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

PRODUCT SUMMARY			
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
75	0.0062 at V_{GS} = 10 V	90[d]	75

FEATURES

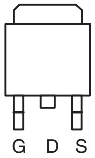
- TrenchFET® Power MOSFETS
- 175 °C Junction Temperature
- 100 % R_g and UIS Tested

RoHS
COMPLIANT

APPLICATIONS

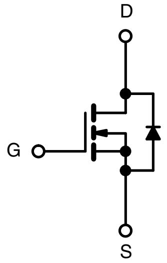
- Power Supply
  - Secondary Synchronous Rectification
- Industrial

TO-263



Top View

Ordering Information: SUM90N08-6m2P-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)	T_C = 25 °C	I_D	90[d]	A
	T_C = 70 °C		90[d]	
Pulsed Drain Current		I_{DM}	240	
Avalanche Current		I_{AS}	50	
Single Avalanche Energy[a]	L = 0.1 mH	E_{AS}	125	mJ
Maximum Power Dissipation[a]	T_C = 25 °C	P_D	272[b]	W
	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	

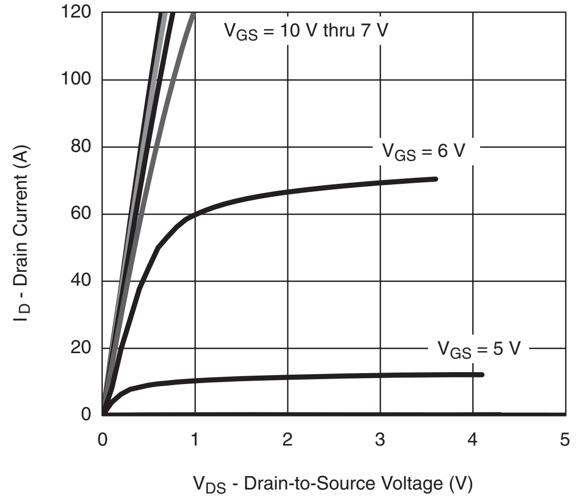
Notes:
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When Mounted on 1" square PCB (FR-4 material).
d. Package limited.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted

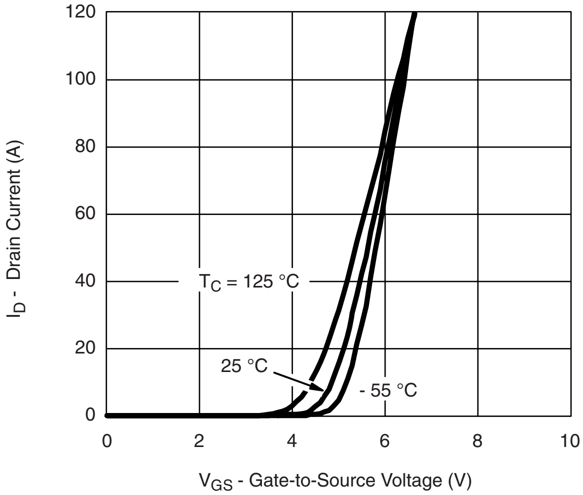
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{DS} = 0 V, I_D = 250 µA	75			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2.5		4.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 75 V, V_{GS} = 0 V			1	µA
		V_{DS} = 75 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 75 V, V_{GS} = 0 V, T_J = 150 °C			250	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 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		0.0051	0.0062	Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125 °C		0.0082	0.0105	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A		50		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 30 V, f = 1 MHz		4620		pF
Output Capacitance	C_{oss}			517		
Reverse Transfer Capacitance	C_{rss}			247		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 50 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 MHz		1.2	2.4	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.6 Ω $I_D \cong$ 50 A, V_{GEN} = 10 V, R_g = 1 Ω		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 °C[b]						
Continuous Current	I_S				85	A
Pulsed Current	I_{SM}				240	
Forward Voltage[a]	V_{SD}	I_F = 20 A, V_{GS} = 0 V		0.83	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 75 A, di/dt = 100 A/µs		60	100	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			3.3	5	A
Reverse Recovery Charge	Q_{rr}			100	150	nC

Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

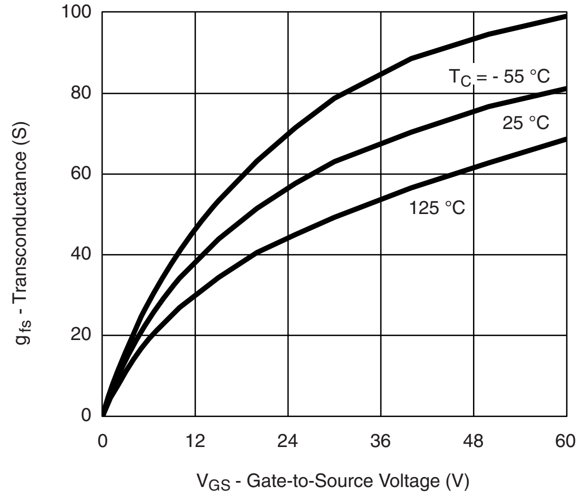
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



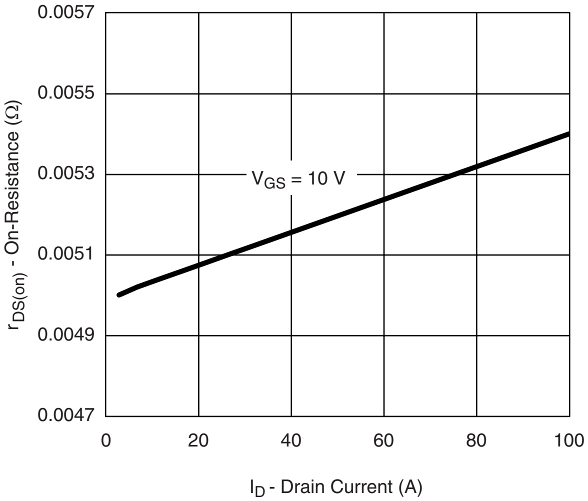
Output Characteristics (SUM)



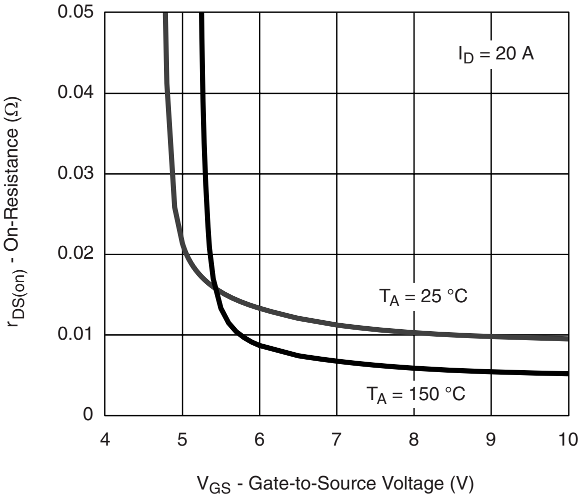
Transfer Characteristics



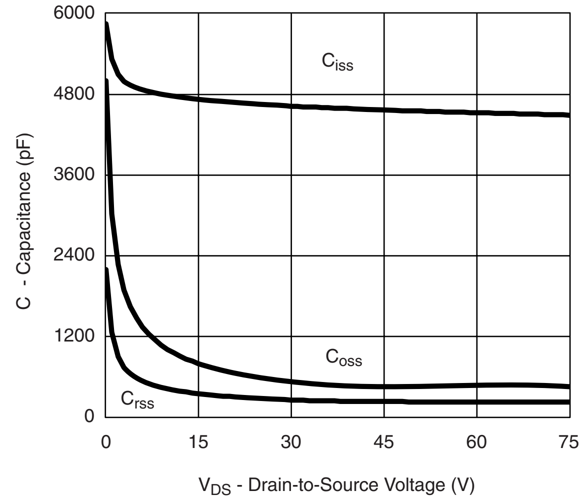
Transconductance



On-Resistance vs. Drain Current (SUM)

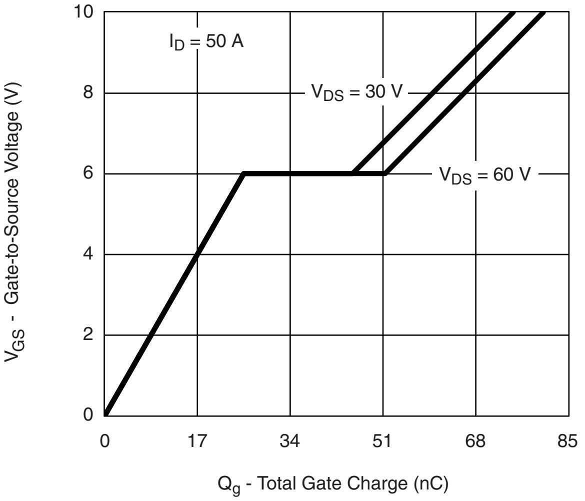


On-Resistance vs. Gate-to-Source Voltage (SUM)

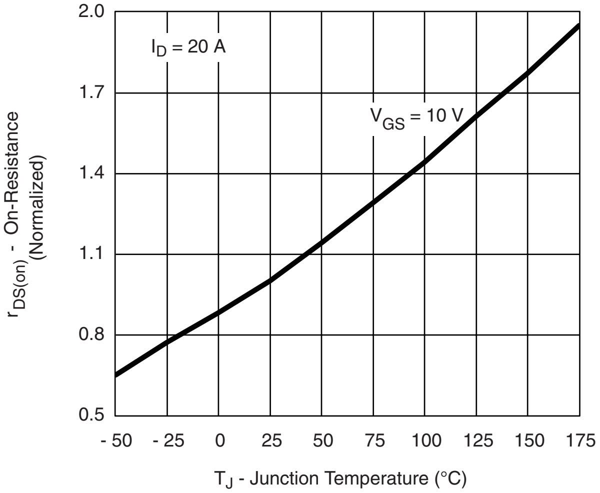


Capacitance

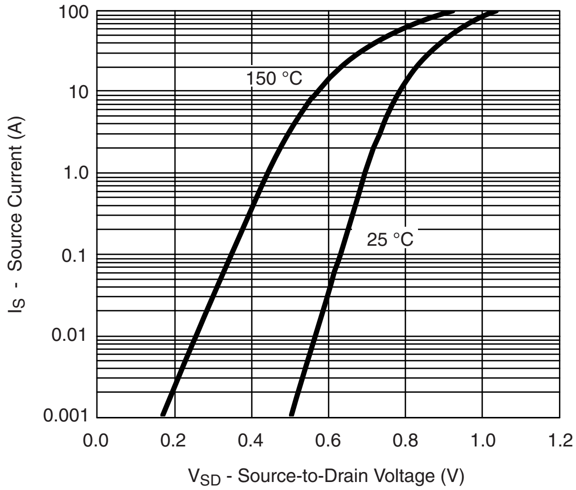
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



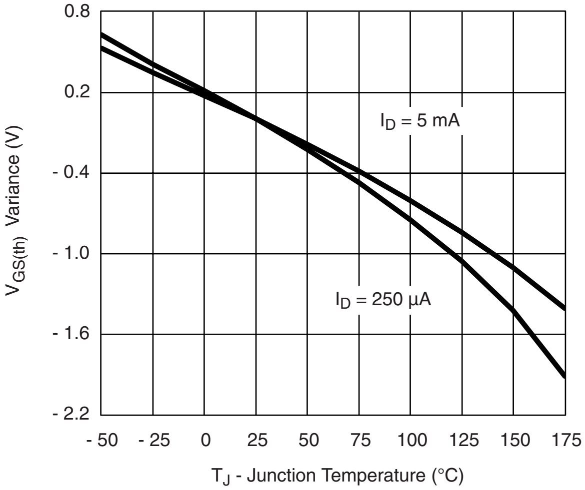
Gate Charge



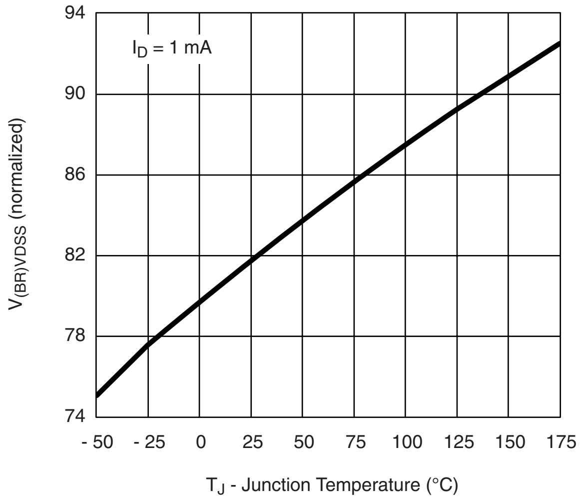
On-Resistance vs. Junction Temperature



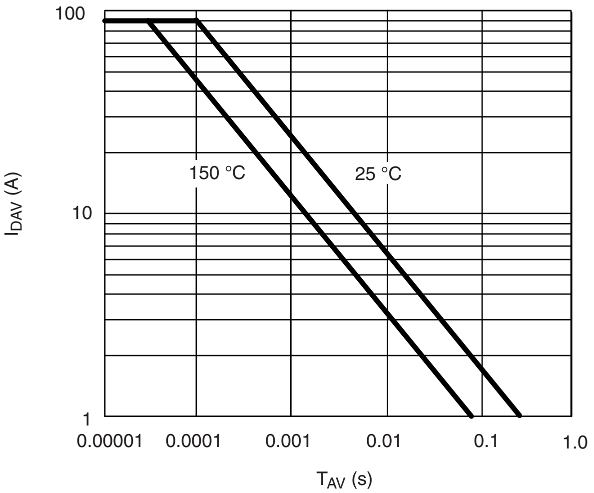
Source-Drain Diode Forward Voltage



Threshold Voltage

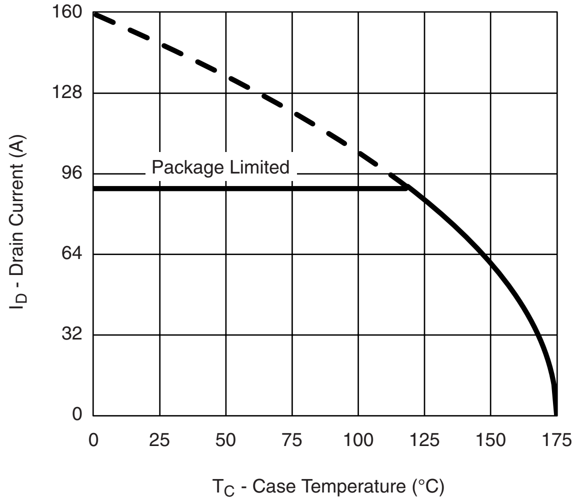


Drain source Breakdown vs. Junction Temperature

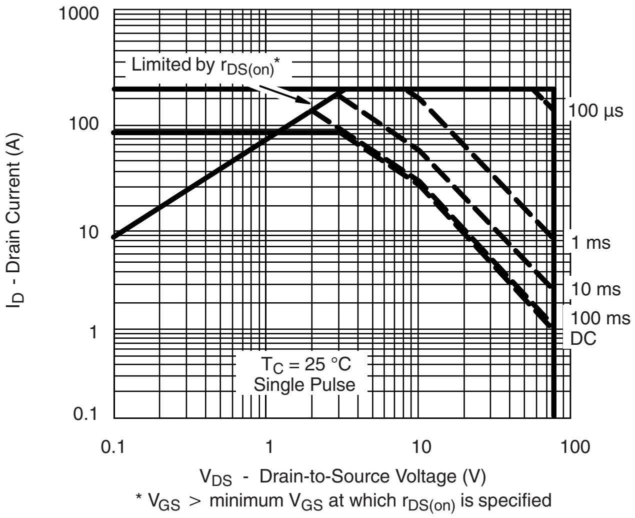


Single Pulse Avalanche Current Capability vs. Time

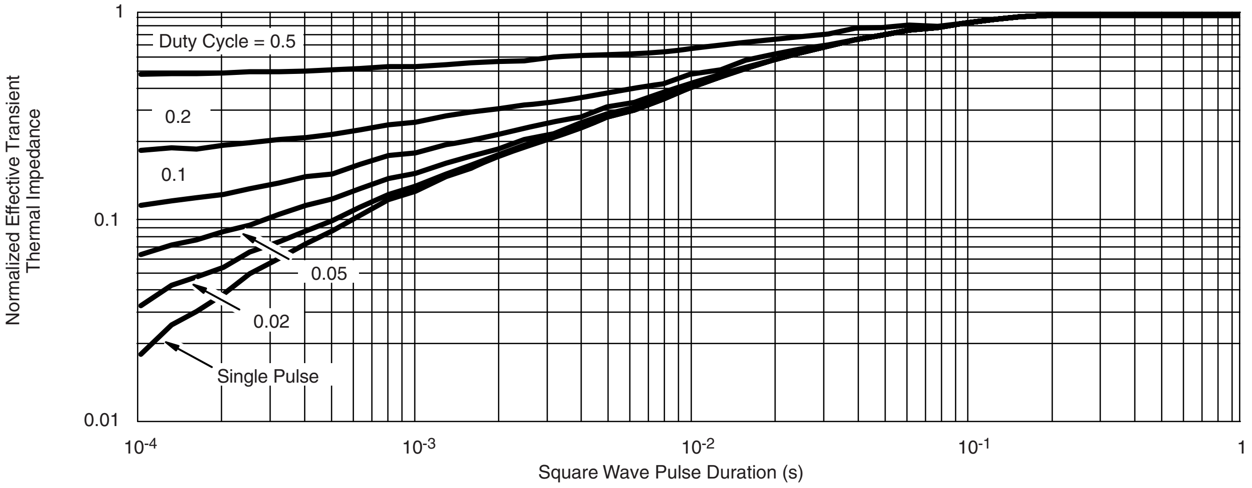
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Maximum Drain Current vs. Case Temperature (SUM)



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 http://www.vishay.com/ppg?69552.

Notice