

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

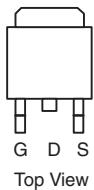
PRODUCT SUMMARY			
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)	$Q_g$ (Typ)
75	0.0062 at $V_{GS} = 10$ V	90 <sup>d</sup>	75

### FEATURES

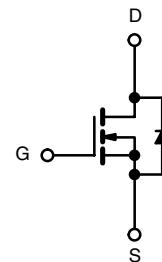
- TrenchFET® Power MOSFETs
- 175 °C Junction Temperature
- 100 %  $R_g$  and UIS Tested



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	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175$ °C)	$I_D$	90 <sup>d</sup>	A
		90 <sup>d</sup>	
Pulsed Drain Current	$I_{DM}$	240	
Avalanche Current	$I_{AS}$	50	
Single Avalanche Energy <sup>a</sup>	$E_{AS}$	125	mJ
Maximum Power Dissipation <sup>a</sup>	$P_D$	272 <sup>b</sup>	W
		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) <sup>c</sup>	$R_{thJA}$	40	°C/W
Junction-to-Case (Drain)	$R_{thJC}$	0.55	

Notes:

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

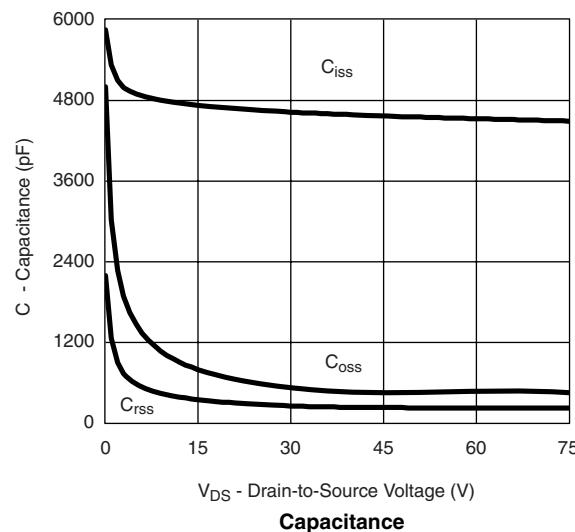
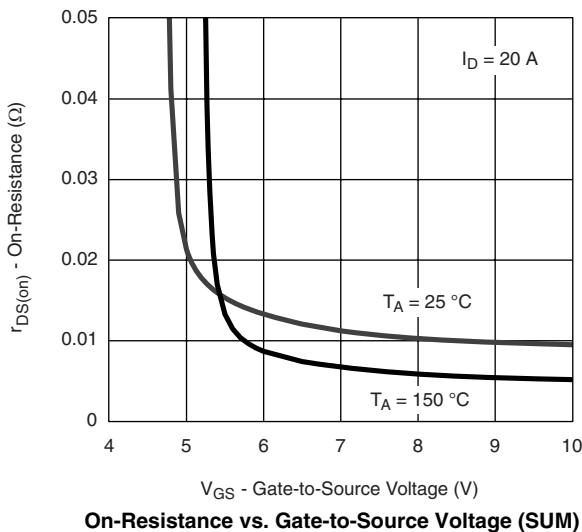
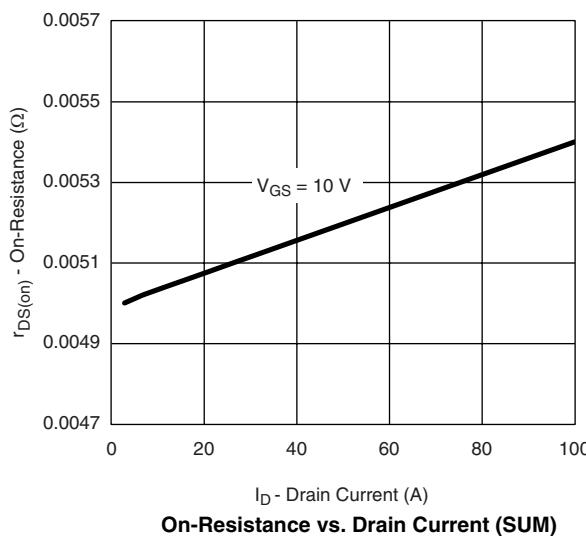
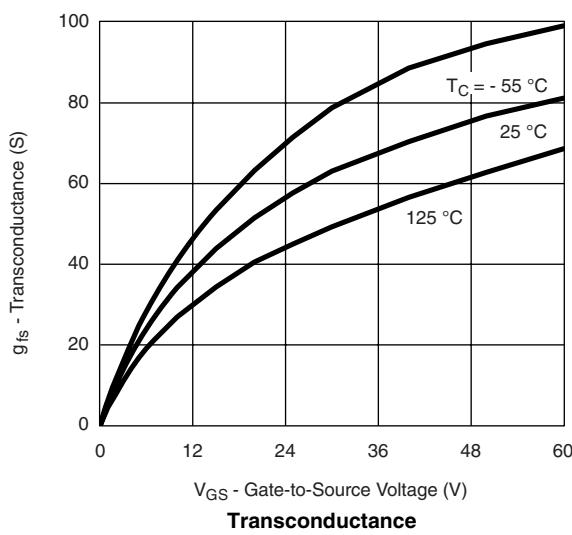
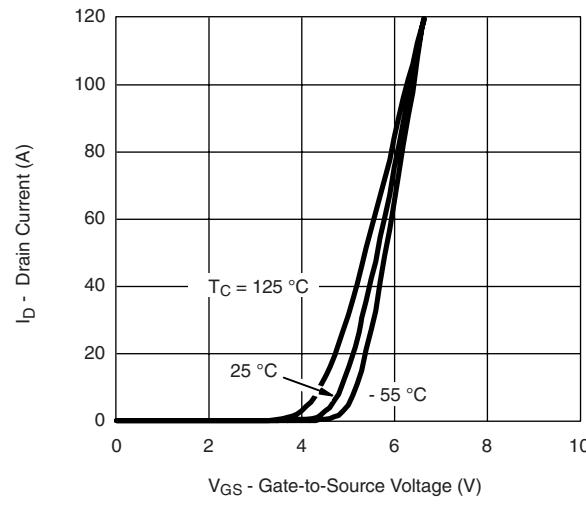
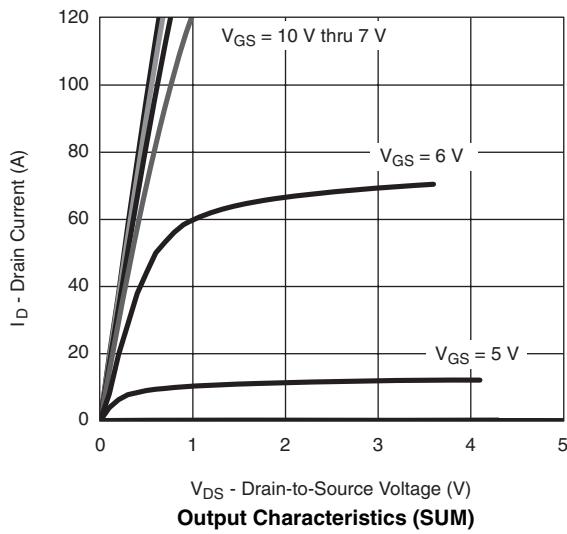
**SPECIFICATIONS**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{DS}} = 0 \text{ V}, I_D = 250 \mu\text{A}$	75			V
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250 \mu\text{A}$	2.5		4.5	
Gate-Body Leakage	$I_{\text{GSS}}$	$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 20 \text{ V}$			$\pm 250$	nA
Zero Gate Voltage Drain Current	$I_{\text{DSS}}$	$V_{\text{DS}} = 75 \text{ V}, V_{\text{GS}} = 0 \text{ V}$			1	$\mu\text{A}$
		$V_{\text{DS}} = 75 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 125^\circ\text{C}$			50	
		$V_{\text{DS}} = 75 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 150^\circ\text{C}$			250	
On-State Drain Current <sup>a</sup>	$I_{\text{D}(\text{on})}$	$V_{\text{DS}} \geq 10 \text{ V}, V_{\text{GS}} = 10 \text{ V}$	70			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 10 \text{ V}, I_D = 20 \text{ A}$		0.0051	0.0062	$\Omega$
		$V_{\text{GS}} = 10 \text{ V}, I_D = 20 \text{ A}, T_J = 125^\circ\text{C}$		0.0082	0.0105	
Forward Transconductance <sup>a</sup>	$g_{\text{fs}}$	$V_{\text{DS}} = 15 \text{ V}, I_D = 20 \text{ A}$		50		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{\text{iss}}$	$V_{\text{GS}} = 0 \text{ V}, V_{\text{DS}} = 30 \text{ V}, f = 1 \text{ MHz}$		4620		$\text{pF}$
Output Capacitance	$C_{\text{oss}}$			517		
Reverse Transfer Capacitance	$C_{\text{rss}}$			247		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{\text{DS}} = 30 \text{ V}, V_{\text{GS}} = 10 \text{ V}, I_D = 50 \text{ A}$		75	115	$\text{nC}$
Gate-Source Charge <sup>c</sup>	$Q_{\text{gs}}$			25.5		
Gate-Drain Charge <sup>c</sup>	$Q_{\text{gd}}$			20		
Gate Resistance	$R_g$	$f = 1 \text{ MHz}$		1.2	2.4	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = 30 \text{ V}, R_L = 0.6 \Omega$ $I_D \geq 50 \text{ A}, V_{\text{GEN}} = 10 \text{ V}, R_g = 1 \Omega$		16	30	$\text{ns}$
Rise Time <sup>c</sup>	$t_r$			11	20	
Turn-Off Delay Time <sup>c</sup>	$t_{\text{d}(\text{off})}$			24	40	
Fall Time <sup>c</sup>	$t_f$			10	20	
<b>Source-Drain Diode Ratings and Characteristics</b> $T_C = 25^\circ\text{C}^b$						
Continuous Current	$I_S$				85	$\text{A}$
Pulsed Current	$I_{\text{SM}}$				240	
Forward Voltage <sup>a</sup>	$V_{\text{SD}}$	$I_F = 20 \text{ A}, V_{\text{GS}} = 0 \text{ V}$		0.83	1.5	V
Reverse Recovery Time	$t_{\text{rr}}$	$I_F = 75 \text{ A}, \text{di/dt} = 100 \text{ A}/\mu\text{s}$		60	100	ns
Peak Reverse Recovery Current	$I_{\text{PRM}(\text{REC})}$			3.3	5	A
Reverse Recovery Charge	$Q_{\text{rr}}$			100	150	nC

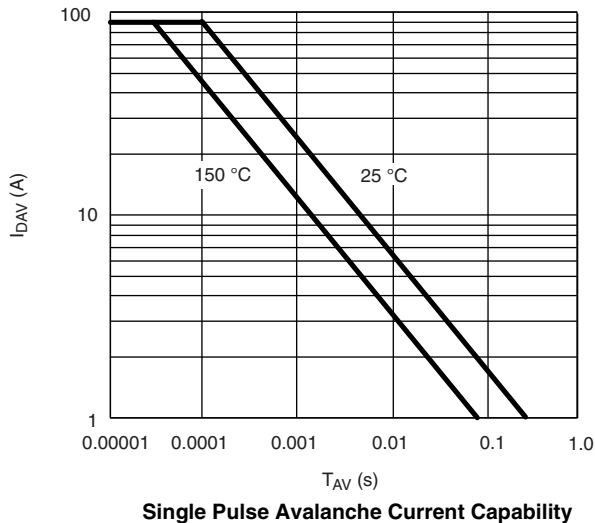
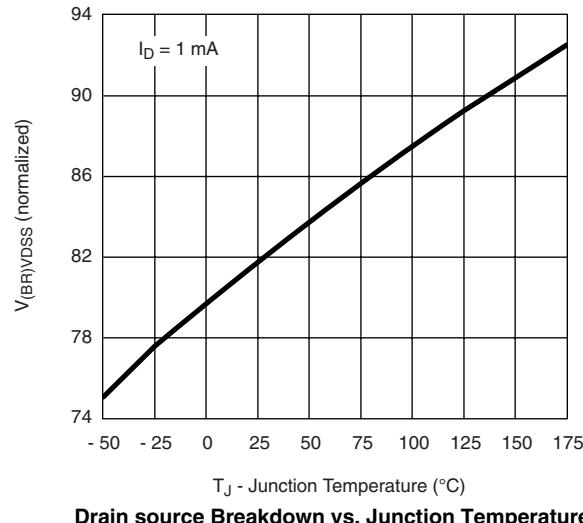
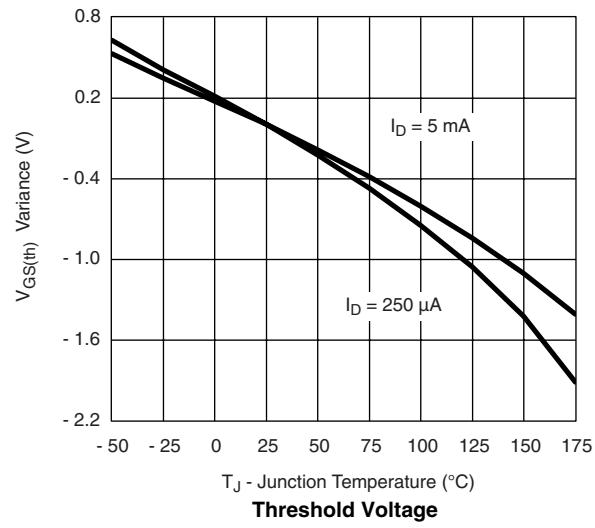
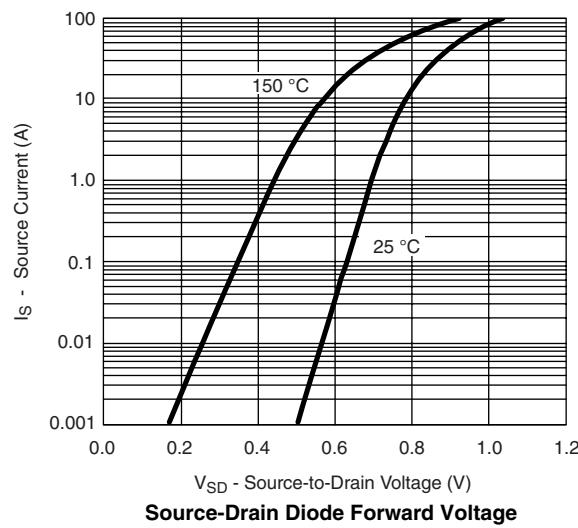
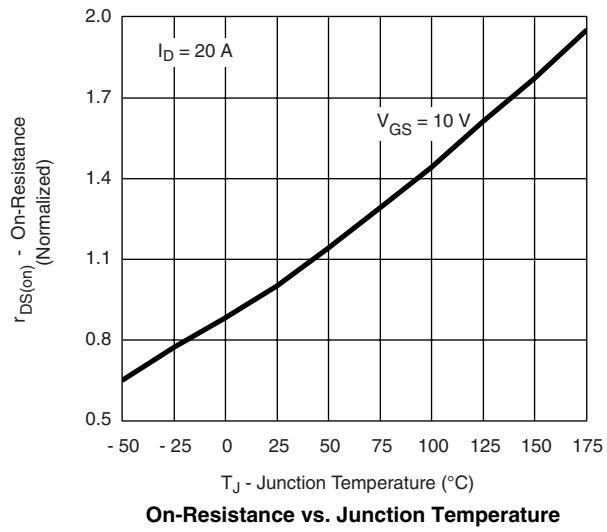
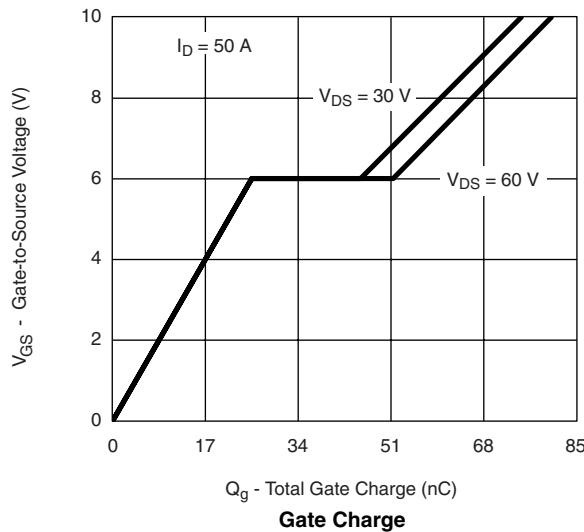
## Notes:

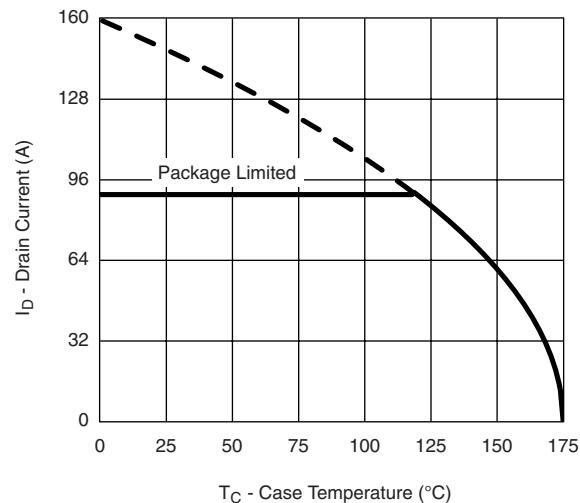
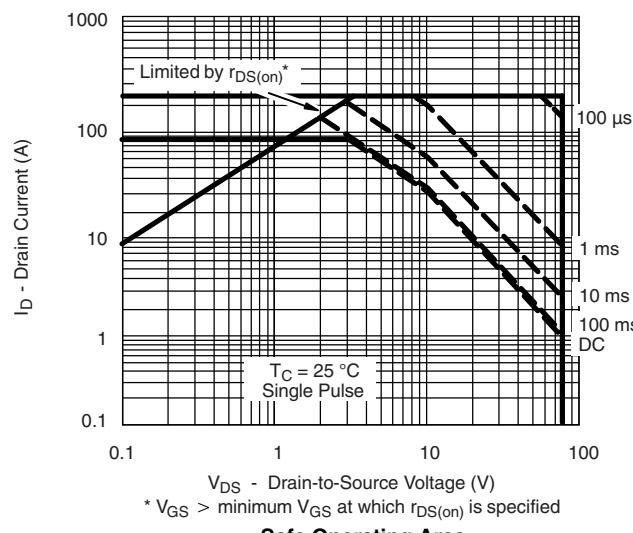
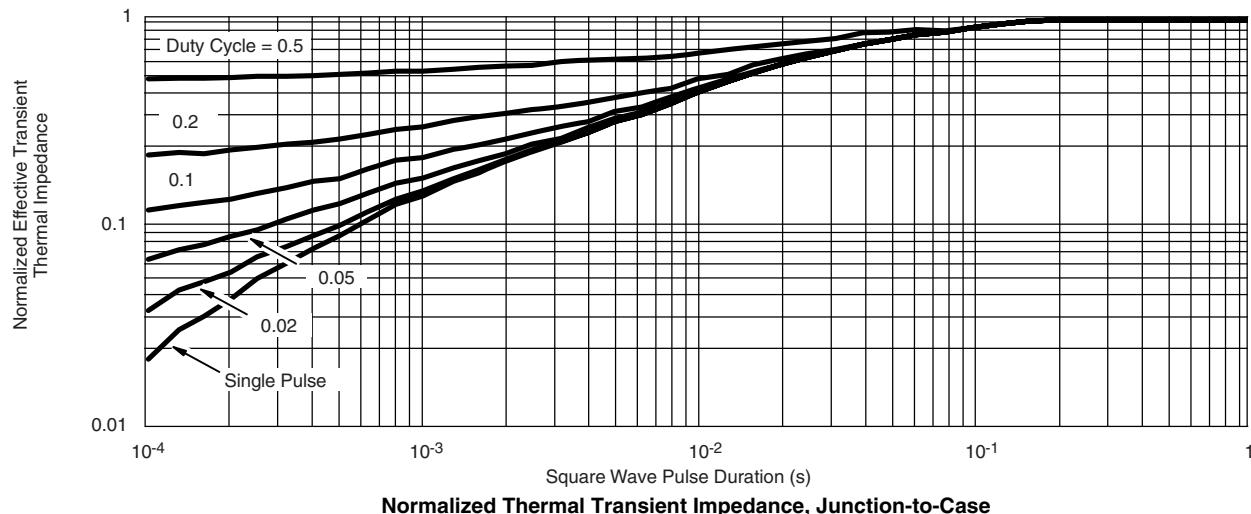
- a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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


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**Maximum Drain Current vs. Case Temperature (SUM)**

**Safe Operating Area**

**Normalized Thermal Transient Impedance, Junction-to-Case**

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