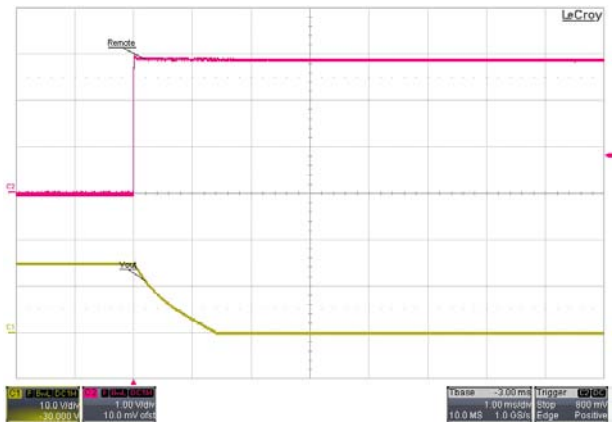
Efficiency Versus Input Voltage. Full Load



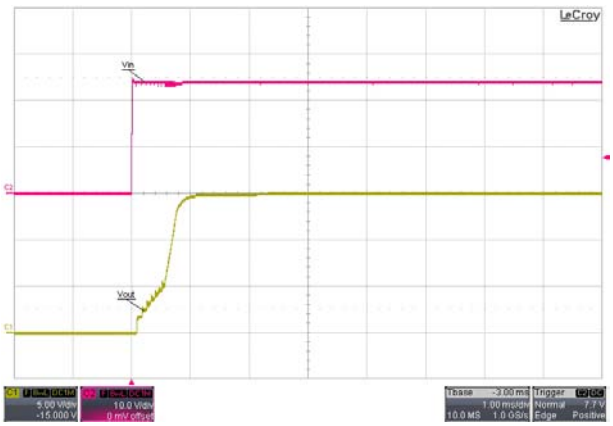
Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$



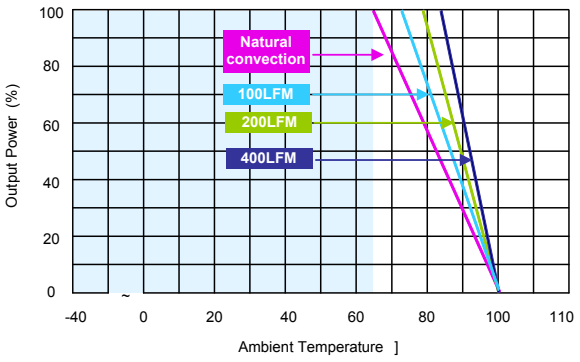
Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load



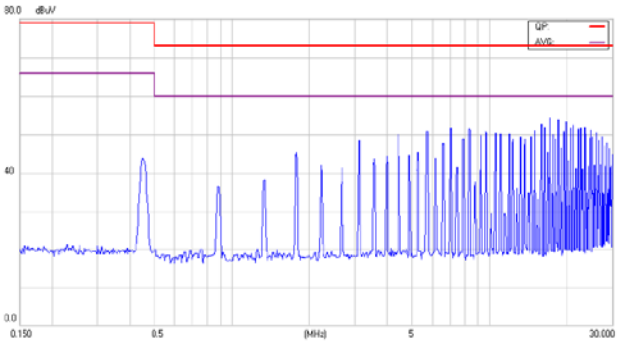
Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-2413WI (Continued)



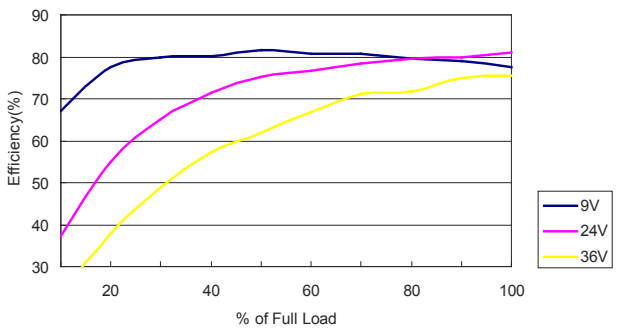
Derating Output Current Versus Ambient Temperature and Airflow
V_{in} =$V_{in\ nom}$



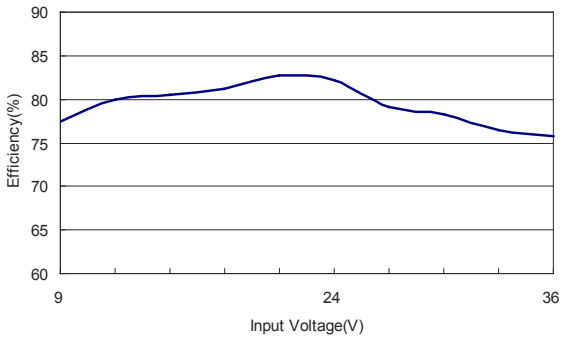
Conduction Emission of EN55022 Class A
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

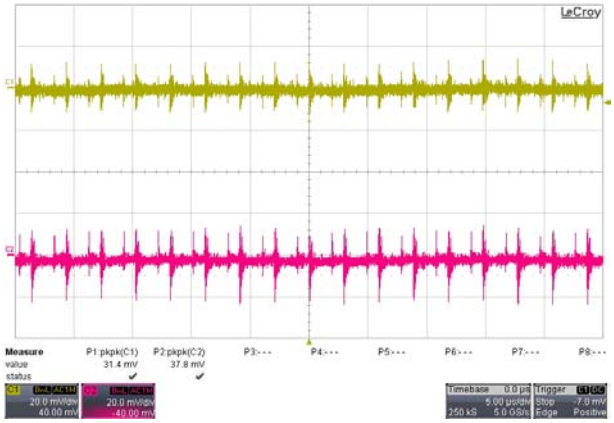
All test conditions are at 25°C The figures are identical for TMR 2-2421WI



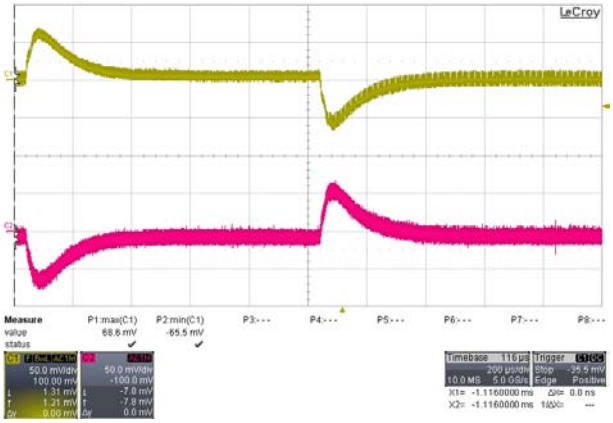
Efficiency Versus Output Current



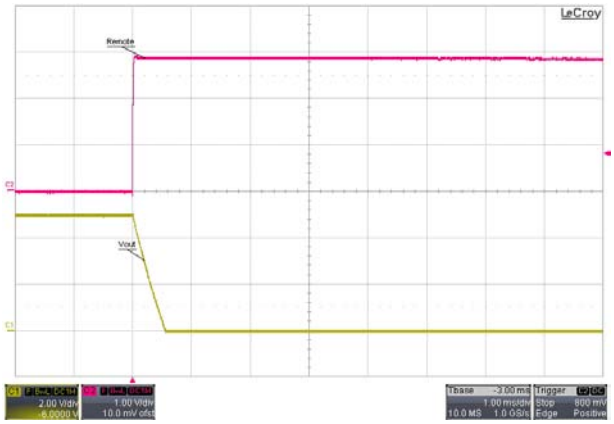
Efficiency Versus Input Voltage. Full Load



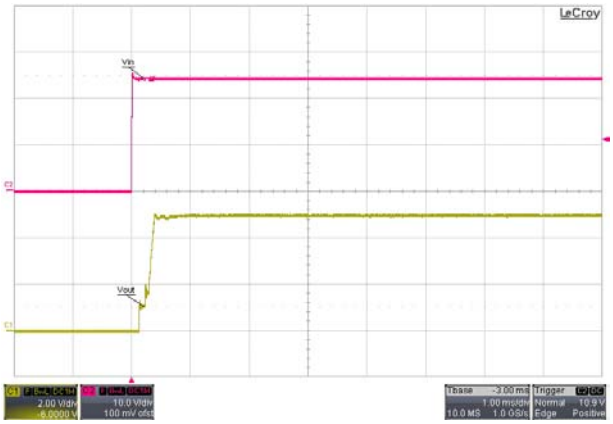
Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$



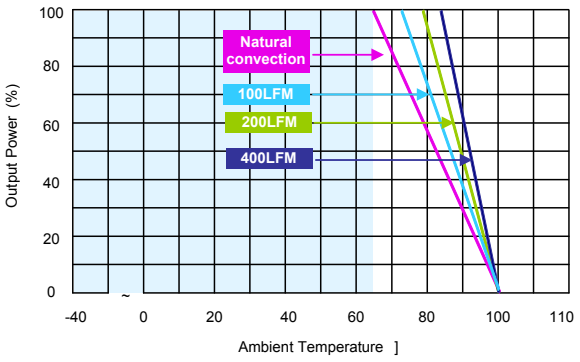
Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load



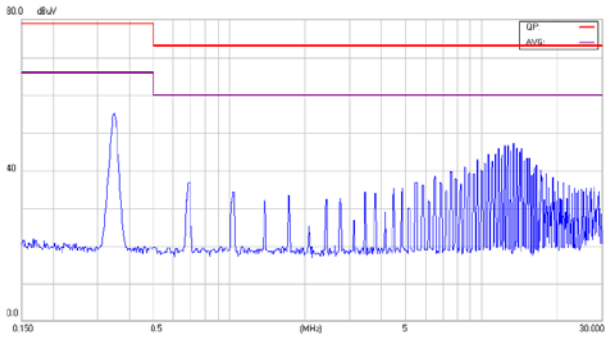
Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-2421WI (Continued)



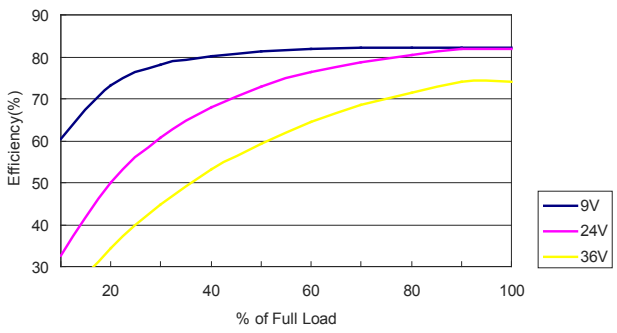
Derating Output Current Versus Ambient Temperature and Airflow
V_{in} =$V_{in\ nom}$



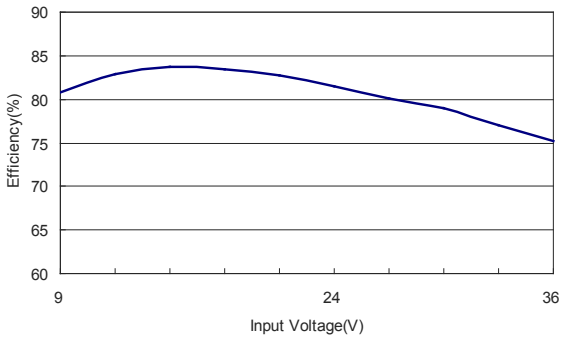
Conduction Emission of EN55022 Class A
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

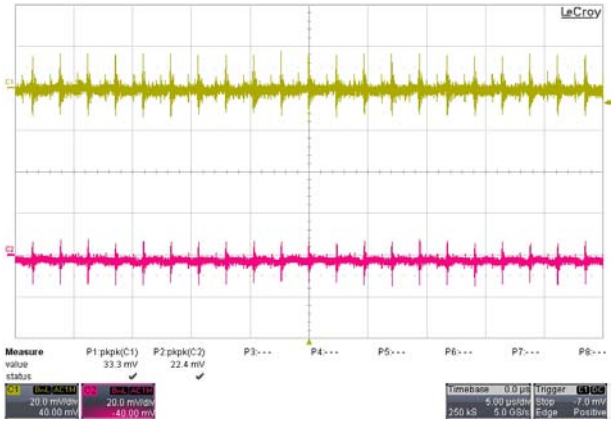
All test conditions are at 25°C The figures are identical for TMR 2-2422WI



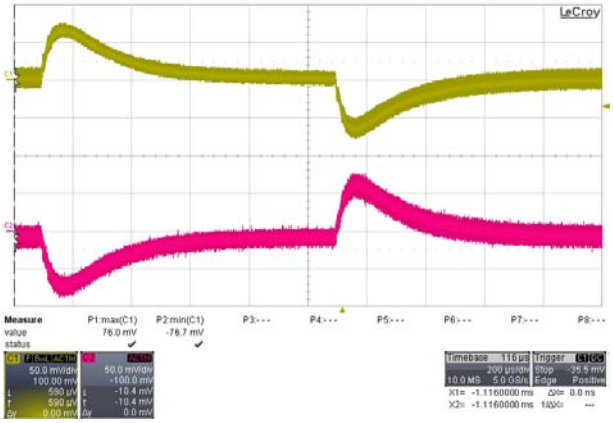
Efficiency Versus Output Current



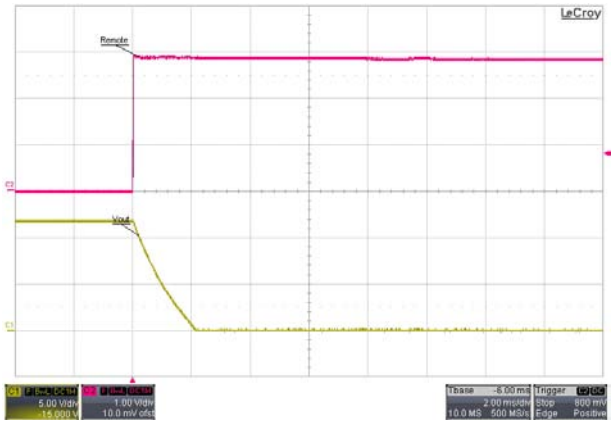
Efficiency Versus Input Voltage. Full Load



Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$

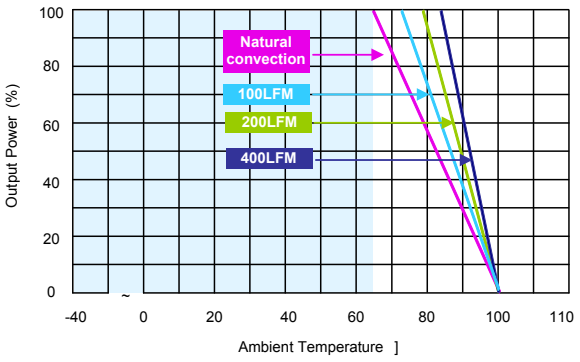


Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

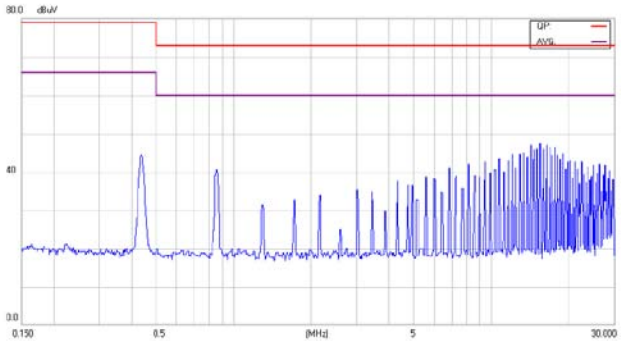
Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-2422WI (Continued)



Derating Output Current Versus Ambient Temperature and Airflow

V_{in} =$V_{in\ nom}$

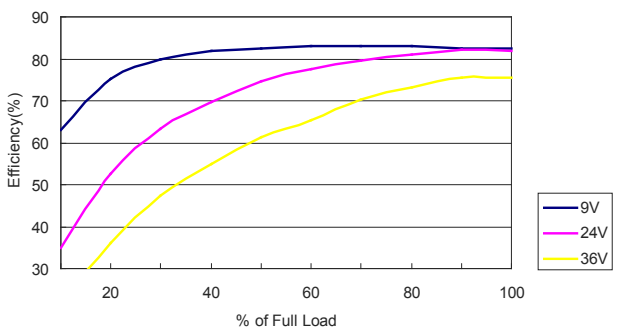


Conduction Emission of EN55022 Class A

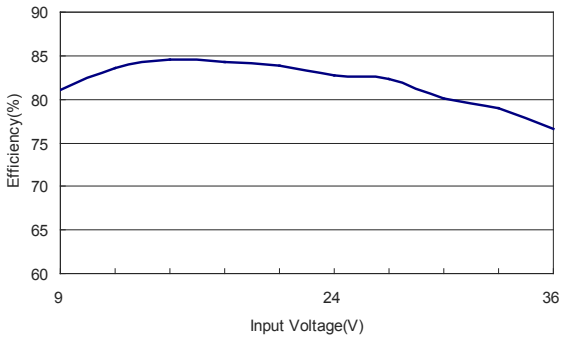
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

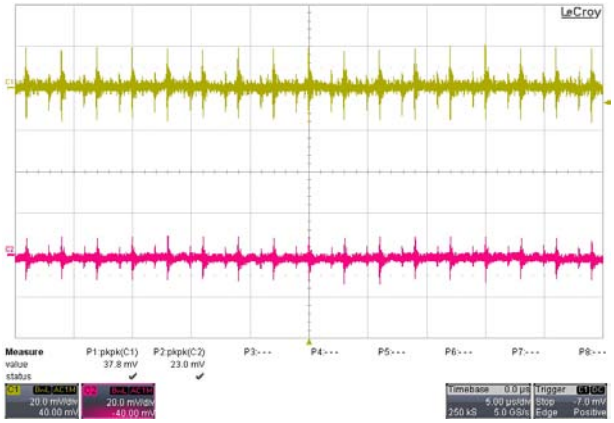
All test conditions are at 25°C The figures are identical for TMR 2-2423WI



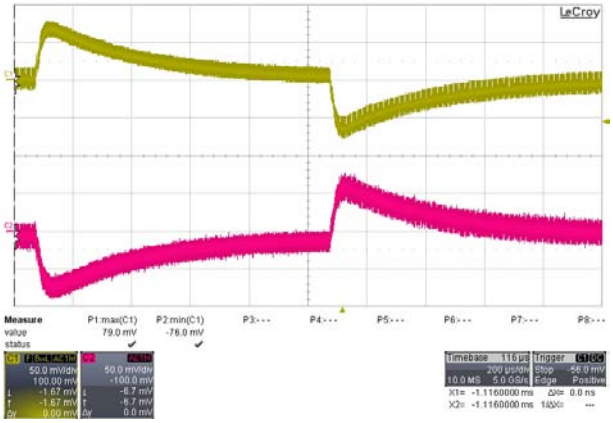
Efficiency Versus Output Current



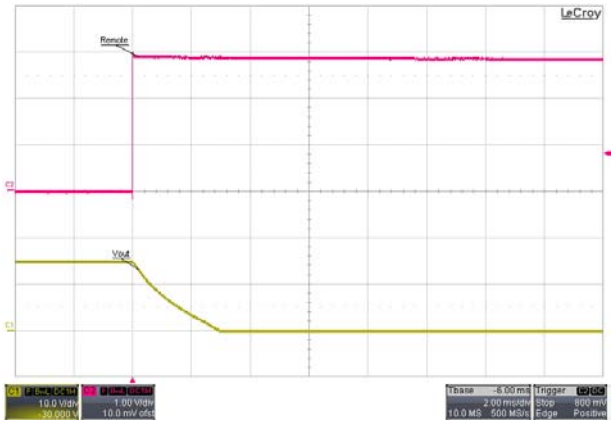
Efficiency Versus Input Voltage. Full Load



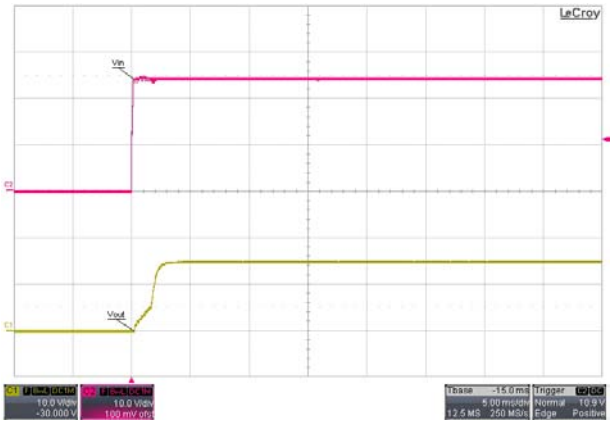
Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$



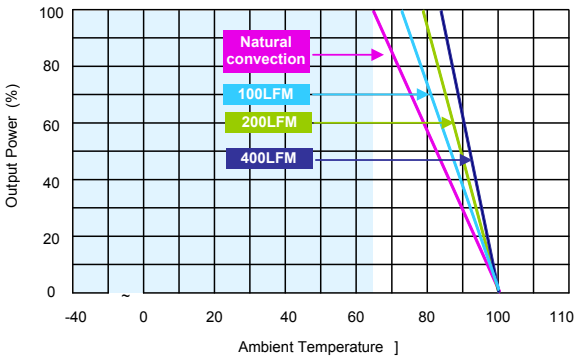
Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load



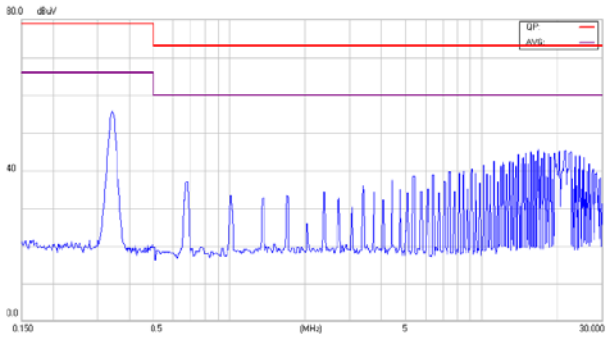
Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-2423WI (Continued)



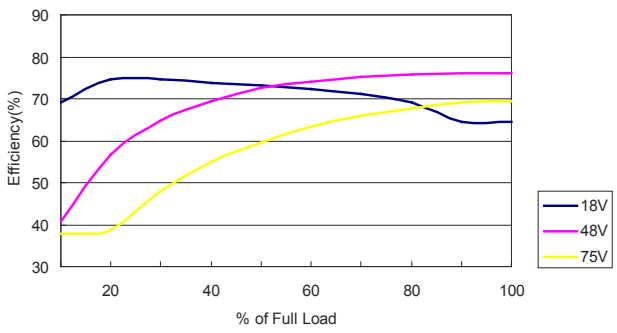
Derating Output Current Versus Ambient Temperature and Airflow
V_{in} =$V_{in\ nom}$



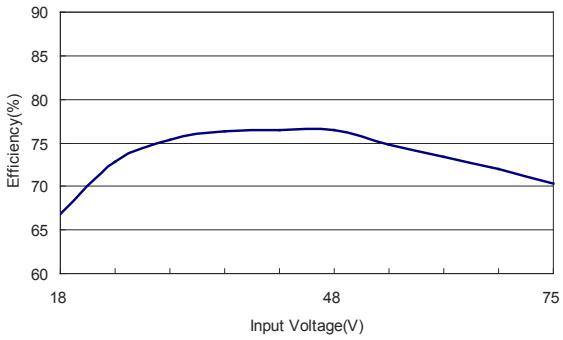
Conduction Emission of EN55022 Class A
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

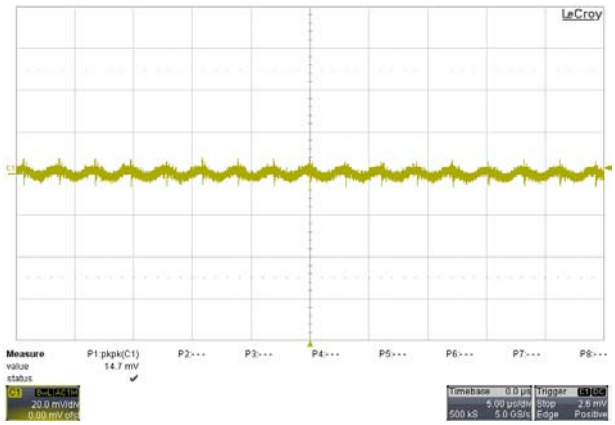
All test conditions are at 25°C The figures are identical for TMR 2-4810WI



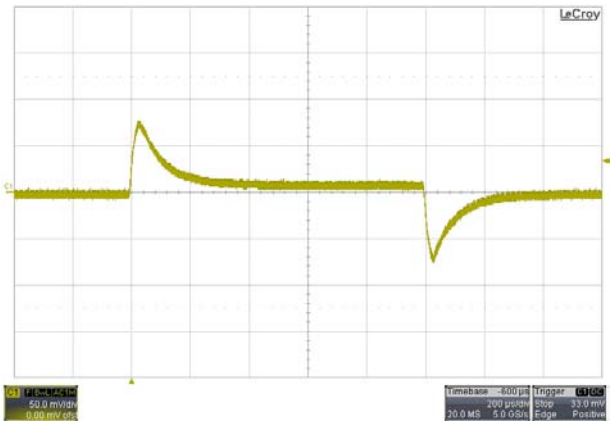
Efficiency Versus Output Current



Efficiency Versus Input Voltage. Full Load

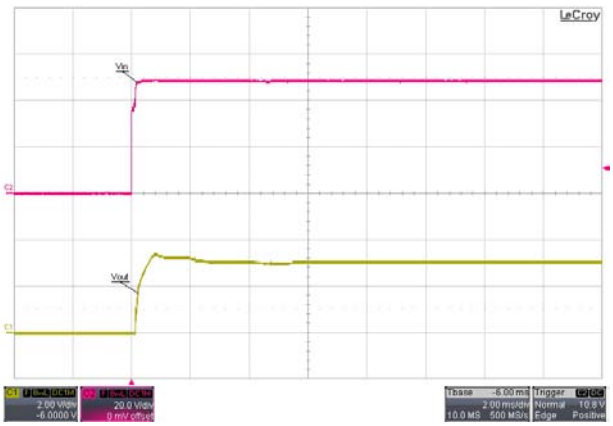


Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$

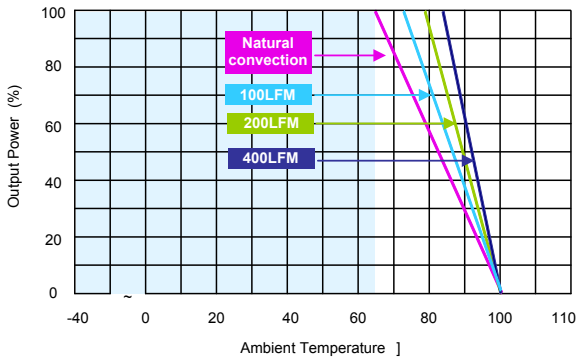
Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load



Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

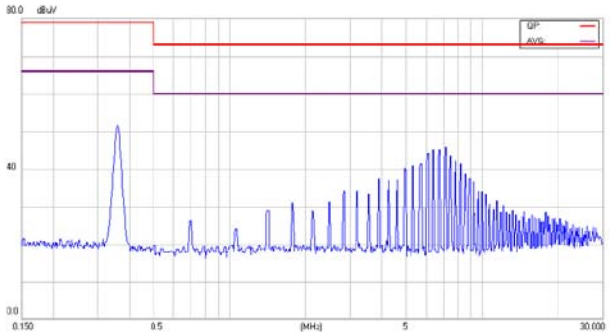
Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-4810WI (Continued)



Derating Output Current Versus Ambient Temperature and Airflow

V_{in} =$V_{in\ nom}$

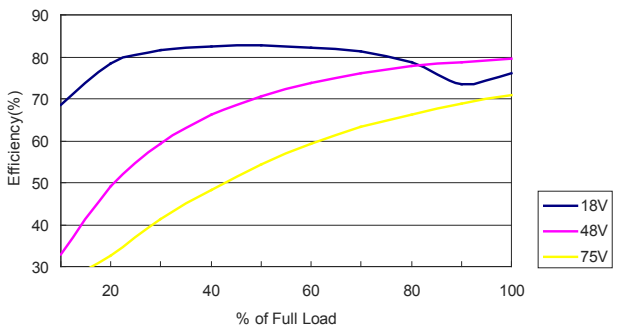


Conduction Emission of EN55022 Class A

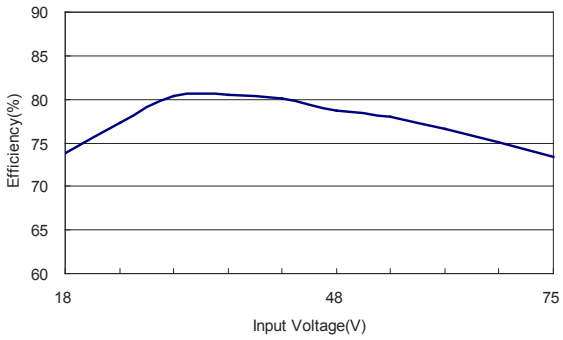
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

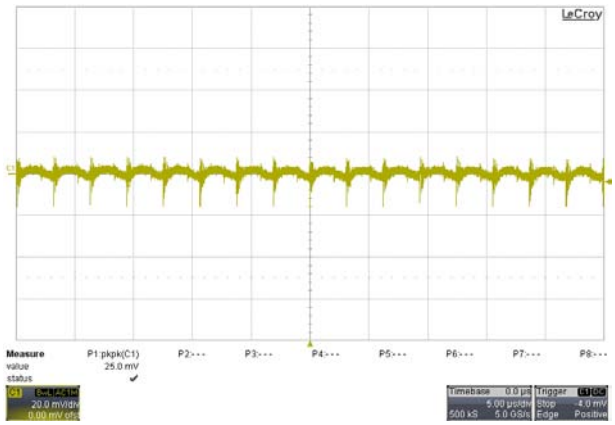
All test conditions are at 25°C The figures are identical for TMR 2-4811WI



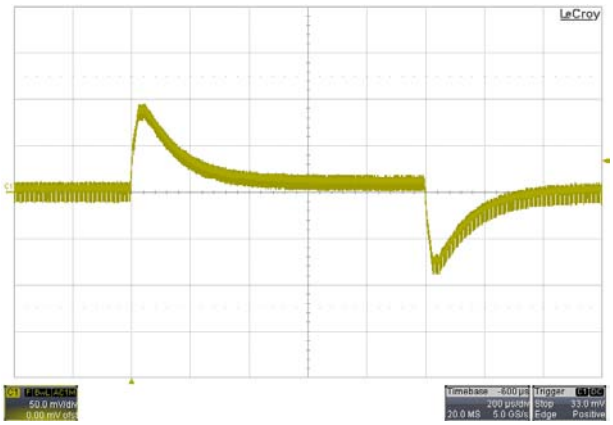
Efficiency Versus Output Current



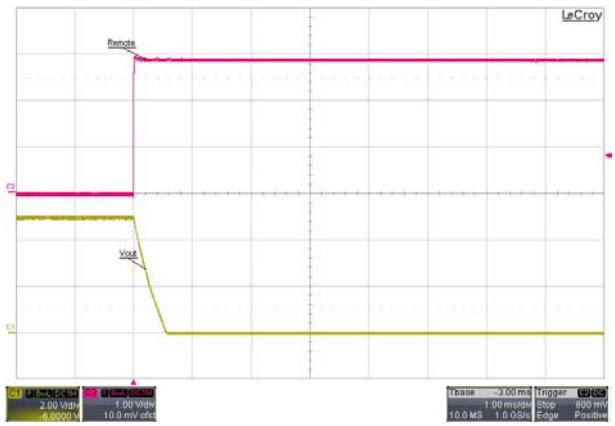
Efficiency Versus Input Voltage. Full Load



Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$

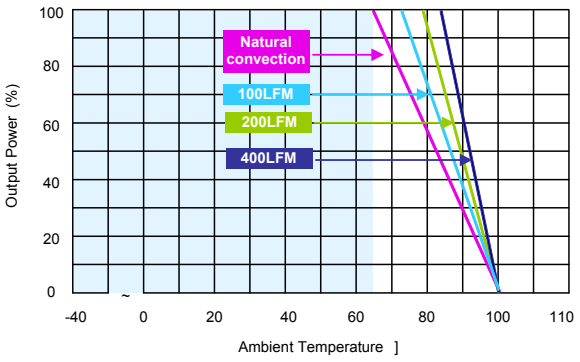


Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

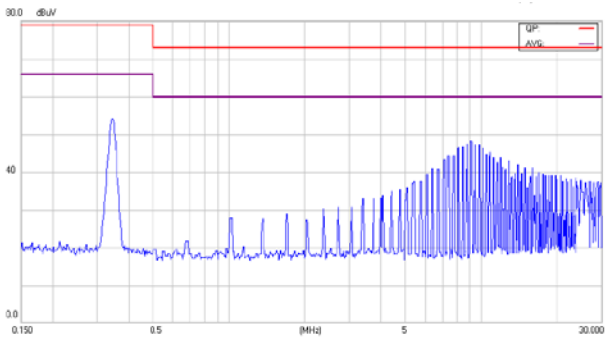
Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-4811WI (Continued)



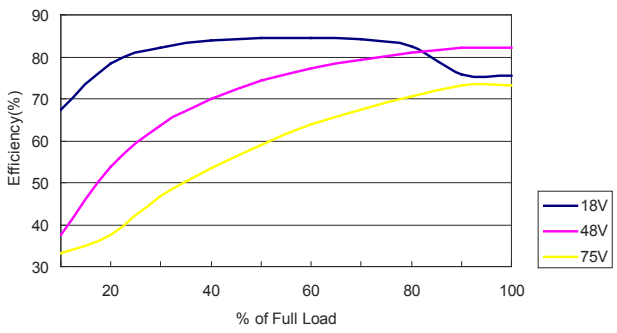
Derating Output Current Versus Ambient Temperature and Airflow
V_{in} =$V_{in\ nom}$



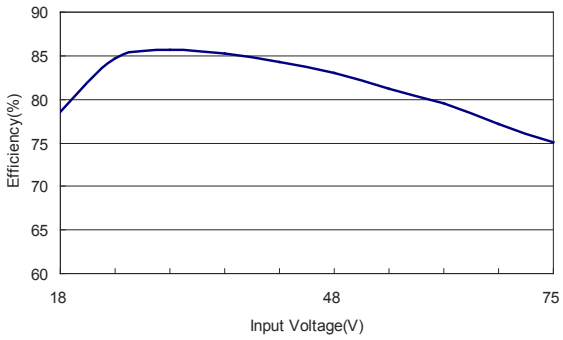
Conduction Emission of EN55022 Class A
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

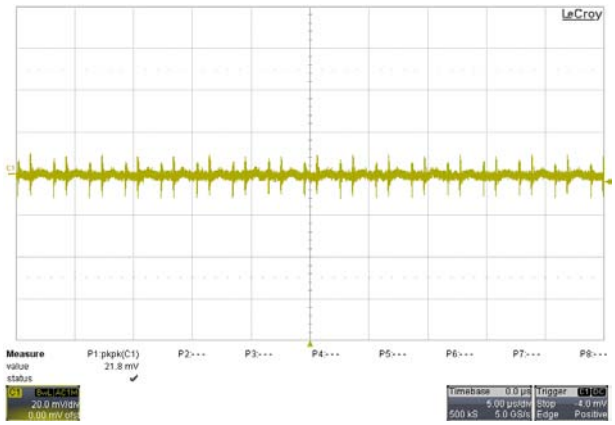
All test conditions are at 25°C The figures are identical for TMR 2-4812WI



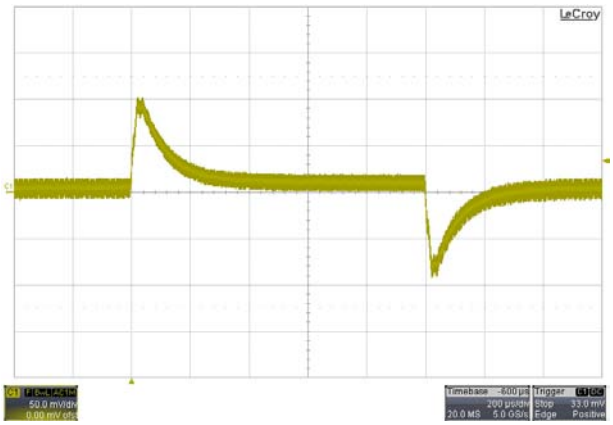
Efficiency Versus Output Current



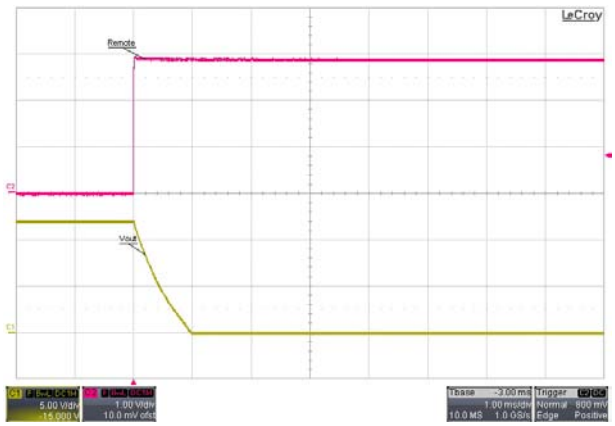
Efficiency Versus Input Voltage. Full Load



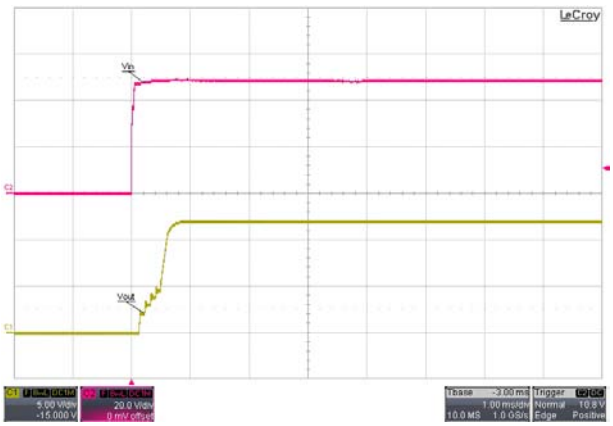
Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$



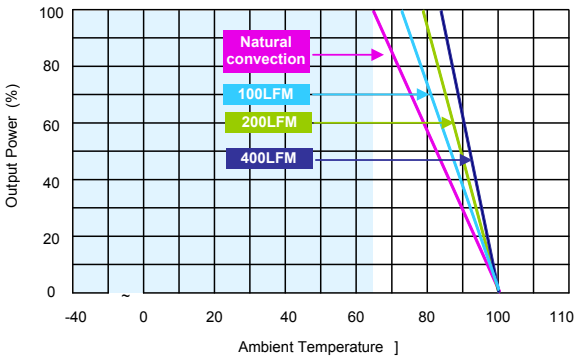
Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load



Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

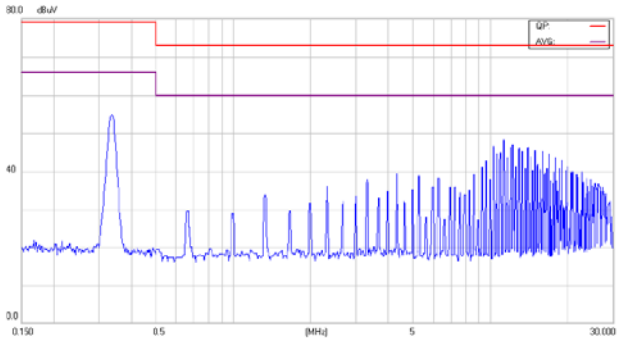
Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-4812WI (Continued)



Derating Output Current Versus Ambient Temperature and Airflow

V_{in} =$V_{in\ nom}$

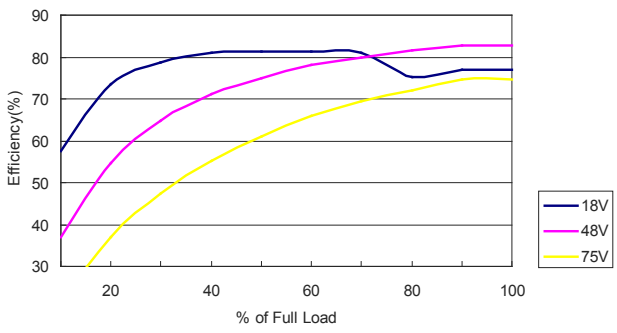


Conduction Emission of EN55022 Class A

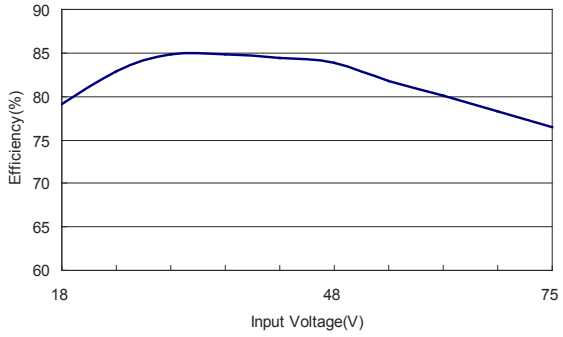
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

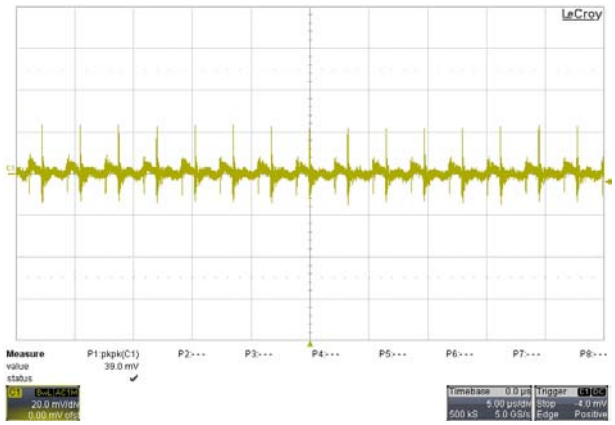
All test conditions are at 25°C The figures are identical for TMR 2-4813WI



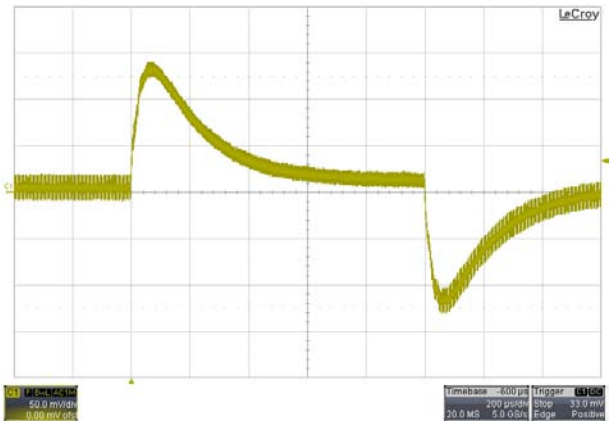
Efficiency Versus Output Current



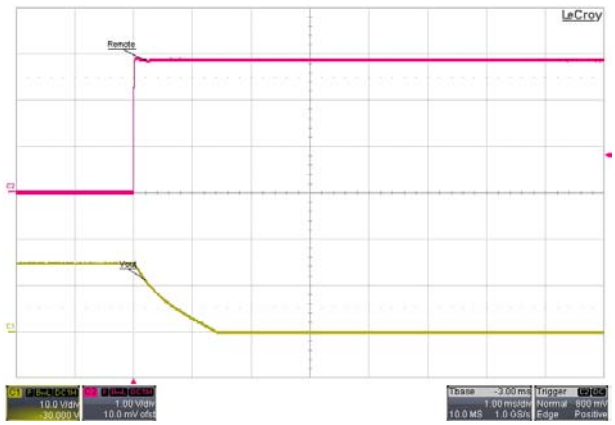
Efficiency Versus Input Voltage. Full Load



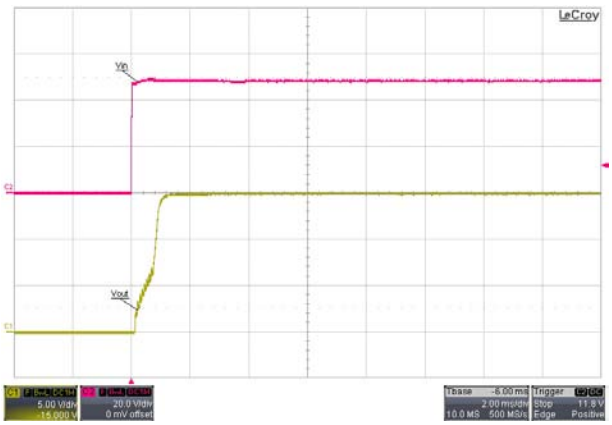
Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$



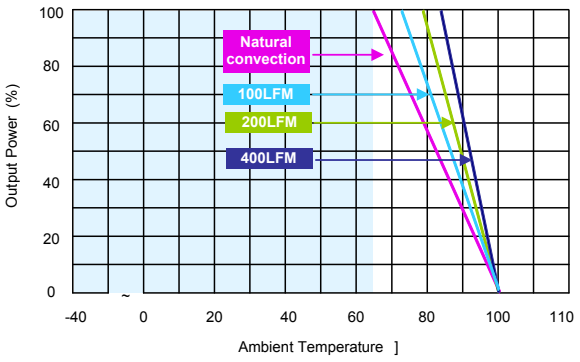
Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load



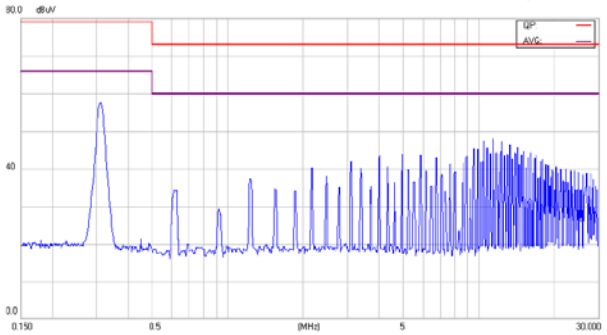
Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-4813WI (Continued)



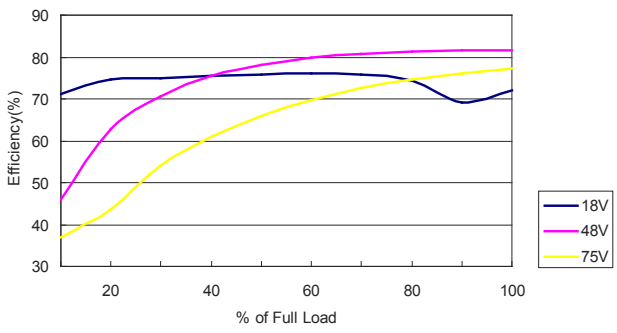
Derating Output Current Versus Ambient Temperature and Airflow
V_{in} =$V_{in\ nom}$



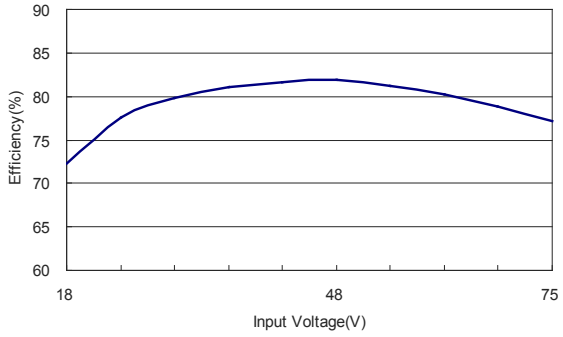
Conduction Emission of EN55022 Class A
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

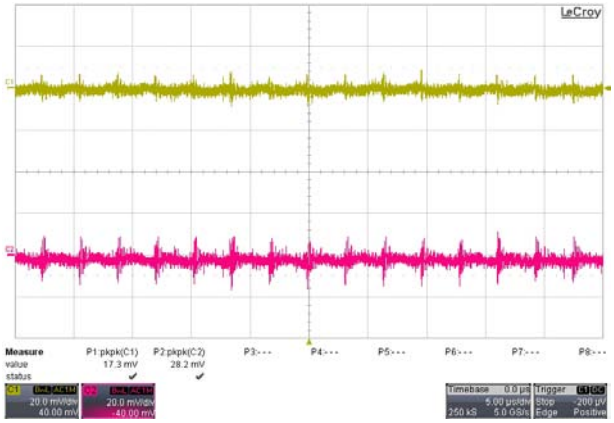
All test conditions are at 25°C The figures are identical for TMR 2-4821WI



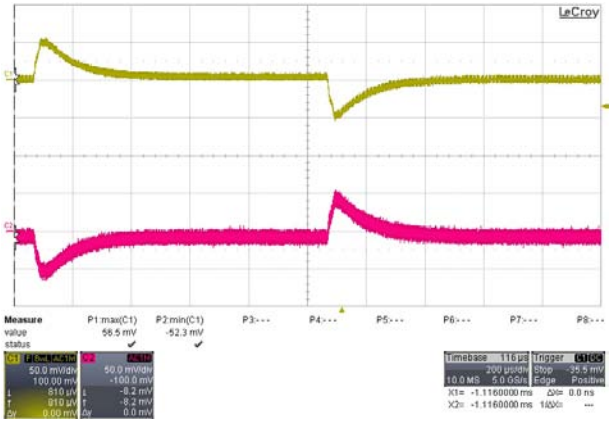
Efficiency Versus Output Current



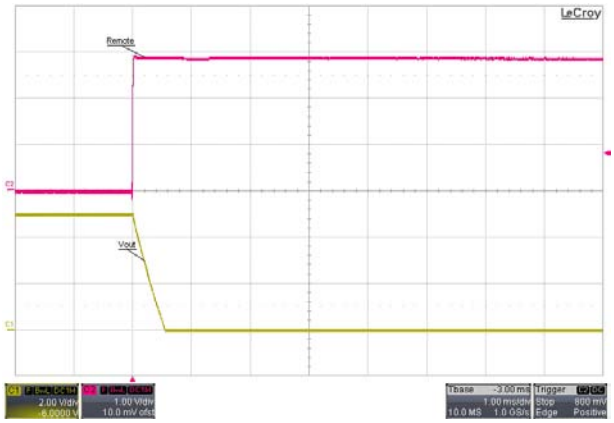
Efficiency Versus Input Voltage. Full Load



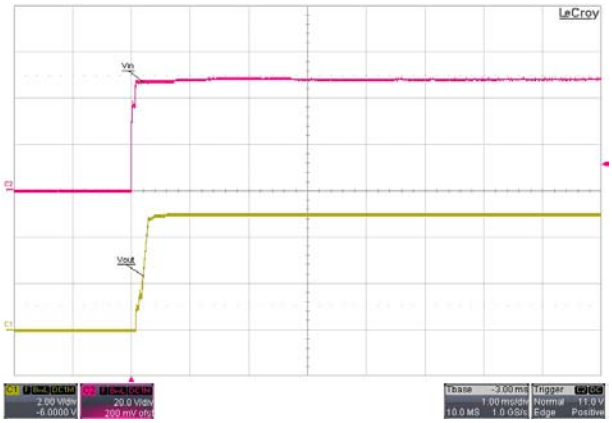
Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$



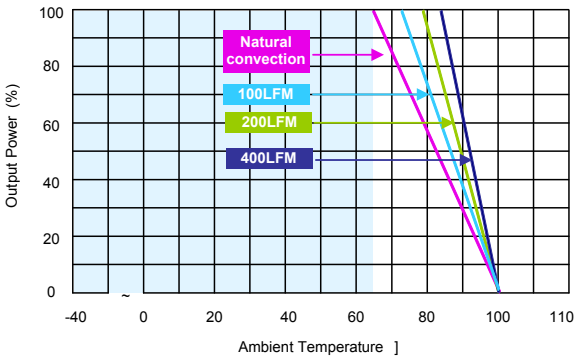
Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load



Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

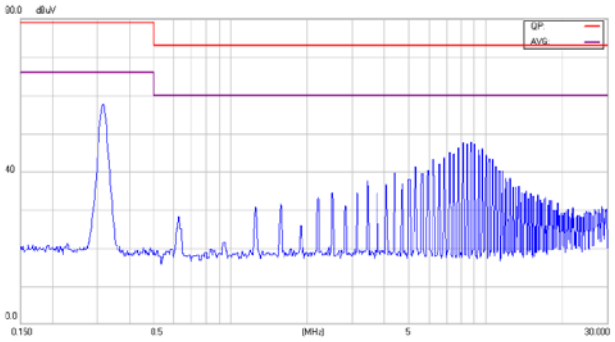
Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-4821WI (Continued)



Derating Output Current Versus Ambient Temperature and Airflow

V_{in} =$V_{in\ nom}$

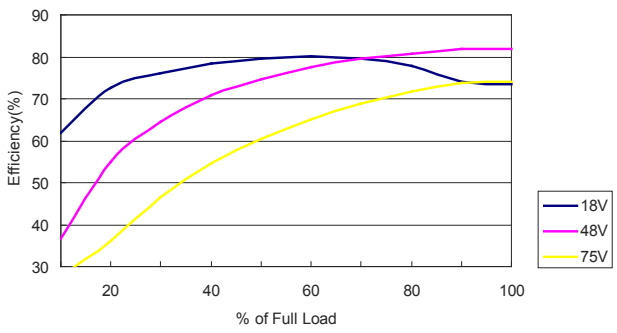


Conduction Emission of EN55022 Class A

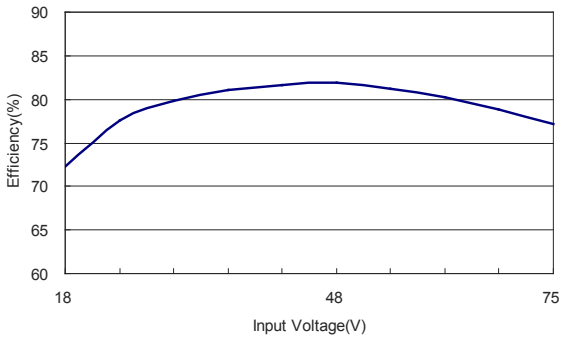
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

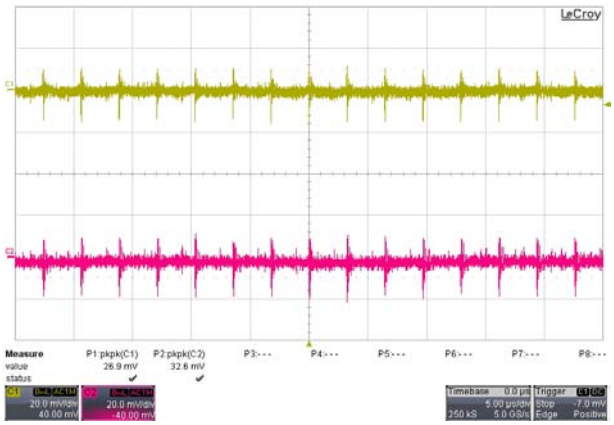
All test conditions are at 25°C The figures are identical for TMR 2-4822WI



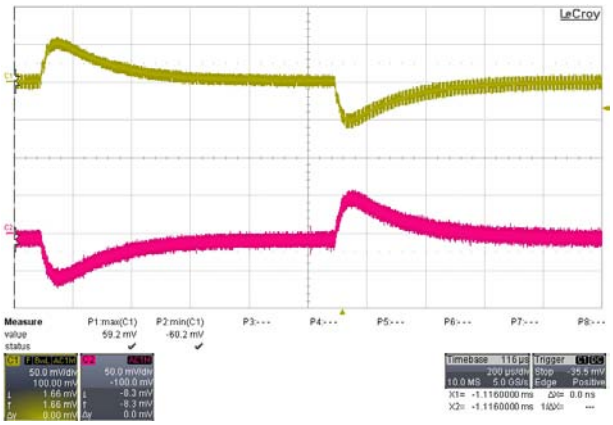
Efficiency Versus Output Current



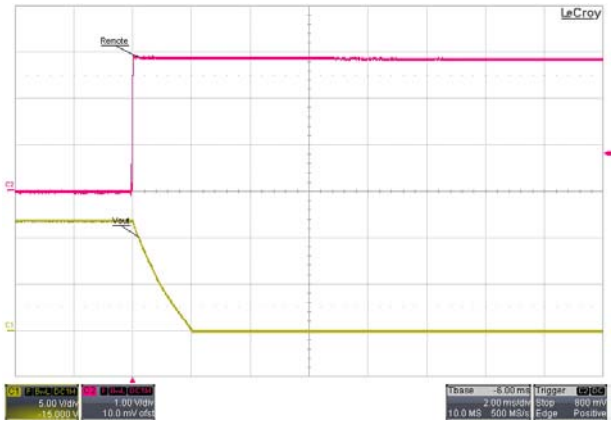
Efficiency Versus Input Voltage. Full Load



Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$

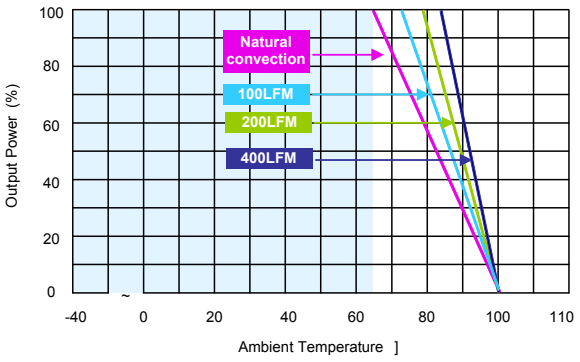


Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

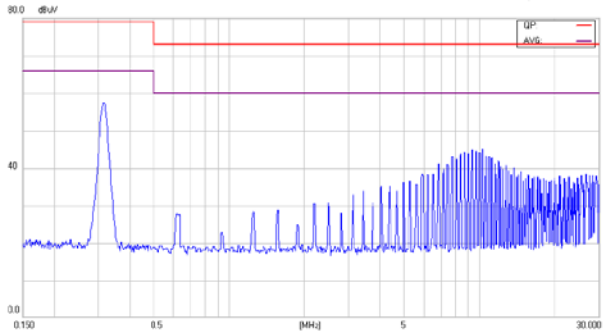
Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-4822WI (Continued)



Derating Output Current Versus Ambient Temperature and Airflow

V_{in} =$V_{in\ nom}$

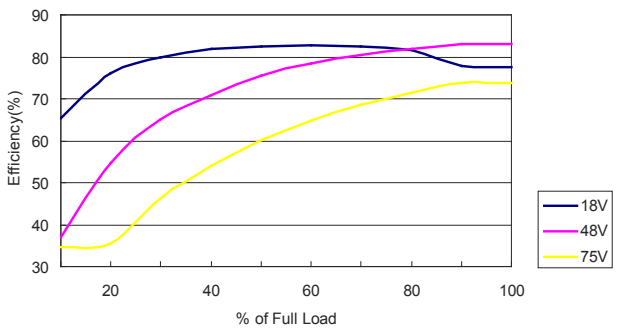


Conduction Emission of EN55022 Class A

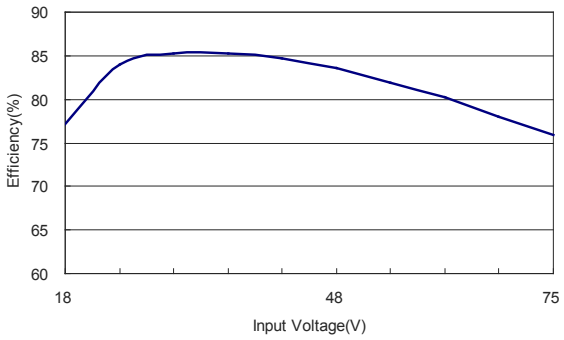
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

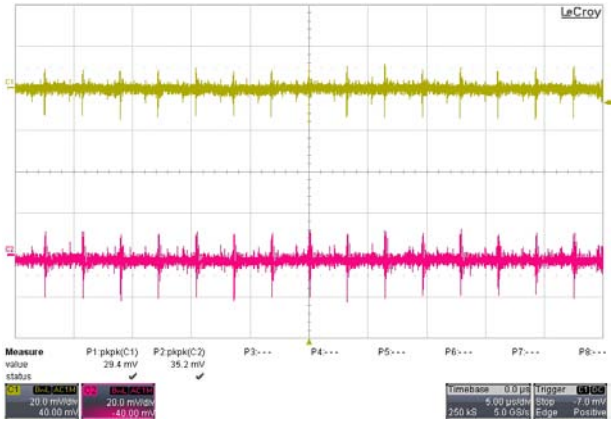
All test conditions are at 25°C The figures are identical for TMR 2-4823WI



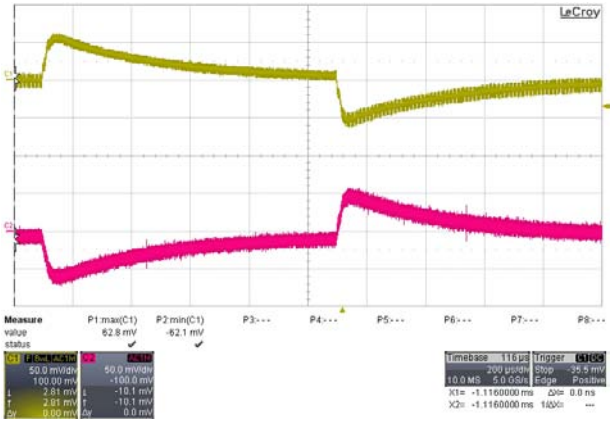
Efficiency Versus Output Current



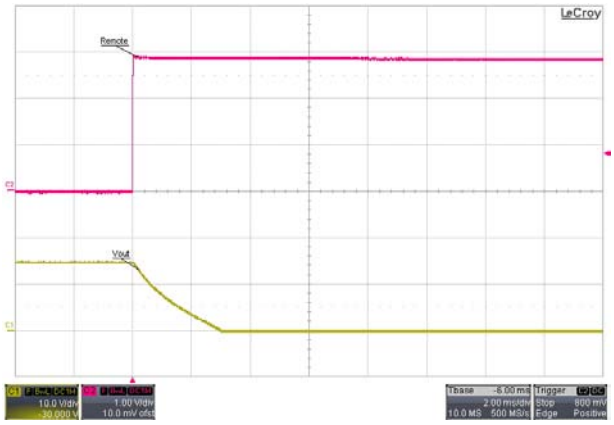
Efficiency Versus Input Voltage. Full Load



Typical Output Ripple and Noise.
V_{in} =$V_{in\ nom}$; Full Load; T_A



Transient Response to Dynamic Load Change from 100% to 75% of Full Load ; V_{in} =$V_{in\ nom}$

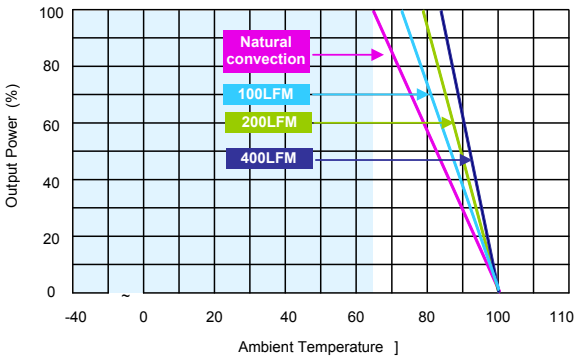


Using ON/OFF Voltage Start-Up and V_{out} Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

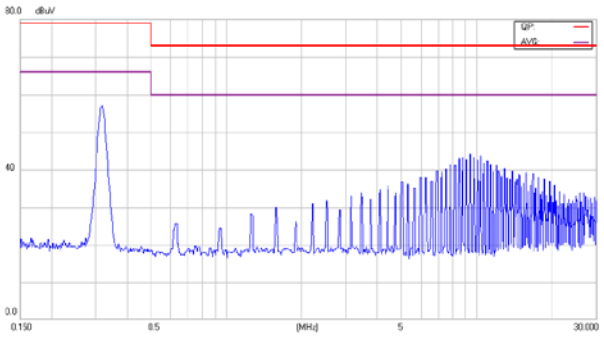
Typical Input Start-Up and Output Rise Characteristic
V_{in} =$V_{in\ nom}$; Full Load

Characteristic Curves

All test conditions are at 25°C The figures are identical for TMR 2-4823WI (Continued)



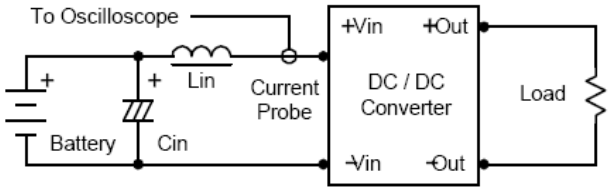
Derating Output Current Versus Ambient Temperature and Airflow
V_{in} =$V_{in\ nom}$



Conduction Emission of EN55022 Class A
V_{in} =$V_{in\ nom}$; Full Load

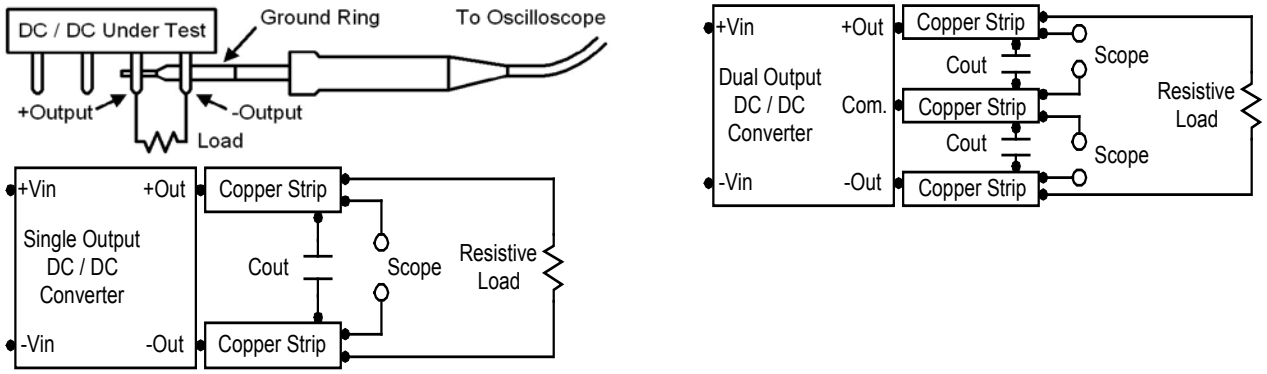
Testing Configurations

Input reflected-ripple current measurement test up



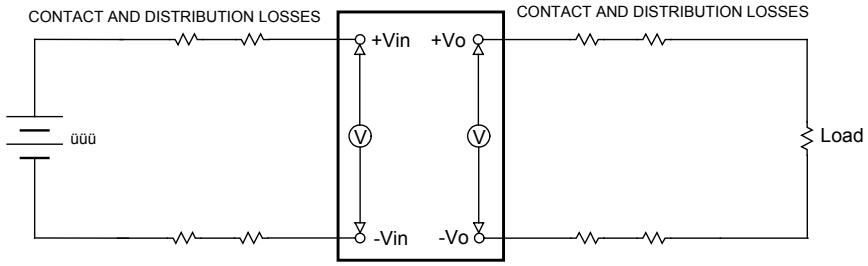
Component	Value	Reference
L	4.7µH	-----
C	220µF (ESR<1.0Ω at 100KHz)	Aluminum Electrolytic Capacitor

Peak-to-peak output ripple & noise measurement test up

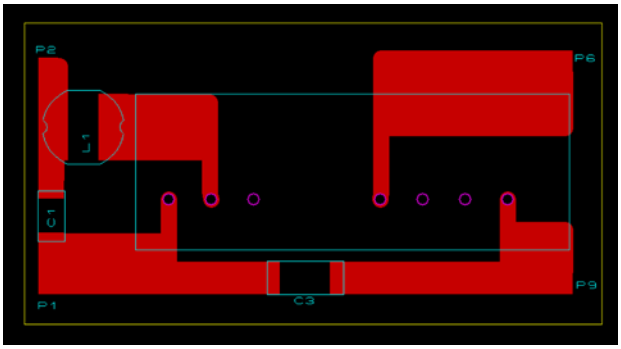


Output voltage and efficiency measurement test up

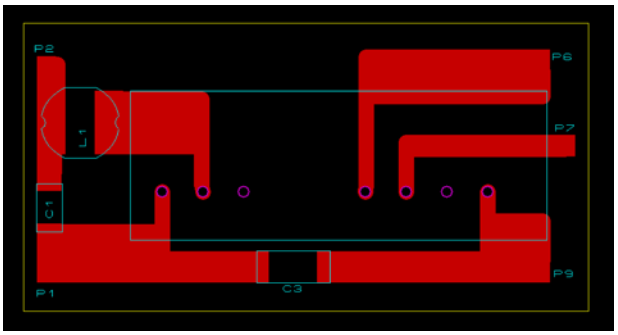
$$Efficiency = \left(\frac{V_{out} \times I_{out}}{V_{in} \times I_{in}} \right) \times 100\% = [\%]$$



EMC considerations

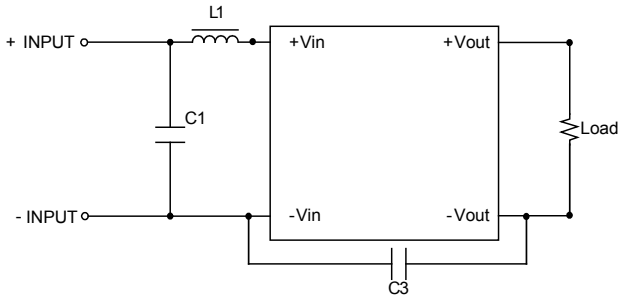


Single Output

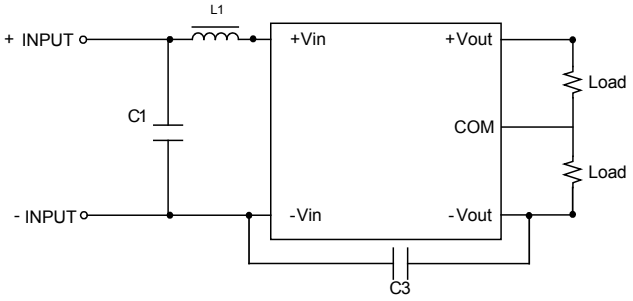


Dual Output

Recommended circuit to comply EN55022 Class A Limits



Single Output



Dual Output

Recommended PCB Layout with Input Filter

To: comply with EN55022 CLASS A following components are needed:

Model	Component	Value
TMR 2-24xxWI	C1	4.7µF/50V 1206 MLCC
	C3	220pF/2KV 1808 X7R
	L1	3.3µH SCD0403T/2.15A
TMR 2-48xxWI	C1	4.7µF/50V 1206 MLCC
	C3	220pF/2KV 1808 X7R
	L1	18µH SCD0403T/0.84A

Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module.
In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor on the input to insure startup.
By using a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100 kHz) capacitor of a 1.5µF for the 24V and 48V devices, capacitor mounted close to the power module helps ensure stability of the unit.

Output Over Current Protection

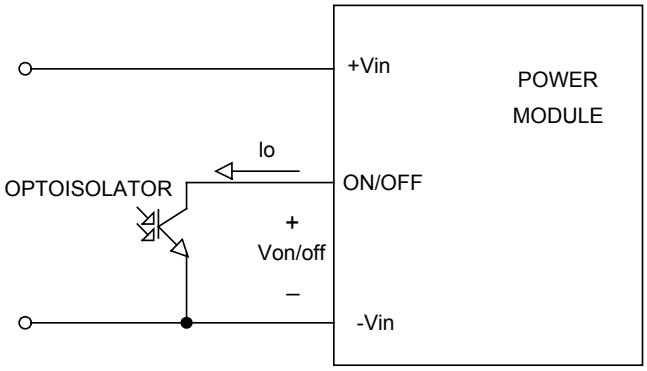
To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specified range.

Remote ON/OFF Control

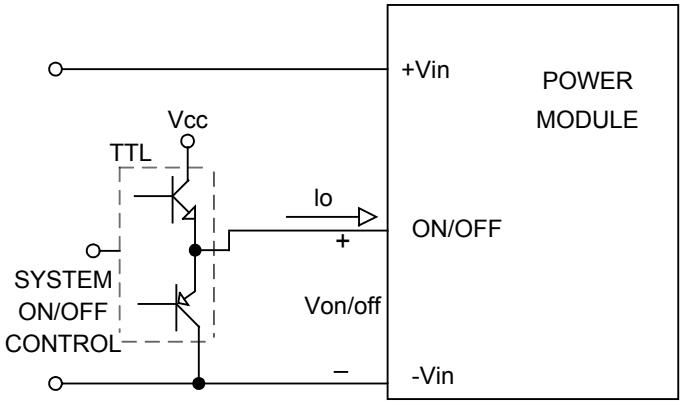
With no suffix, the positive logic remote ON/OFF control circuit is included. Turns the module ON during logic High on the ON/Off pin and turns OFF during logic Low. The ON/OFF input signal (Von/off) that referenced to GND. If not using the remote on/off feature, please open circuit between on/off pin and -Vin pin to turn the module on.

With suffix-N, the negative logic remote ON/OFF control circuit is included.
Turns the module ON during logic Low on the On/Off pin and turns OFF during logic High. The On/Off pin is an open collector/drain logic input signal (Von/off) that referenced to GND. If not using the remote on/off feature. Please short circuit between on/off pin and –Vin pin to turn the module on.

Remote ON/OFF implementation

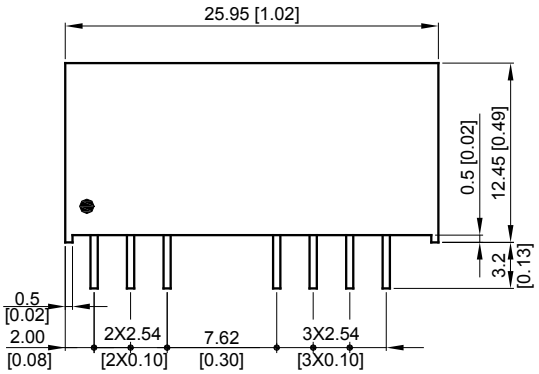


Isolated-Closure Remote ON/OFF

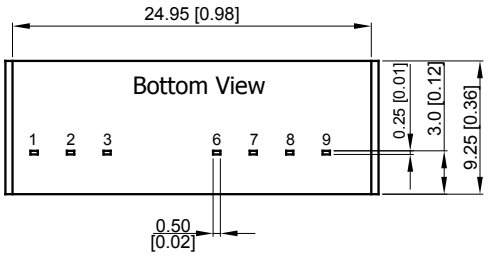


Level Control Using TTL Output

Mechanical Dimensions



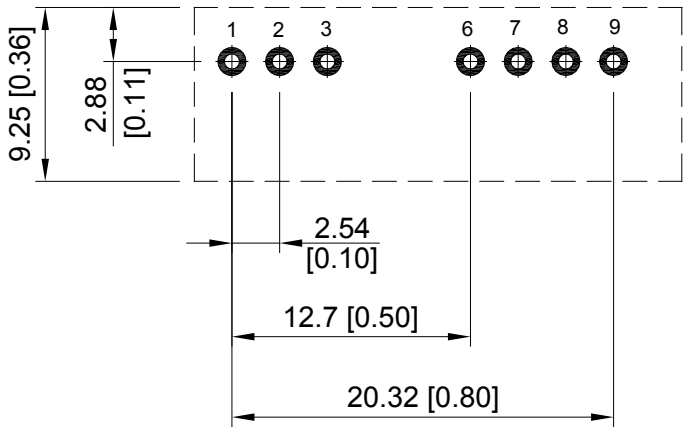
Pin Connections		
Pin	Single Output	Dual Output
1	-Vin	-Vin
2	+Vin	+Vin
3	Remote On/Off	Remote On/Off
6	+Vout	+Vout
7	NC	Common
8	NC	NC
9	-Vout	-Vout



1. All dimensions in mm (inches)
Tolerance: X.X±0.25 (X.XX±0.01")
X.XX±0.13 (X.XXX±0.005")
2.Pin pitch tolerance:±0.25 (±0.01")
3.Pin dimension tolerance:±0.1 (±0.004")

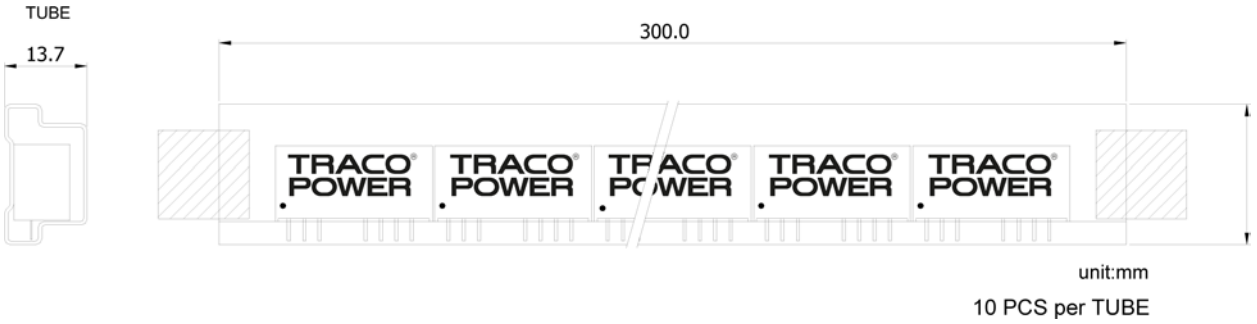
Recommended Pad Layout for Single & Dual Output Converter

TOP VIEW



1.All dimensions in mm (Inches)
Tolerance: x.x±0.5mm (x.xx ±0.02")
x.xx±0.25mm (x.xxx ±0.01")
2. Pin pitch tolerance: ±0.25mm (±0.01")
3. Pin dimension tolerance: ±0.1mm (±0.004")

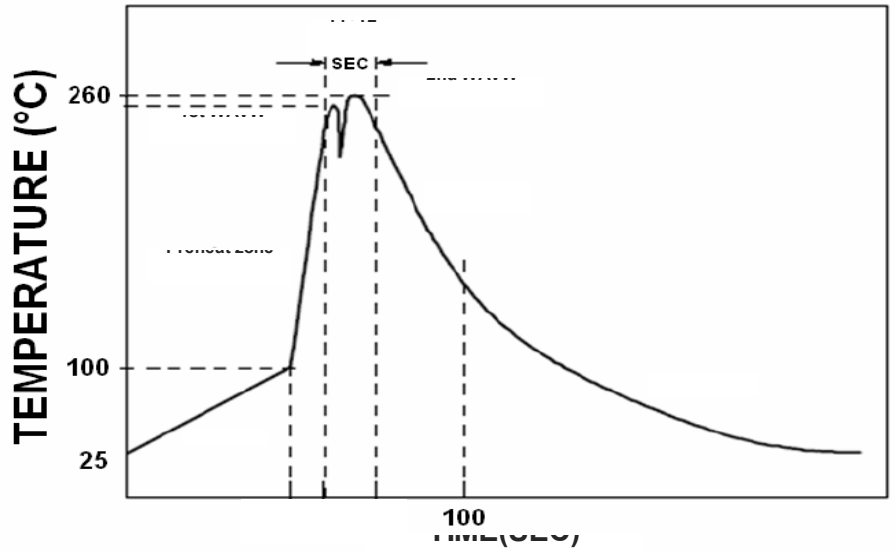
Packaging Information



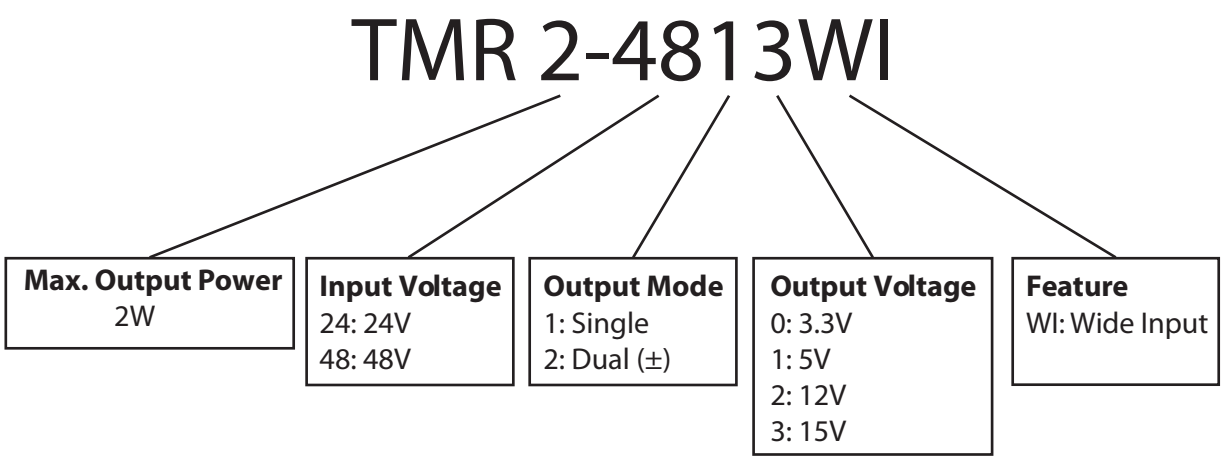
10 PCS per TUBE

Soldering and Reflow Considerations

Lead free wave solder profile for TMR 2WI Series



Part Number Structure



Model Number	Input Range (VDC)	Output Voltage (VDC)	Max. Output Current (mA)	Input Current at Full Load[1] (mA)	Efficiency[2] (%)
TMR 2-2410WI	9-36	3.3	500	97	71
TMR 2-2411WI	9-36	5	400	110	76
TMR 2-2412WI	9-36	12	167	106	79
TMR 2-2413WI	9-36	15	134	105	80
TMR 2-2421WI	9-36	±5	±200	114	73
TMR 2-2422WI	9-36	±12	±83	108	77
TMR 2-2423WI	9-36	±15	±67	106	79
TMR 2-4810WI	18-75	3.3	500	49	70
TMR 2-4811WI	18-75	5	400	58	72
TMR 2-4812WI	18-75	12	167	54	78
TMR 2-4813WI	18-75	15	134	54	78
TMR 2-4821WI	18-75	±5	±200	60	70
TMR 2-4822WI	18-75	±12	±83	55	76
TMR 2-4823WI	18-75	±15	±67	55	76

Note 1. Maximum value at nominal input voltage and full load of standard type.

Note 2. Typical value at nominal input voltage and full load.

Safety and Installation Instruction

Fusing Consideration

Caution: This power module is not internally fused. An input line fuse must always be used.
This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture. To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse. The safety agencies require a normal-blow fuse in 24Vin, 48Vin with maximum rating of 350mA, 135mA. Based on the information provided in this data sheet on Inrush energy and maximum dc input current; the same type of fuse with lower rating can be used. Refer to the fuse manufacturer's data for further information.

MTBF and Reliability

The MTBF of TMR 2WI series of DC/DC converters has been calculated using MIL-HDBK 217F NOTICE2, Operating Temperature 25°C, Ground Benign.

Model	MTBF	Unit
TMR 2-2410WI	1,310,960	Hours
TMR 2-2411WI	1,380,643	Hours
TMR 2-2412WI	1,417,434	Hours
TMR 2-2413WI	1,414,627	Hours
TMR 2-2421WI	1,280,574	Hours
TMR 2-2422WI	1,353,913	Hours
TMR 2-2423WI	1,338,867	Hours
TMR 2-4810WI	1,344,086	Hours
TMR 2-4811WI	1,341,922	Hours
TMR 2-4812WI	1,372,307	Hours
TMR 2-4813WI	1,374,193	Hours
TMR 2-4821WI	1,292,658	Hours
TMR 2-4822WI	1,282,545	Hours
TMR 2-4823WI	1,296,176	Hours

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