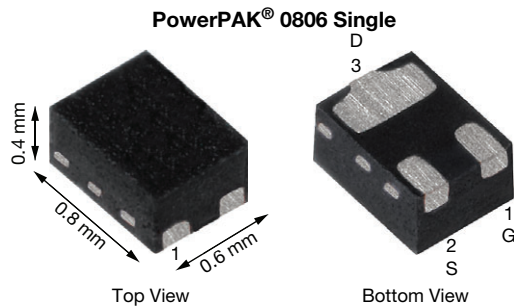


N-Channel 30 V (D-S) MOSFET



FEATURES

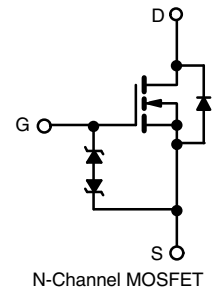
- TrenchFET® power MOSFET
- Ultra small 0.8 mm x 0.6 mm outline
- Ultra thin 0.4 mm max. height
- Typical ESD protection 1000 V (HBM)
- 100 % R_g tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Load switch
- High speed switching
- DC/DC converters
- Battery-operated and mobile devices



PRODUCT SUMMARY	
V _{DS} (V)	30
R _{DS(on)} max. (Ω) at V _{GS} = 4.5 V	1.46
R _{DS(on)} max. (Ω) at V _{GS} = 2.5 V	1.66
R _{DS(on)} max. (Ω) at V _{GS} = 1.8 V	1.85
Q _g typ. (nC)	0.4
I _D (A)	0.5 ^{a, f}
Configuration	Single

Marking code: J

ORDERING INFORMATION	
Package	PowerPAK 0806
Lead (Pb)-free and halogen-free	SiUD406ED-T1-GE3

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V _{DS}	30	V
Gate-source voltage		V _{GS}	± 8	
Continuous drain current /T _J = 150 °C)	T _A = 25 °C	I _D	0.5 ^{a, f}	A
	T _A = 70 °C		0.5 ^a	
	T _A = 25 °C		0.37 ^b	
	T _A = 70 °C		0.29 ^b	
Pulsed drain current (t = 100 μs)		I _{DM}	0.8	
Continuous source-drain diode current	T _A = 25 °C	I _S	0.5 ^{a, f}	
	T _A = 25 °C		0.31 ^b	
Maximum power dissipation	T _A = 25 °C	P _D	1.25 ^a	W
	T _A = 70 °C		0.8 ^a	
	T _A = 25 °C		0.37 ^b	
	T _A = 70 °C		0.24 ^b	
Operating junction and storage temperature range		T _J , T _{stg}	-55 to +150	°C
Soldering recommendations (peak temperature) ^c			260	

THERMAL RESISTANCE RATINGS					
PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^{a, d}	t ≤ 5 s	R _{thJA}	80	100	°C/W
Maximum junction-to-ambient ^{b, e}	t ≤ 5 s	R _{thJA}	265	335	

Notes

- Surface mounted on 1" x 1" FR4 board with full copper, t = 5 s
- Surface mounted on 1" x 1" FR4 board with minimum copper, t = 5 s
- Refer to IPC / JEDEC® (J-STD-020), no manual or hand soldering
- Maximum under steady state conditions is 135 °C/W
- Maximum under steady state conditions is 400 °C/W
- Package limited



SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	30	-	-	V
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$	-	28	-	mV/ $^\circ\text{C}$
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$		-	-1.5	-	
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	0.4	-	1.1	V
Gate-source leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 4.5\text{ V}$	-	-	± 0.5	μA
		$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 8\text{ V}$	-	-	10	
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	1	
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^\circ\text{C}$	-	-	10	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}$, $V_{GS} = 4.5\text{ V}$	0.5	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}$, $I_D = 0.2\text{ A}$	-	1.17	1.46	Ω
		$V_{GS} = 2.5\text{ V}$, $I_D = 0.1\text{ A}$	-	1.24	1.66	
		$V_{GS} = 1.8\text{ V}$, $I_D = 0.1\text{ A}$	-	1.37	1.85	
Forward transconductance ^a	g_{fs}	$V_{DS} = 5\text{ V}$, $I_D = 0.4\text{ A}$	-	1.2	-	S
Dynamic ^b						
Input capacitance	C_{iss}	$V_{DS} = 15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	-	17	-	μF
Output capacitance	C_{oss}		-	5	-	
Reverse transfer capacitance	C_{rss}		-	2.5	-	
Total gate charge	Q_g	$V_{DS} = 15\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 0.2\text{ A}$	-	0.4	0.6	nC
Gate-source charge	Q_{gs}	$V_{DS} = 15\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 0.2\text{ A}$	-	0.04	-	
Gate-drain charge	Q_{gd}		-	0.1	-	
Gate resistance	R_g	$f = 1\text{ MHz}$	3	15	30	Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15\text{ V}$, $R_L = 75\text{ }\Omega$, $I_D \cong 0.2\text{ A}$, $V_{GEN} = 4.5\text{ V}$, $R_g = 1\text{ }\Omega$	-	5	10	ns
Rise time	t_r		-	5	10	
Turn-off delay time	$t_{d(off)}$		-	20	40	
Fall time	t_f		-	5	10	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15\text{ V}$, $R_L = 75\text{ }\Omega$, $I_D \cong 0.2\text{ A}$, $V_{GEN} = 8\text{ V}$, $R_g = 1\text{ }\Omega$	-	5	10	
Rise time	t_r		-	5	10	
Turn-off delay time	$t_{d(off)}$		-	7	15	
Fall time	t_f		-	5	10	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	$T_A = 25\text{ }^\circ\text{C}$	-	-	0.5 ^c	A
Pulse diode forward current	I_{SM}		-	-	0.8	
Body diode voltage	V_{SD}	$I_S = 0.2\text{ A}$, $V_{GS} = 0\text{ V}$	-	0.88	1.2	V
Body diode reverse recovery time	t_{rr}	$I_F = 0.2\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^\circ\text{C}$	-	10	20	ns
Body diode reverse recovery charge	Q_{rr}		-	3	6	nC
Reverse recovery fall time	t_a		-	5	-	ns
Reverse recovery rise time	t_b		-	5	-	

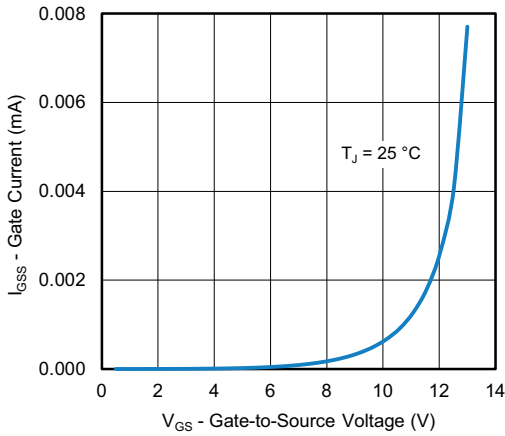
Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
b. Guaranteed by design, not subject to production testing
c. Surface mounted on 1" x 1" FR4 board with full copper, $t = 5\text{ s}$

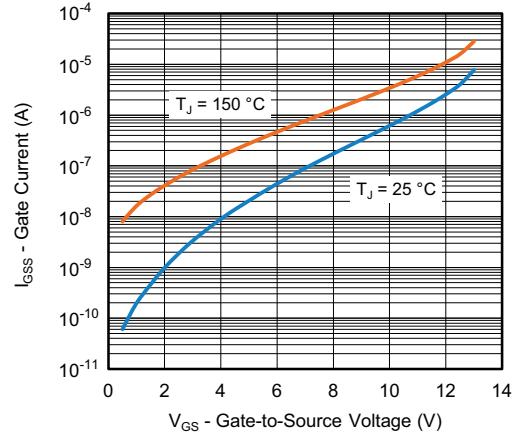
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum ratings conditions for extended periods may affect device reliability.



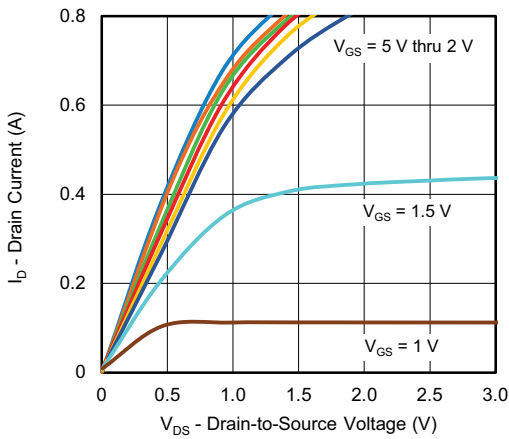
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



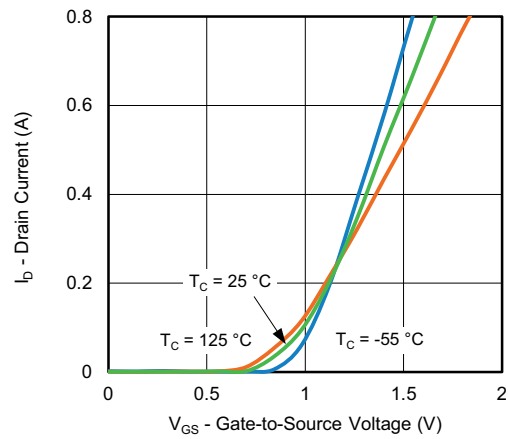
Gate-Current vs. Gate-Source Voltage



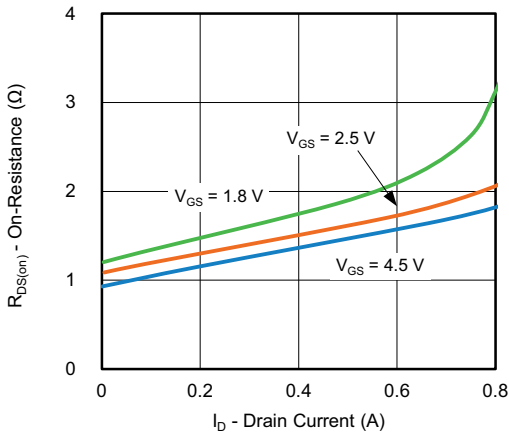
Gate-Current vs. Gate-Source Voltage



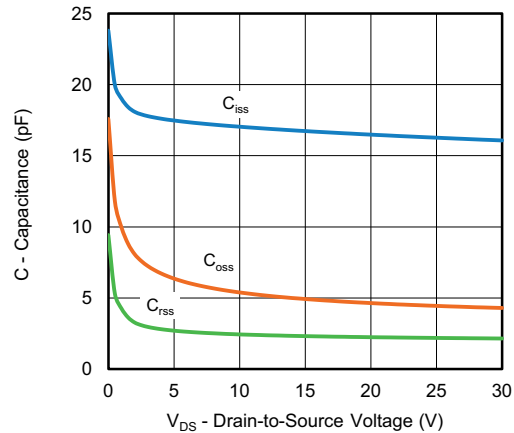
Output Characteristics



Transfer Characteristics



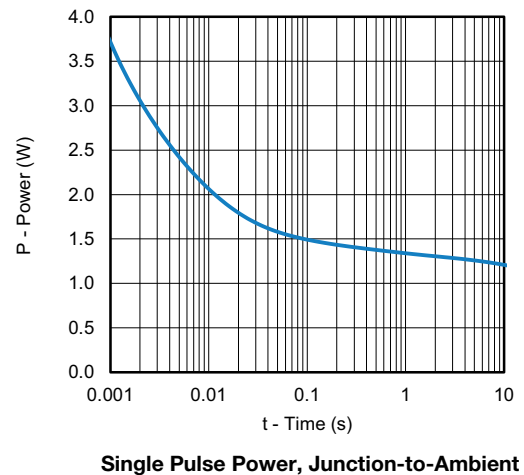
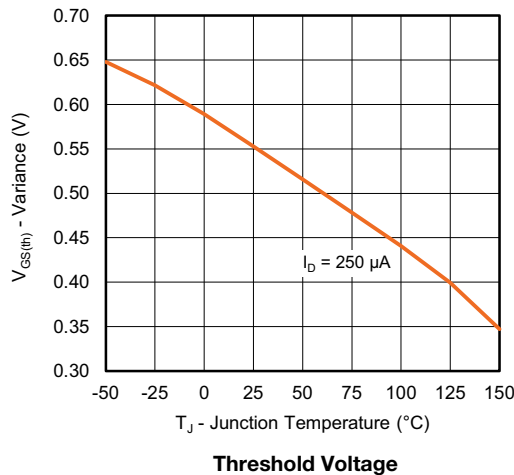
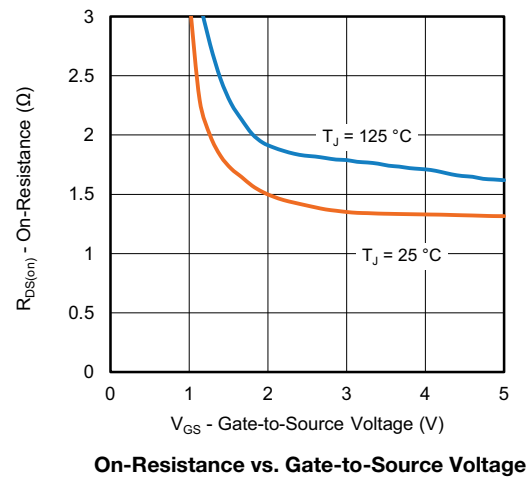
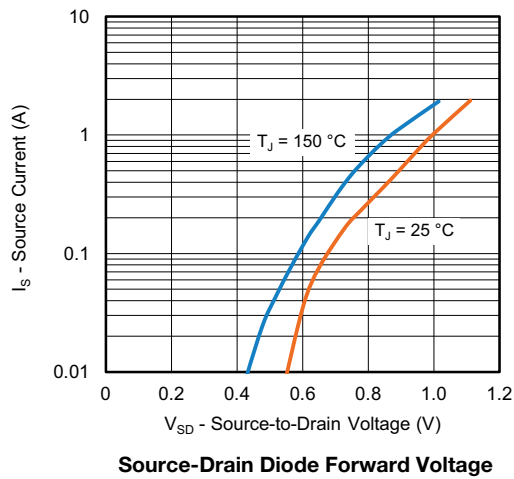
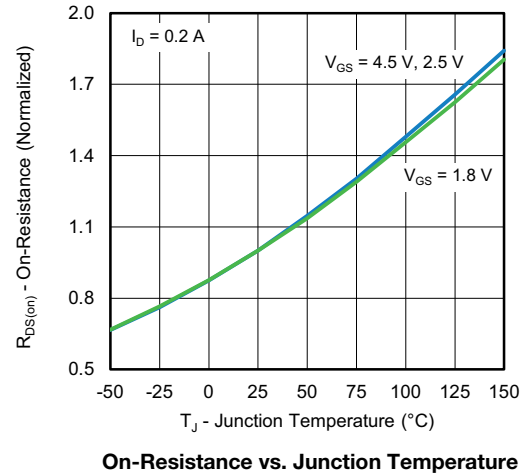
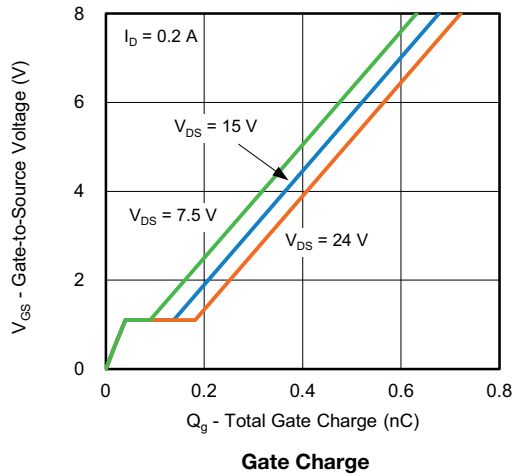
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

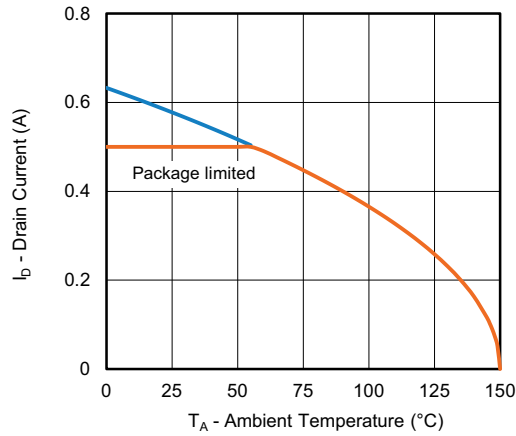


TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

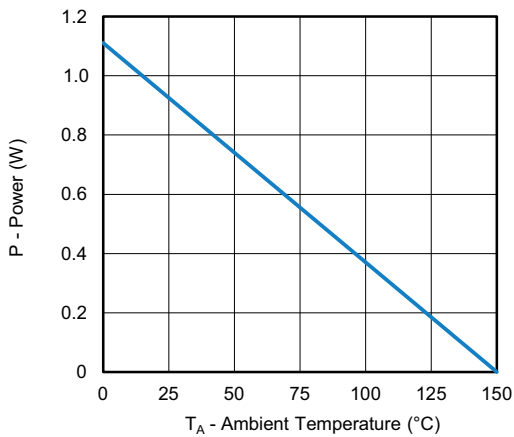




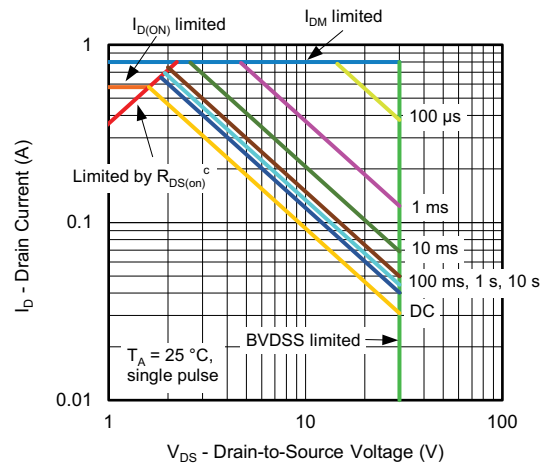
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating ^{a, b}



Power Derating, Junction-to-Ambient ^a



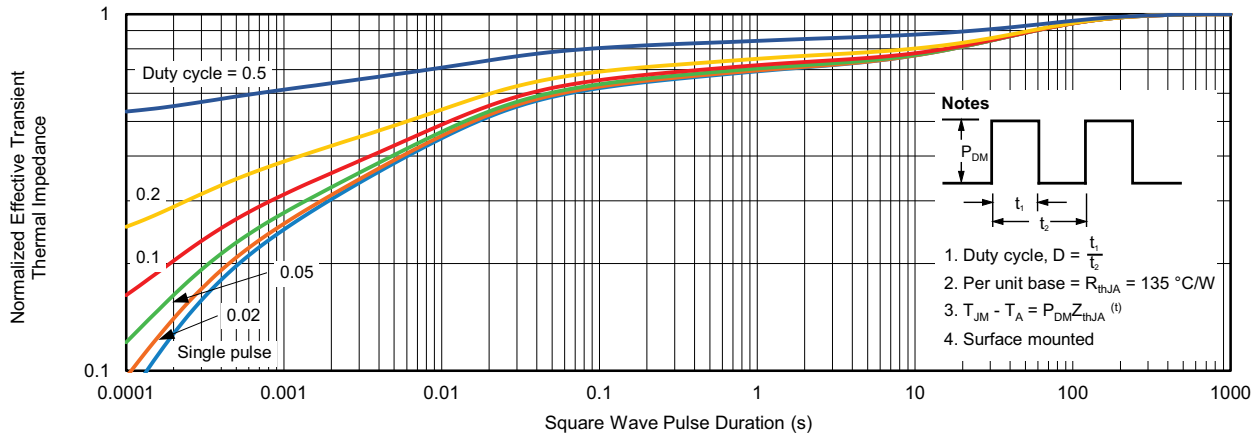
Safe Operating Area, Junction-to-Ambient

Notes

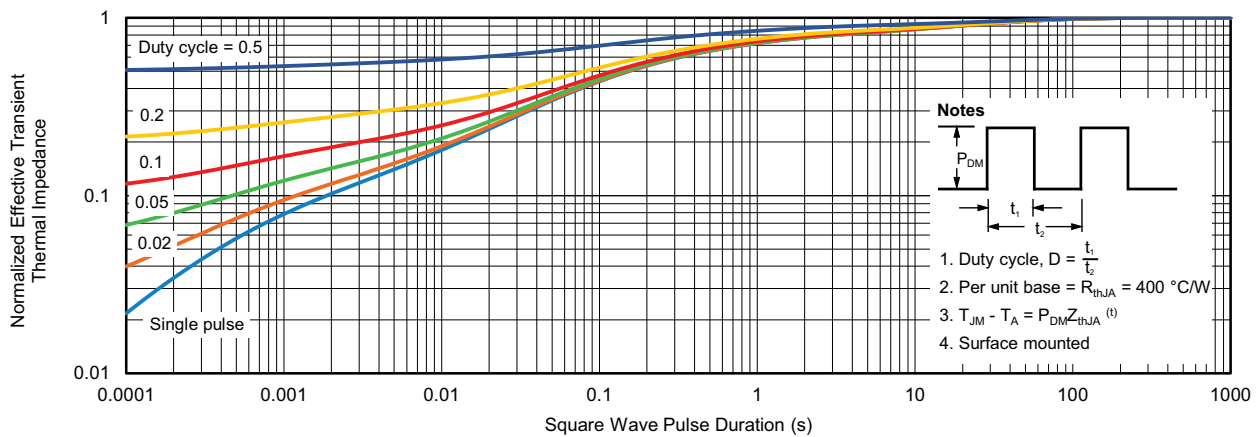
- a. When mounted on 1" x 1" FR4 with full copper
- b. The power dissipation P_D is based on $T_J \text{ max.} = 150\text{ °C}$, using junction-to-ambient thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit
- c. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



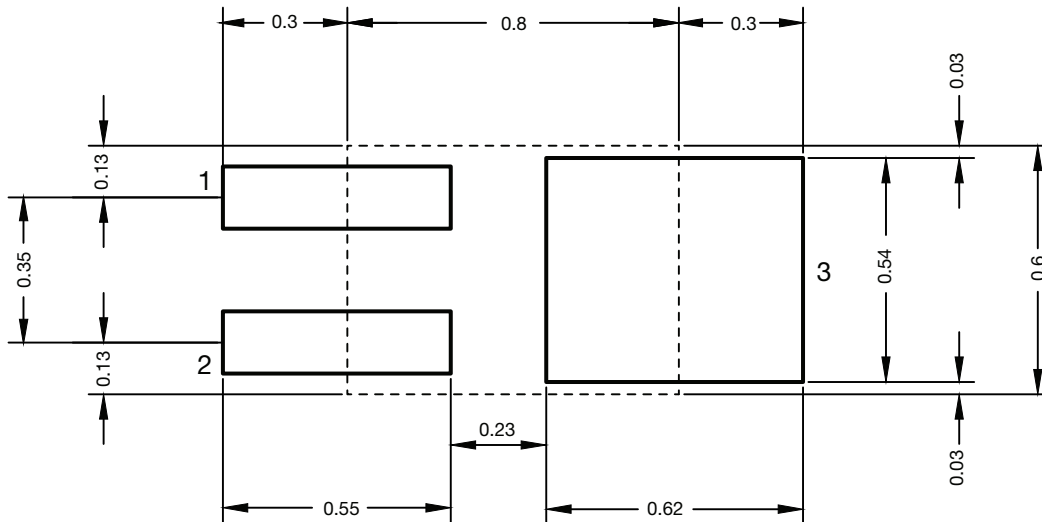
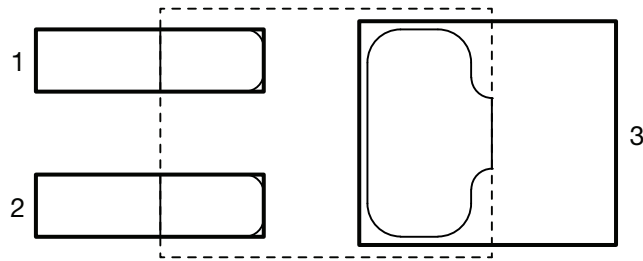
Normalized Thermal Transient Impedance, Junction-to-Ambient (on 1" x 1" FR4 board with maximum copper)



Normalized Thermal Transient Impedance, Junction-to-Ambient (on 1" x 1" FR4 board with minimum copper)

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Recommended Land Pattern PowerPAK® 0806





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