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

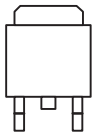
- TrenchFET® Power MOSFETS
- 175 °C Junction Temperature
- 100 % R_g and UIS Tested

RoHS COMPLIANT

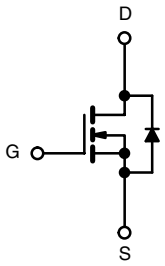
APPLICATIONS

- Power Supply
  - Secondary Synchronous Rectification
- Industrial

TO-263



Top View



N-Channel MOSFET

Ordering Information: SUM90N08-6m2P-E3 (Lead (Pb)-free)

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	

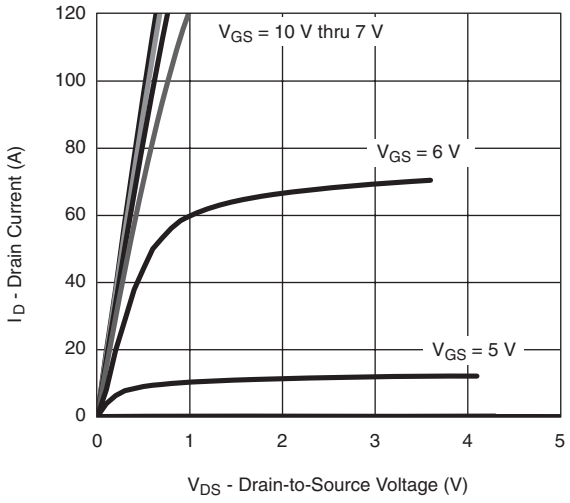
Notes:
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When Mounted on 1" square PCB (FR-4 material).
d. Package limited.

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} ≥ 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 ≅ 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

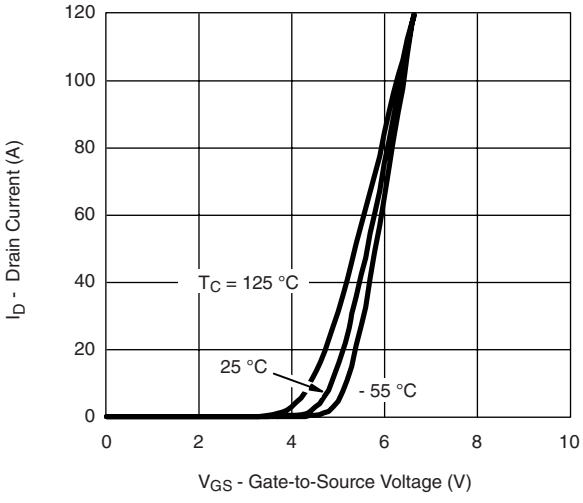
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

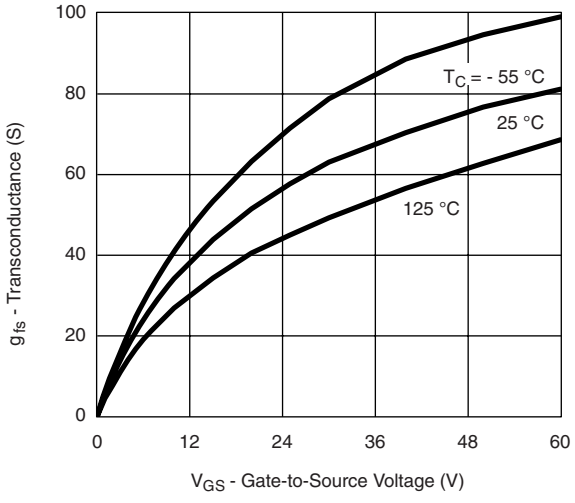
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



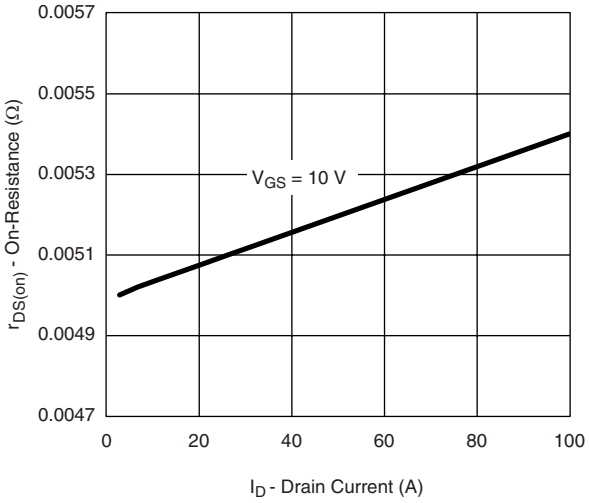
Output Characteristics (SUM)



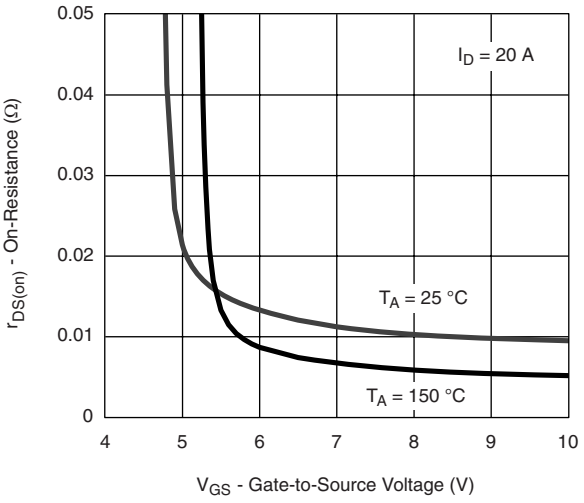
Transfer Characteristics



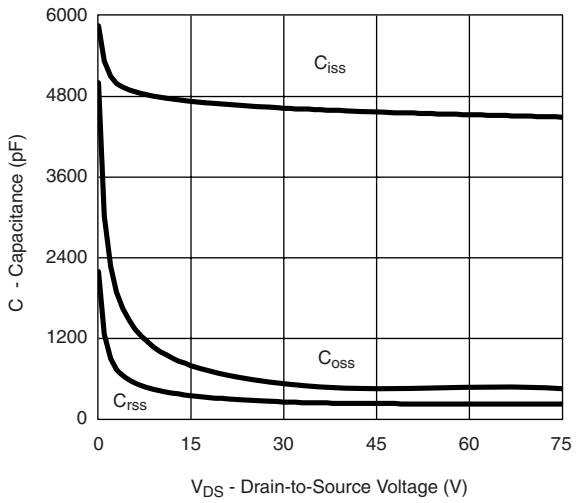
Transconductance



On-Resistance vs. Drain Current (SUM)

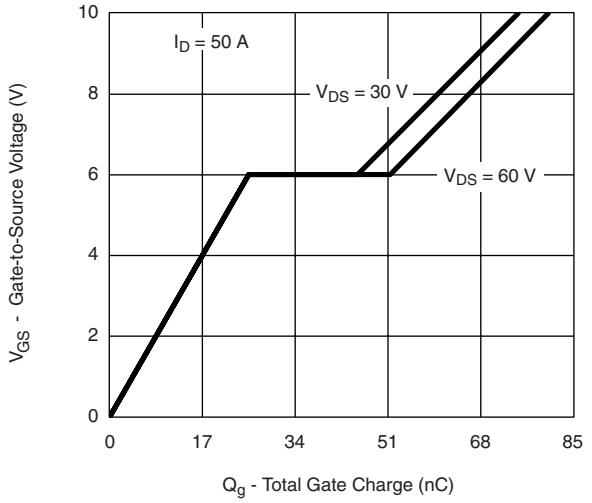


On-Resistance vs. Gate-to-Source Voltage (SUM)

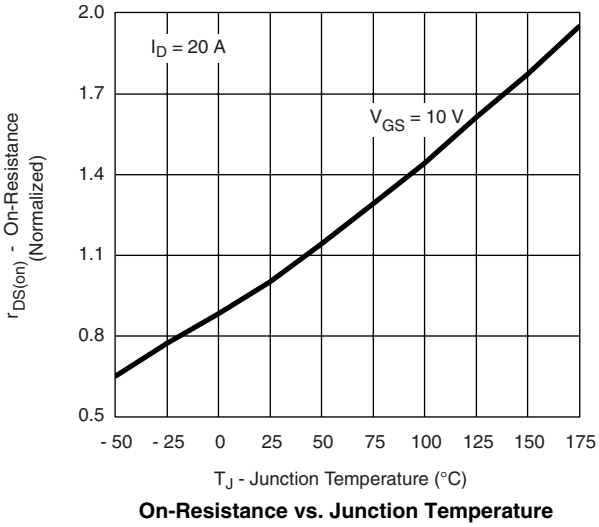


Capacitance

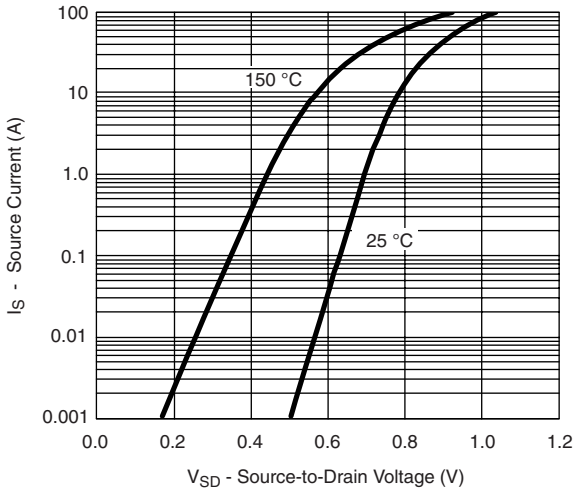
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



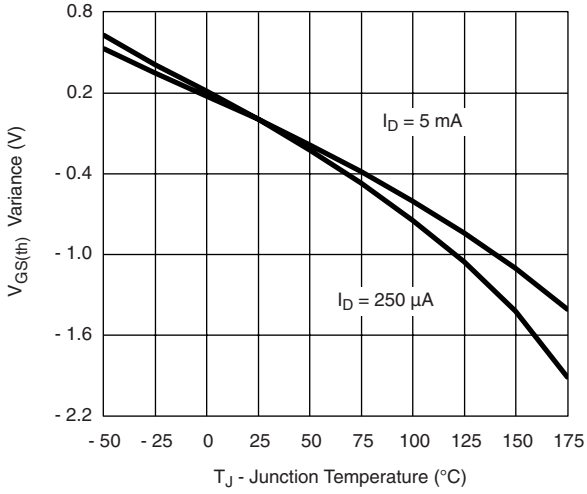
Gate Charge



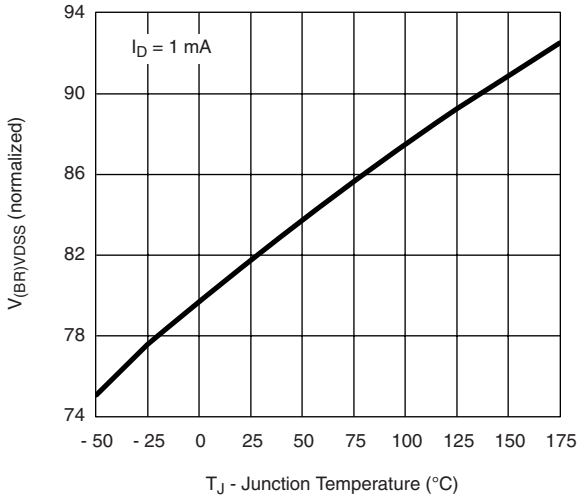
On-Resistance vs. Junction Temperature



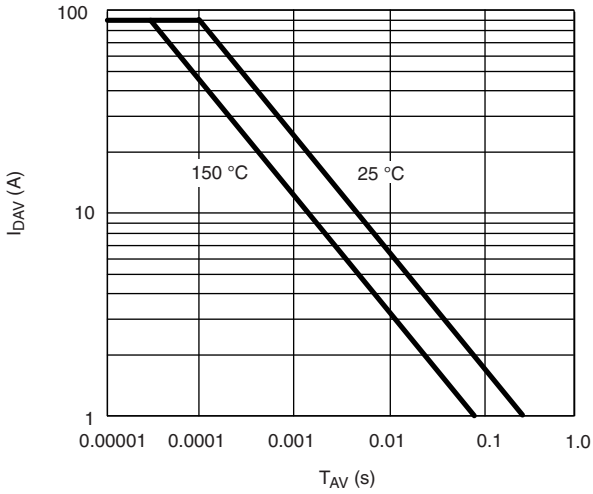
Source-Drain Diode Forward Voltage



Threshold Voltage

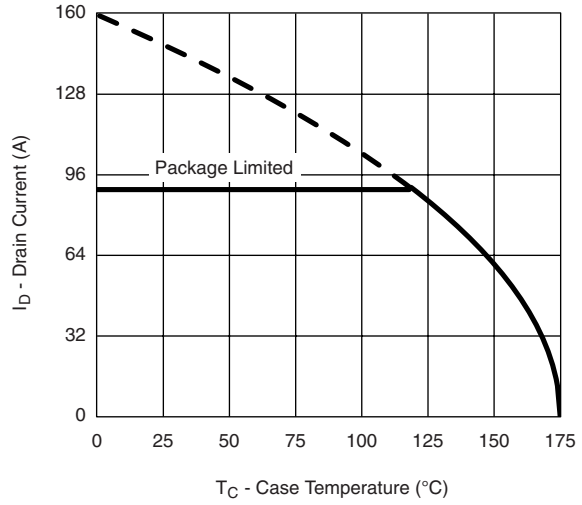


Drain source Breakdown vs. Junction Temperature

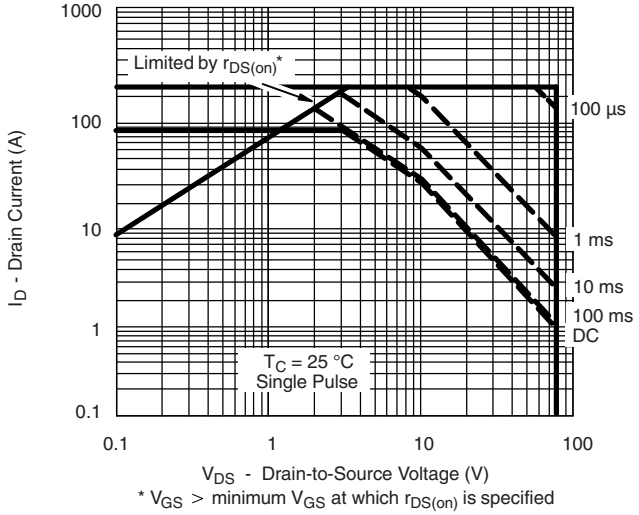


Single Pulse Avalanche Current Capability vs. Time

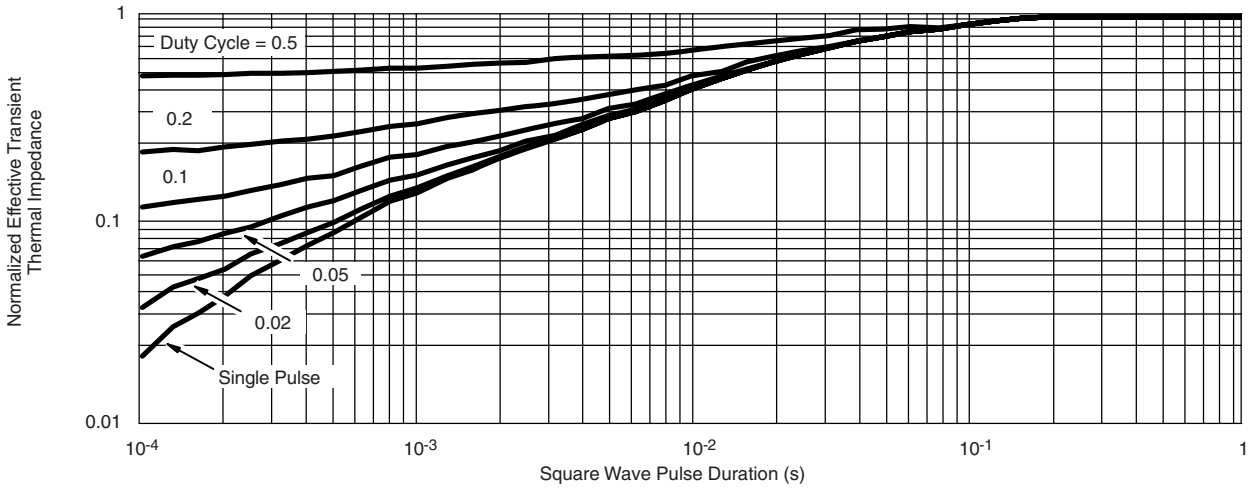
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Maximum Drain Current vs. Case Temperature (SUM)



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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