

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

PRODUCT SUMMARY			
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
75	0.0048 at $V_{GS} = 10$ V	90 ^d	105
	0.006 at $V_{GS} = 8$ V	90 ^d	

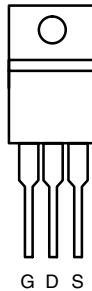
FEATURES

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

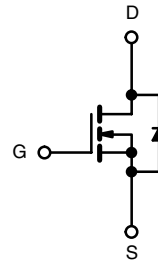

RoHS
COMPLIANT

APPLICATIONS

- Power Supply
 - Half-Bridge
 - Secondary Synchronous Rectification
- Industrial

TO-220AB


Top View

Ordering Information: SUP90N08-4m8P-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}	70	
Single Pulse Avalanche Energy ^a	E_{AS}	245	mJ
Maximum Power Dissipation ^a	P_D	$T_C = 25$ °C	300 ^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}	0.5	

Notes:

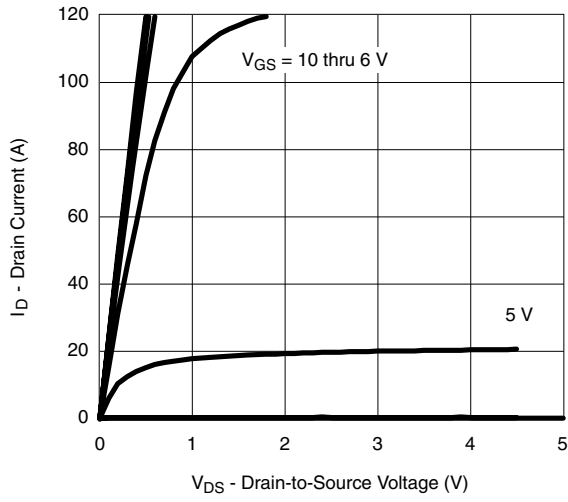
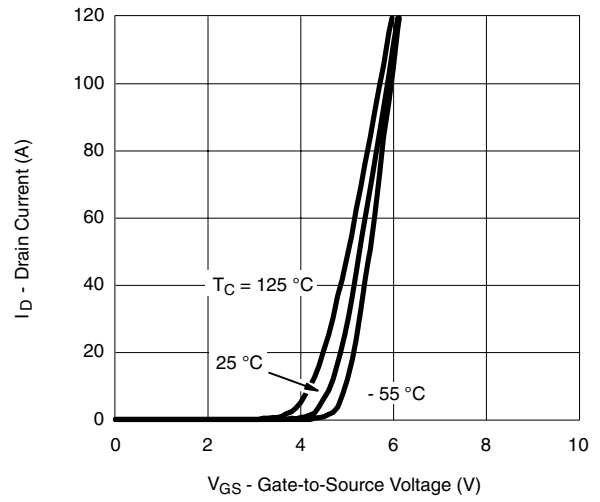
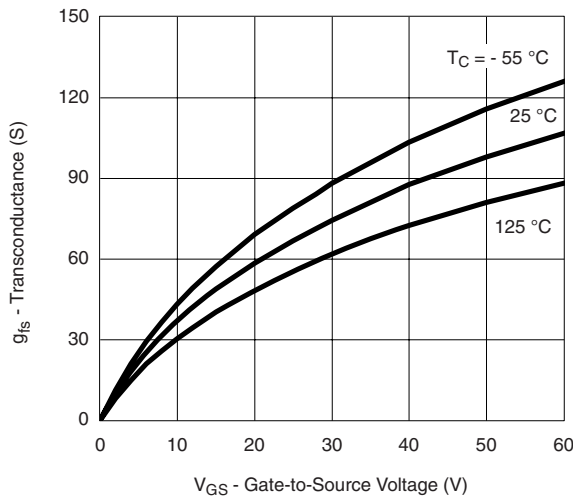
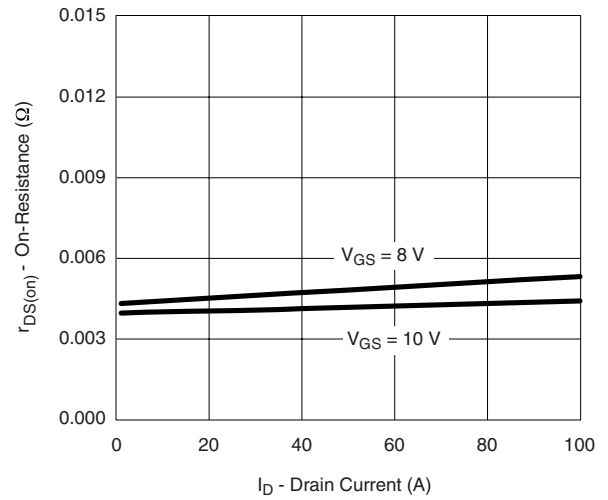
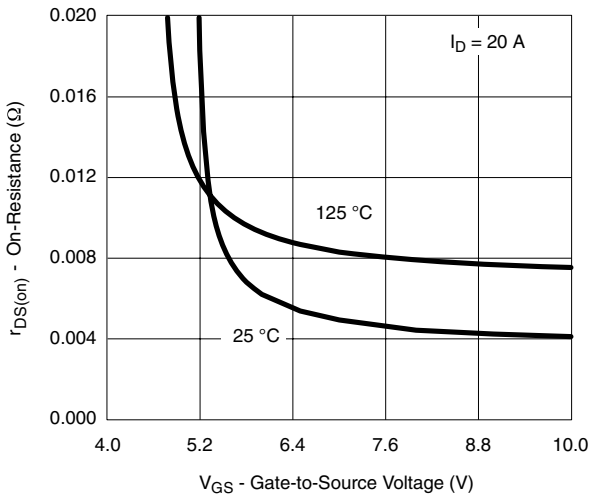
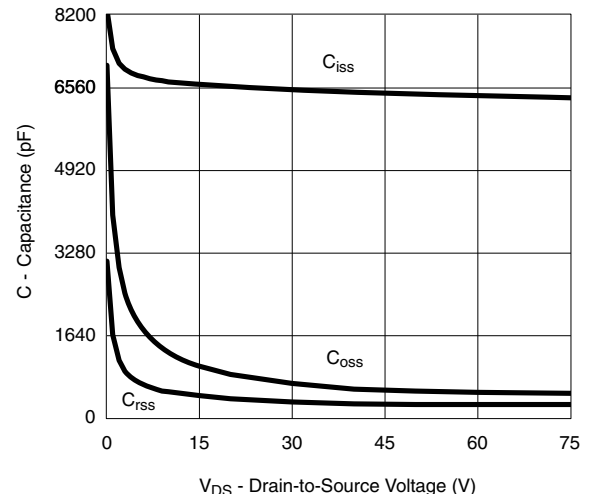
- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When Mounted on 1" square PCB (FR-4 material).
- Package limited.

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		4	
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	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		0.004	0.0048	Ω
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.0096	
		$V_{GS} = 8\text{ V}, I_D = 20\text{ A}, T_J = 150\text{ }^\circ\text{C}$			0.0106	
		$V_{GS} = 8\text{ V}, I_D = 20\text{ A}$		0.0046	0.006	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		58		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 40\text{ V}, f = 1\text{ MHz}$		6460		pF
Output Capacitance	C_{oss}			571		
Reverse Transfer Capacitance	C_{rss}			275		
Total Gate Charge ^c	Q_g	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 85\text{ A}$		105	160	nC
Gate-Source Charge ^c	Q_{gs}			32		
Gate-Drain Charge ^c	Q_{gd}			28		
Gate Resistance	R_g	$f = 1\text{ MHz}$		1.3	2.6	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.4\text{ }\Omega$ $I_D \cong 85\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		23	35	ns
Rise Time ^c	t_r			17	26	
Turn-Off Delay Time ^c	$t_{d(off)}$			34	52	
Fall Time ^c	t_f			8	15	
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}	$I_F = 30\text{ A}, V_{GS} = 0\text{ V}$		0.85	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 75\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		68	100	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2.6	4	A
Reverse Recovery Charge	Q_{rr}				88	132

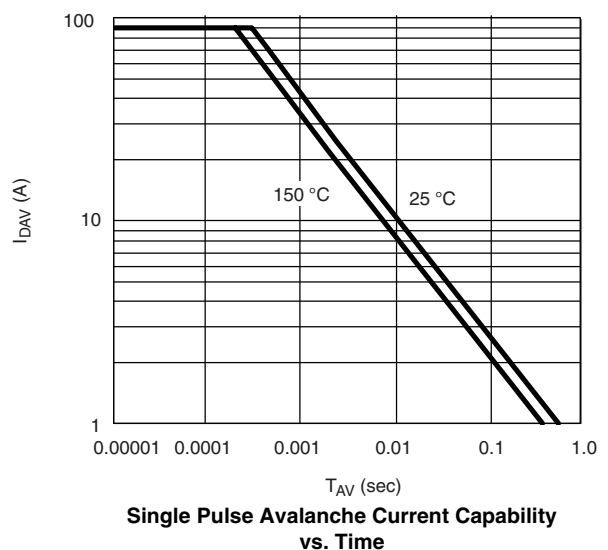
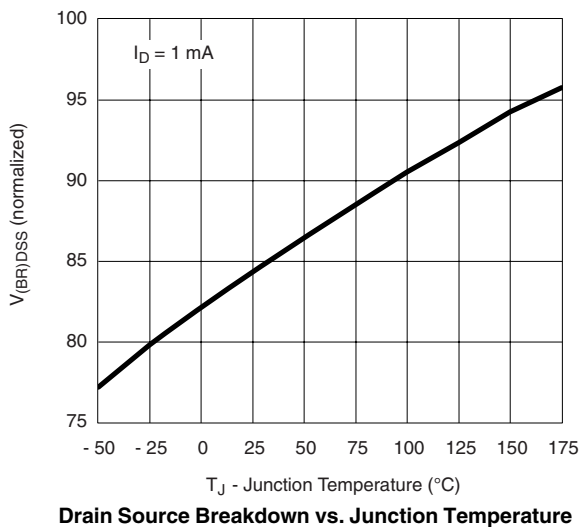
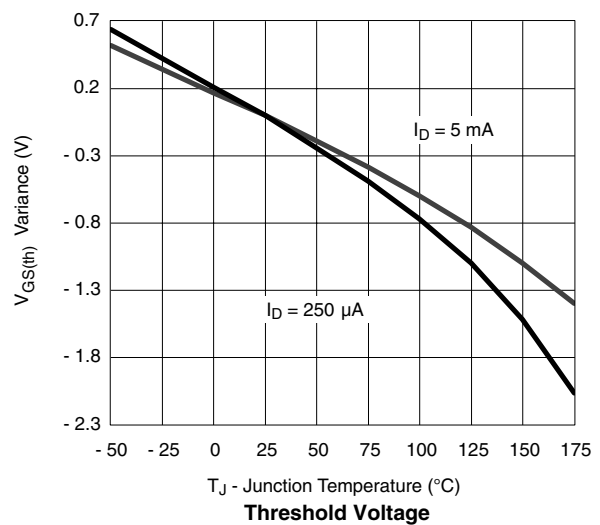
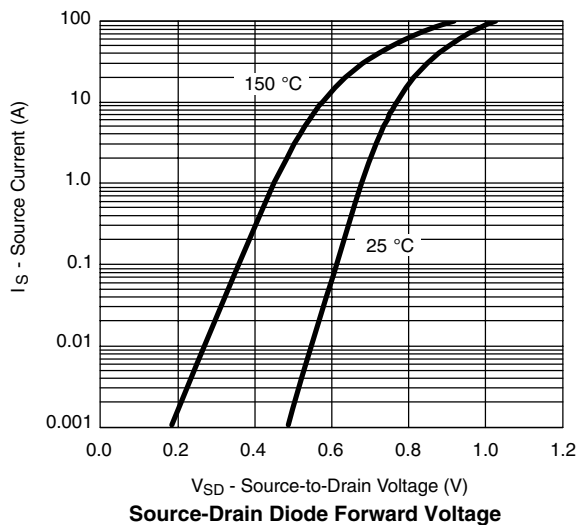
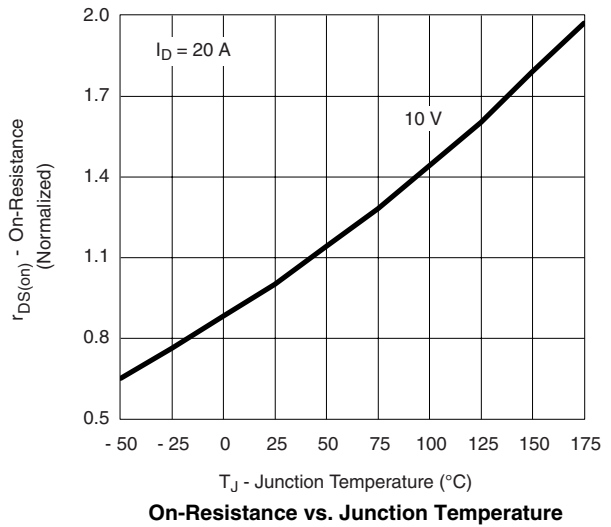
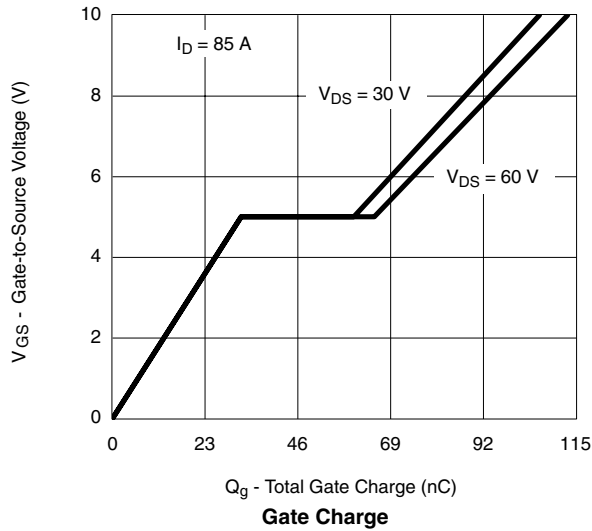
Notes:

- 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.

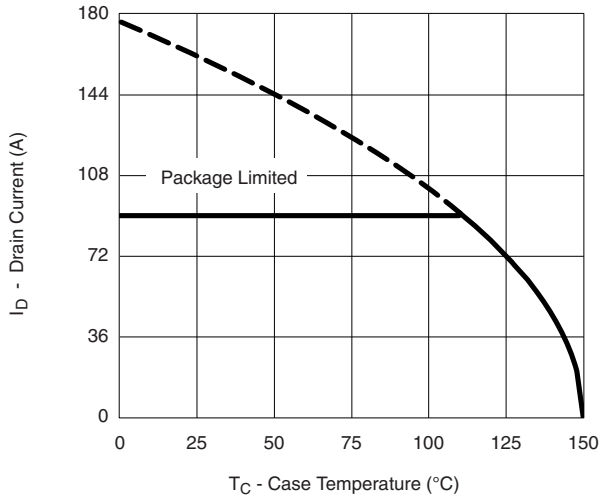
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

On-resistance vs. Gate-to-Source Voltage

Capacitance

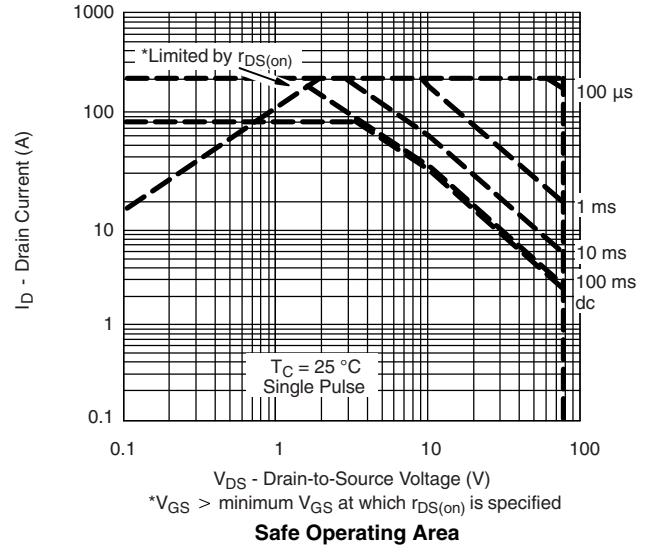
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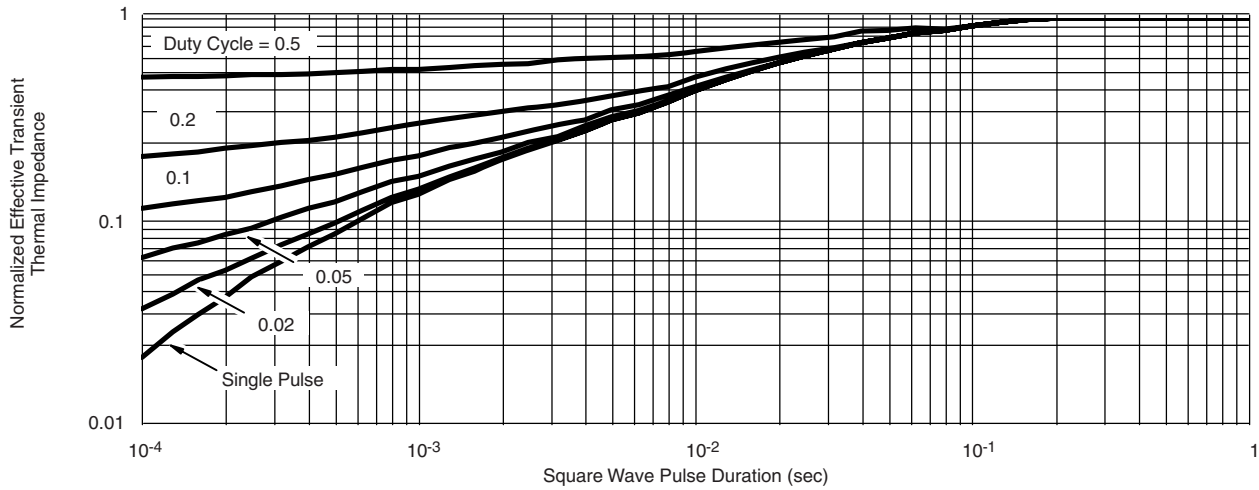
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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