

N-Channel 75-V (D-S) MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
75	0.0068 at $V_{GS} = 10$ V	90 ^d	75

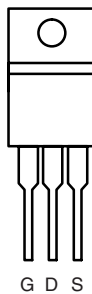
FEATURES

- TrenchFET[®] Power MOSFET
- 175 °C Junction Temperature
- 100 % R_g and UIS Tested

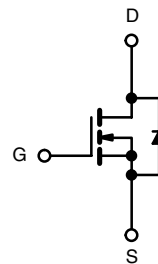

RoHS
COMPLIANT

APPLICATIONS

- Power Supply
 - Secondary Synchronous Rectification
- Industrial

TO-220AB


Top View

Ordering Information: SUP90N08-6m8P-E3 (Lead (Pb)-free)


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	90 ^d
		$T_C = 70$ °C	90 ^d
Pulsed Drain Current	I_{DM}	240	A
Avalanche Current	I_{AS}	50	
Single Avalanche Energy ^a	E_{AS}	125	mJ
Maximum Power Dissipation ^a	P_D	$T_C = 25$ °C	272 ^b
		$T_A = 25$ °C ^c	3.75
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}	0.55	

Notes:

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

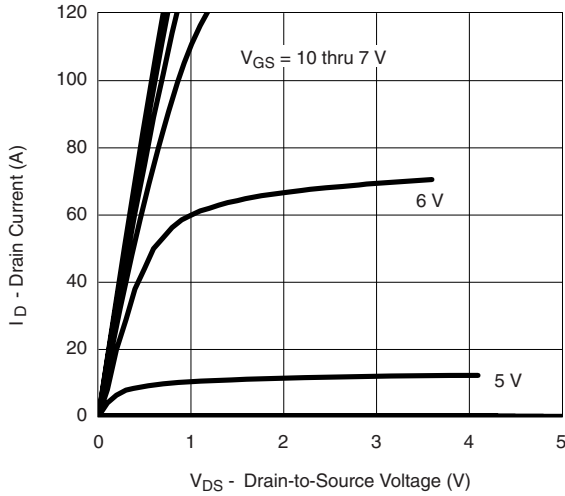
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{DS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	75			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.5		4.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 75\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 75\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 75\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = 10\text{ V}$	70			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		0.0056	0.0068	Ω
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$		0.009	0.011	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		50		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}, f = 1\text{ MHz}$		4620		pF
Output Capacitance	C_{oss}			517		
Reverse Transfer Capacitance	C_{rss}			247		
Total Gate Charge ^c	Q_g	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 50\text{ A}$		75	115	nC
Gate-Source Charge ^c	Q_{gs}			25.5		
Gate-Drain Charge ^c	Q_{gd}			20		
Gate Resistance	R_g	$f = 1\text{ MHz}$		1.2	2.4	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.6\text{ }\Omega$ $I_D \cong 50\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		16	30	ns
Rise Time ^c	t_r			11	20	
Turn-Off Delay Time ^c	$t_{d(off)}$			24	40	
Fall Time ^c	t_f			10	20	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$ ^b						
Continuous Current	I_S				85	A
Pulsed Current	I_{SM}				240	
Forward Voltage ^a	V_{SD}	$I_F = 20\text{ A}, V_{GS} = 0\text{ V}$		0.83	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 75\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		60	100	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			3.3	4.5	A
Reverse Recovery Charge	Q_{rr}				100	150

Notes:

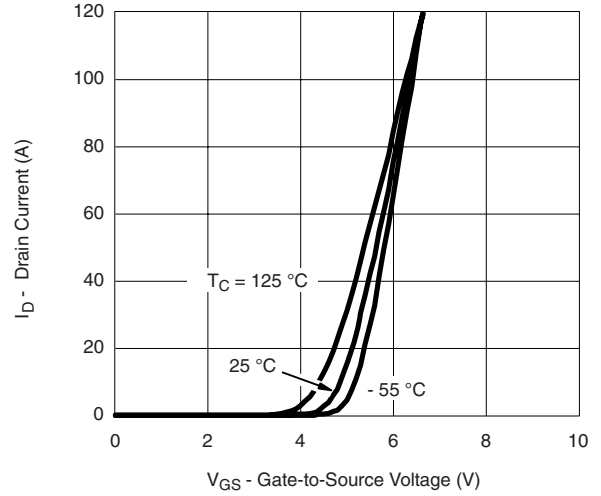
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

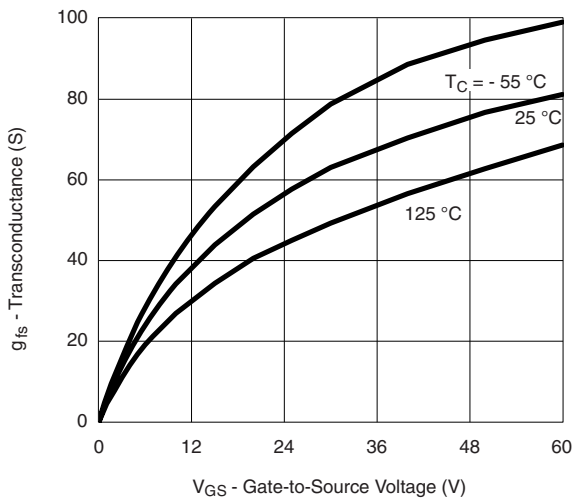
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



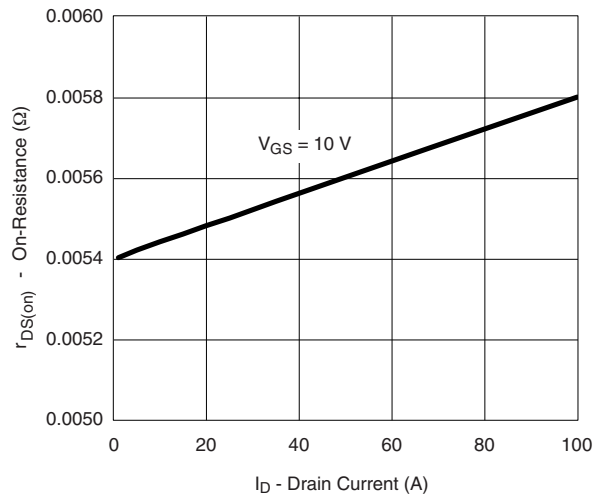
Output Characteristics



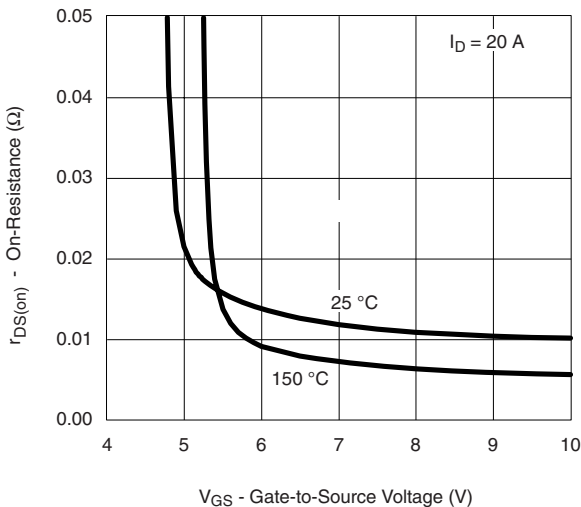
Transconductance



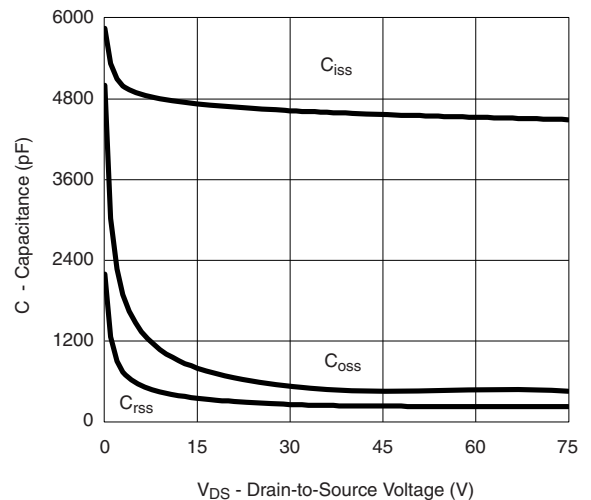
Transfer Characteristics



On-resistance vs. Gate-to-Source Voltage

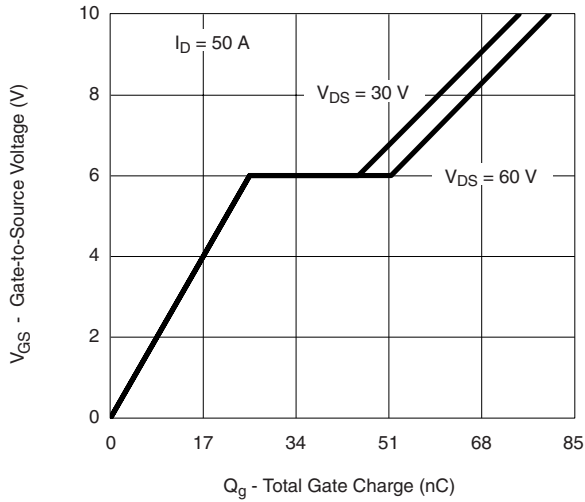


On-Resistance vs. Drain Current

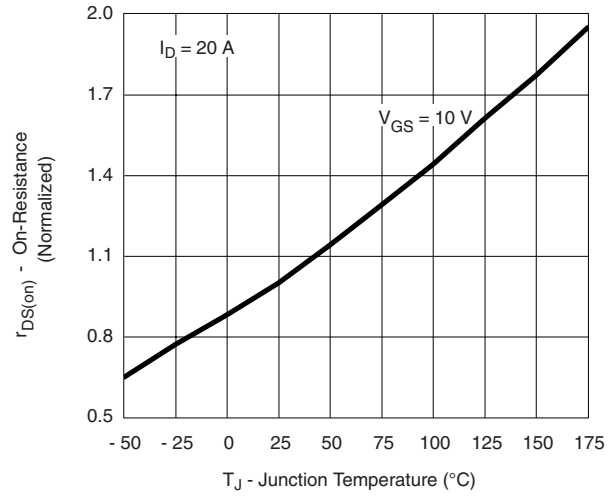


Capacitance

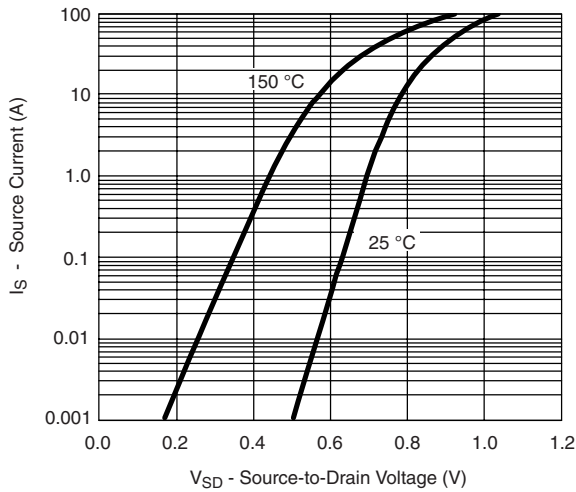
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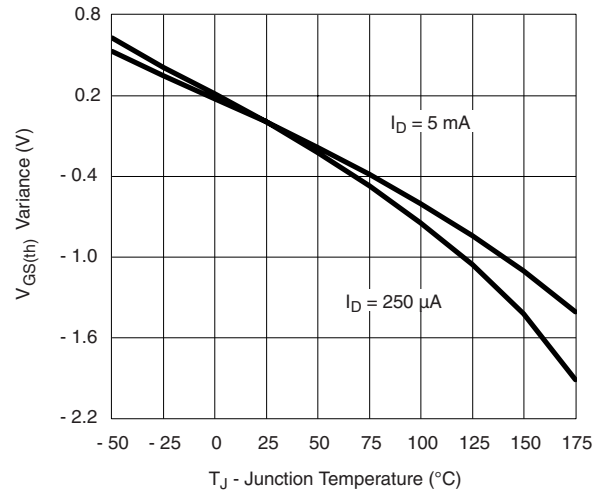
On-Resistance vs. Junction Temperature



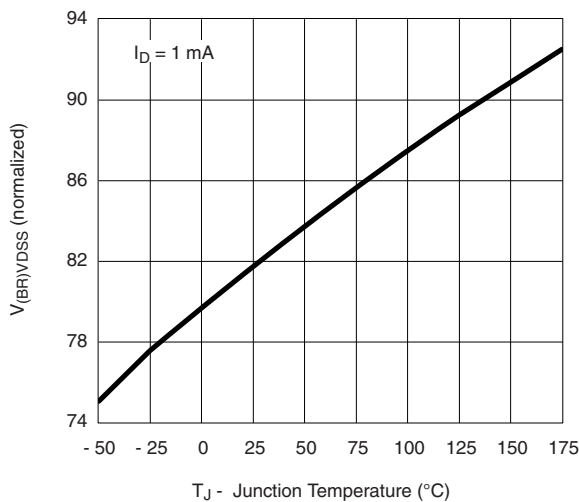
Threshold Voltage



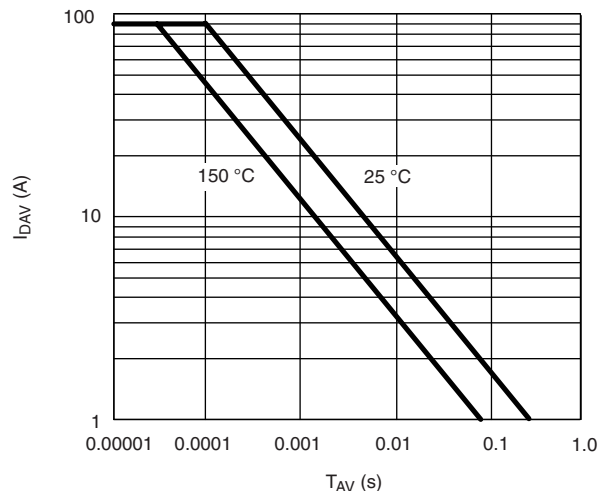
Gate Charge



On-Resistance vs. Junction Temperature

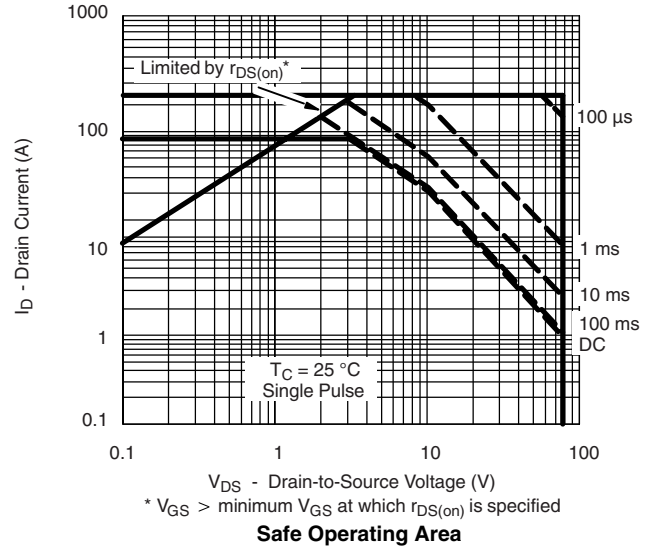
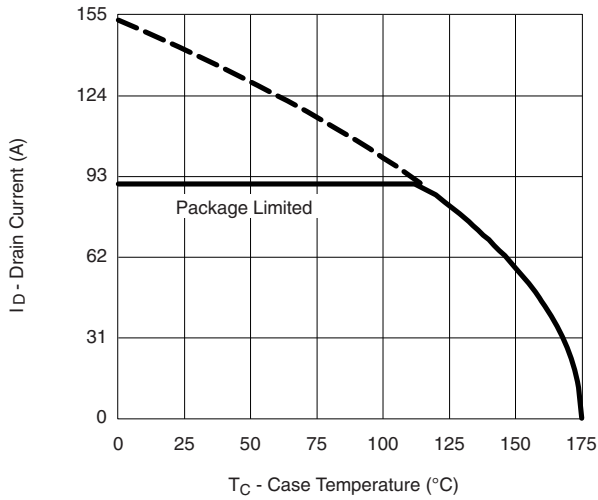


Source-Drain Diode Forward Voltage

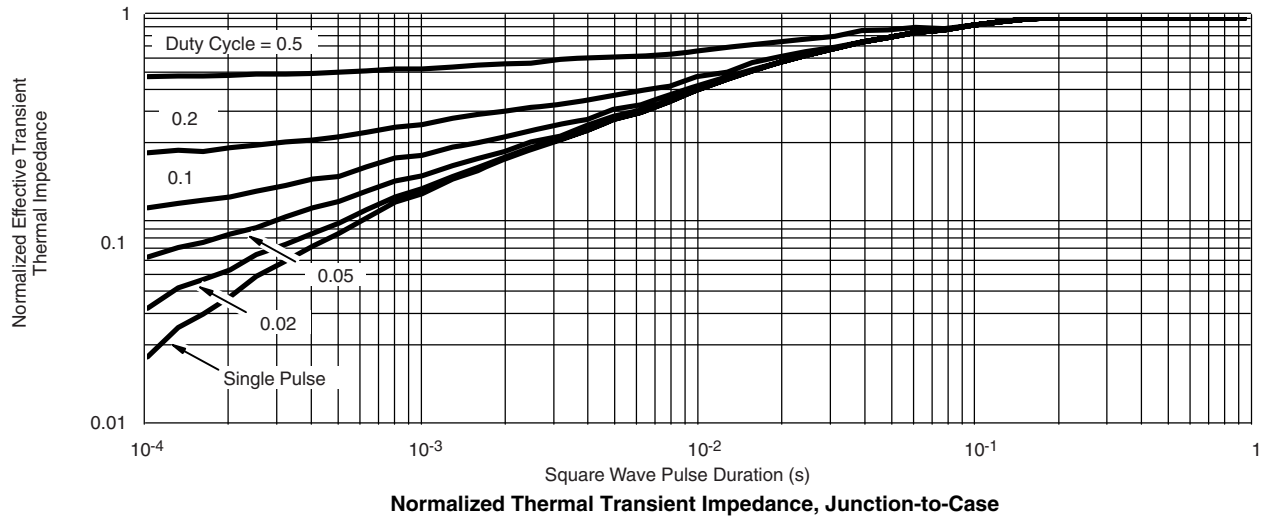


Single Pulse Avalanche Current Capability vs. Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Single Pulse Avalanche Current Capability vs. Time



Safe Operating Area

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 <http://www.vishay.com/ppg?69538>.



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