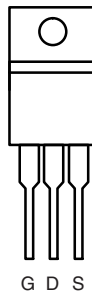


N-Channel 75 V (D-S) MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
75	0.0082 at $V_{GS} = 10$ V	90 ^d	58

TO-220AB



Top View

Ordering Information: SUP90N08-8m2P-E3 (Lead (Pb)-free)

FEATURES

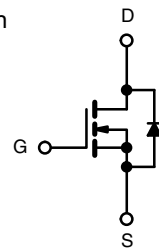
- TrenchFET® Power MOSFET
- 175 °C Junction Temperature
- 100 % R_g and UIS Tested
- Material categorization:
For definitions of compliance please see
www.vishay.com/doc?99912



RoHS
COMPLIANT

APPLICATIONS

- Power Supply
- Secondary Synchronous Rectification
- Industrial



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	75	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	$T_C = 25$ °C	A
		$T_C = 70$ °C	
Pulsed Drain Current	I_{DM}	200	
Avalanche Current	I_{AS}	50	
Single Avalanche Energy ^a	E_{AS}	125	mJ
Maximum Power Dissipation ^a	P_D	$T_C = 25$ °C	W
		$T_A = 25$ °C ^c	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient (PCB Mount) ^c	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	1	

Notes:

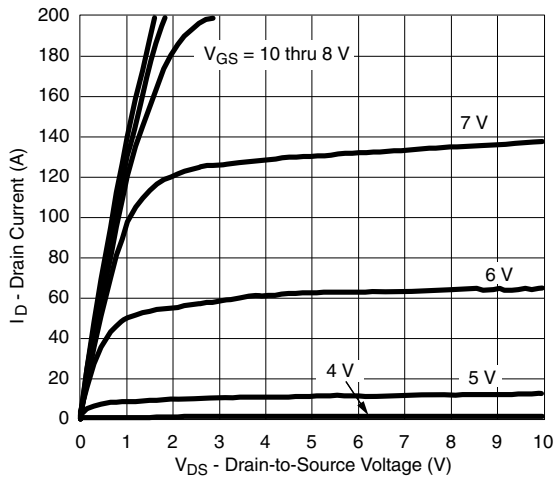
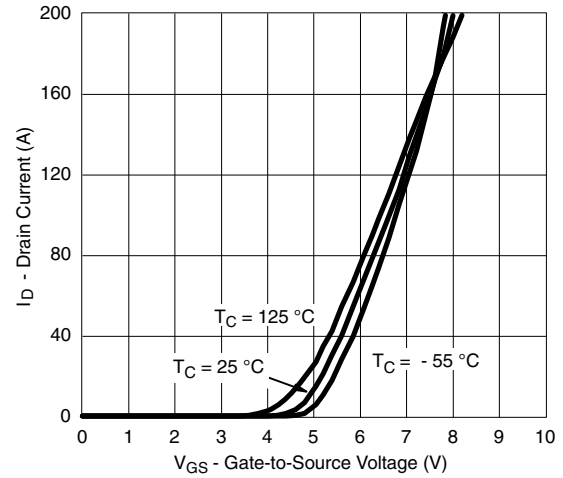
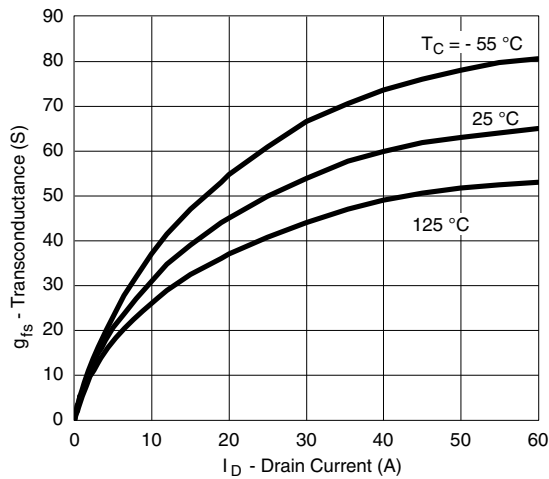
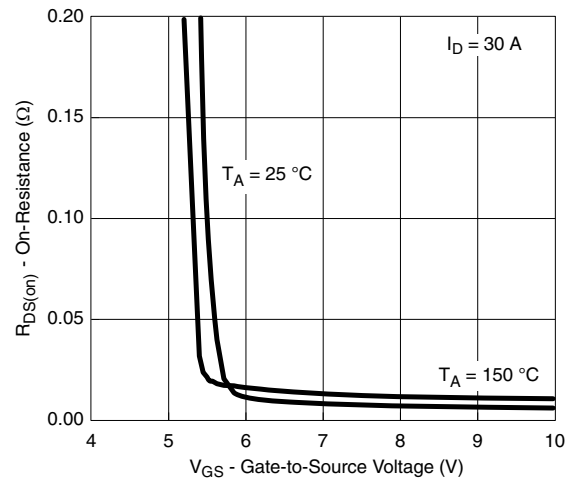
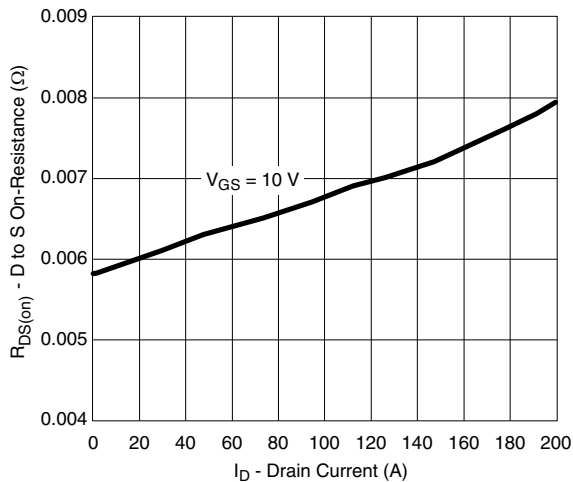
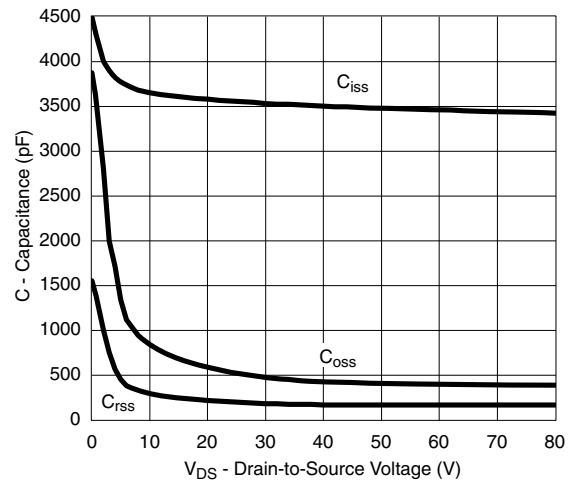
- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When Mounted on 1" square PCB (FR-4 material).
- Package limited.

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 250 μA	75			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.8		4.8	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 250	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V			1	μA
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 150 °C			250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	70			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0069	0.0082	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.0116	0.014	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A		55		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 30 V, f = 1 MHz		3528		pF
Output Capacitance	C _{oss}			470		
Reverse Transfer Capacitance	C _{rss}			178		
Total Gate Charge ^c	Q _g	V _{DS} = 38 V, V _{GS} = 10 V, I _D = 15 A		58	90	nC
Gate-Source Charge ^c	Q _{gs}			21		
Gate-Drain Charge ^c	Q _{gd}			16		
Gate Resistance	R _g	f = 1 MHz		1.8	3.5	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 38 V, R _L = 3.1 Ω I _D ≅ 12.5 A, V _{GEN} = 10 V, R _g = 1 Ω		21	35	ns
Rise Time ^c	t _r			15	25	
Turn-Off Delay Time ^c	t _{d(off)}			32	55	
Fall Time ^c	t _f			10	20	
Source-Drain Diode Ratings and Characteristics T _C = 25 °C ^b						
Continuous Current	I _S				83	A
Pulsed Current	I _{SM}				200	
Forward Voltage ^a	V _{SD}	I _F = 30 A, V _{GS} = 0 V		0.85	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 75 A, di/dt = 100 A/μs		61	100	ns
Peak Reverse Recovery Current	I _{RM(REC)}			2.7	4.5	A
Reverse Recovery Charge	Q _{rr}				83	140

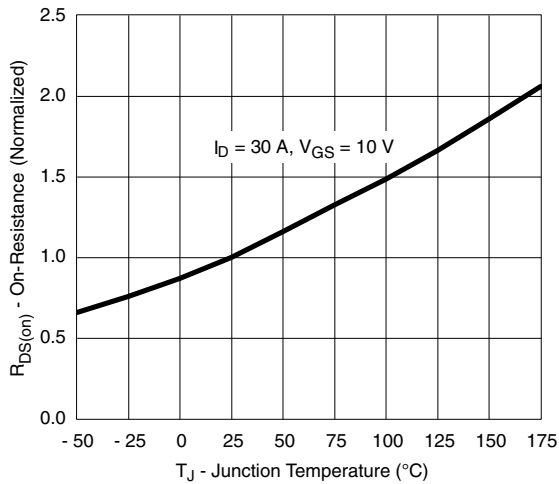
Notes:

- 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. Independent of operating temperature.

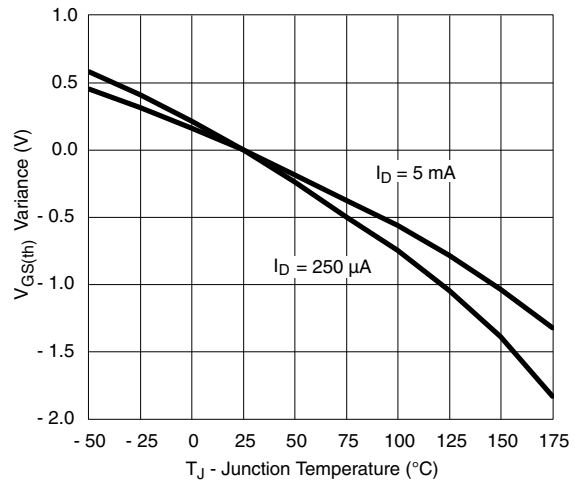
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Gate-to-Source Voltage vs. Temperature

On-Resistance vs. Drain Current

Capacitance

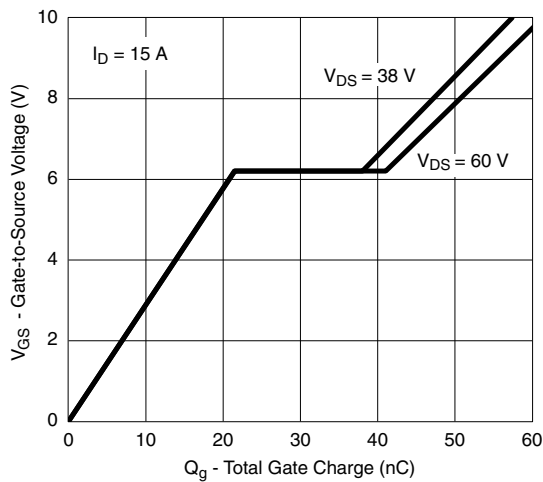
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



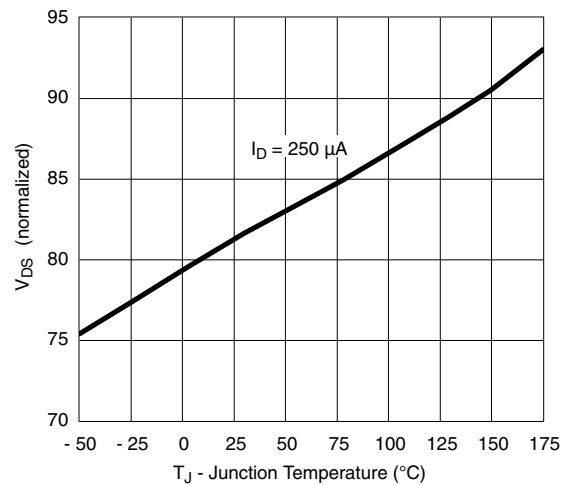
On-Resistance vs. Junction Temperature



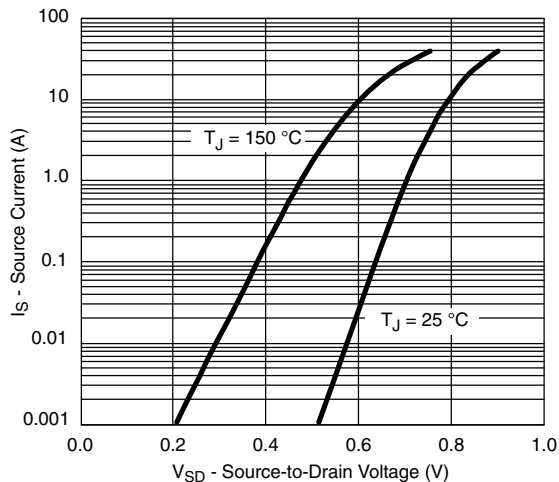
Threshold Voltage



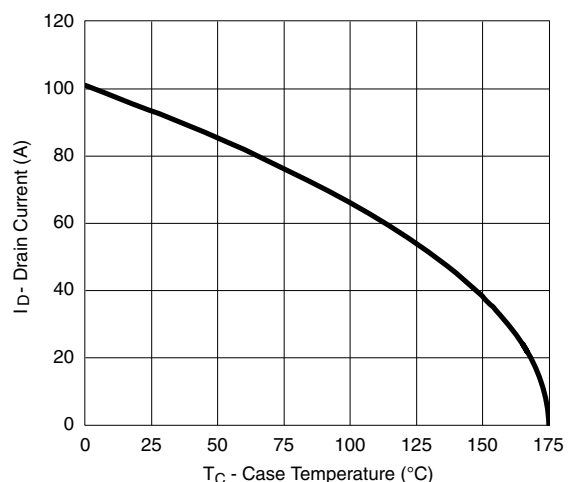
Gate Charge



Drain Source Breakdown vs. Junction Temperature

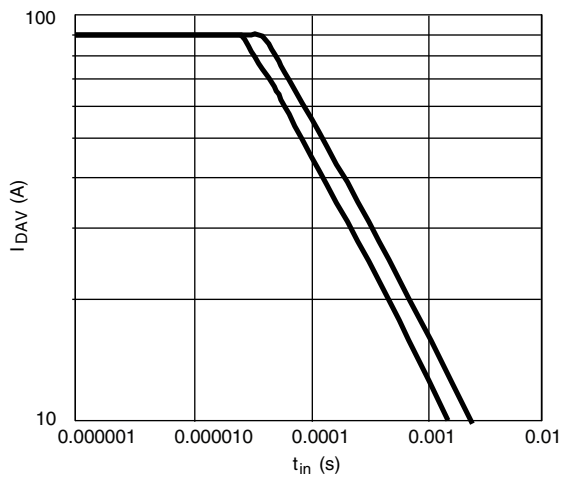


Source-Drain Diode Forward Voltage

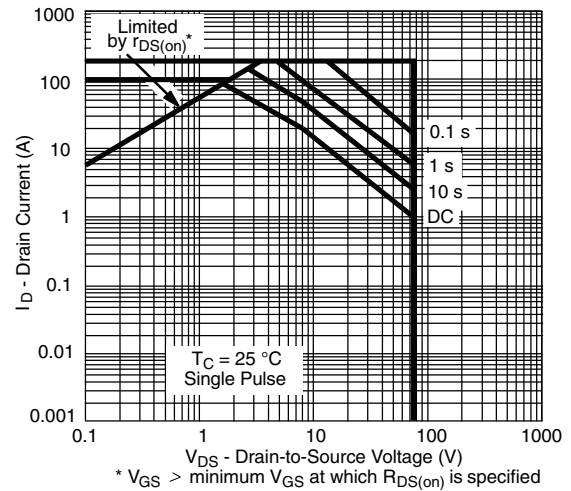


Maximum Drain Current vs. Case Temperature

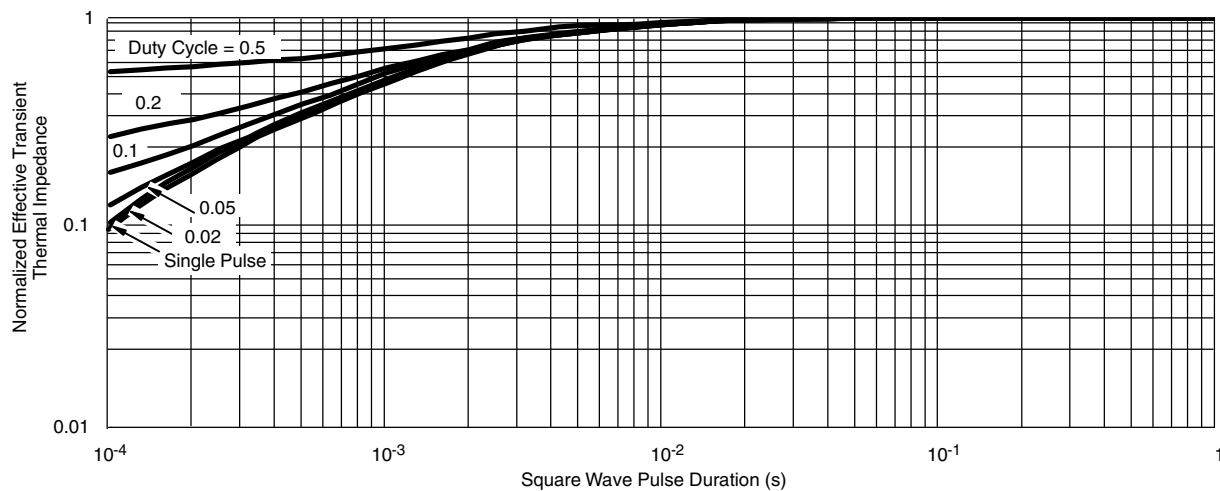
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Single Pulse Avalanche Current Capability vs. Time



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?69615.



TO-220AB



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
D2	12.19	12.70	0.480	0.500
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
$\varnothing P$	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

ECN: T14-0413-Rev. P, 16-Jun-14
DWG: 5471

Note

* $M = 1.32$ mm to 1.62 mm (dimension including protrusion)
Heatsink hole for HVM



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