N-Channel 75-V (D-S) 175°C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
75	0.006 @ V_{GS} = 10 V	90 [a]

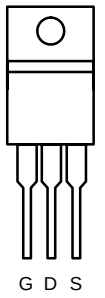
FEATURES

- TrenchFET® Power MOSFETS
- 175°C Junction Temperature

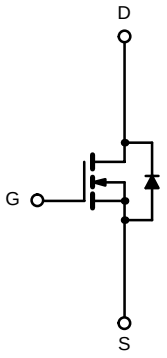
APPLICATIONS

- Automotive
  - Boardnet 42-V EPS and ABS
  - Motor Drives
- High Current
- DC/DC Converters

TO-220AB



Top View
SUP90N08-06



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[a]	A
	T_C = 125°C		83	
Pulsed Drain Current		I_{DM}	240	
Avalanche Current		I_{AR}	75	
Repetitive Avalanche Energy[b]	L = 0.1 mH	E_{AR}	280	mJ
Maximum Power Dissipation[b]	T_C = 25°C	P_D	300	W
	T_A = 25°C[d]		3.7	
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[d]	R_{thJA}	40	°C/W
Junction-to-Case	R_{thJC}	0.5	

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

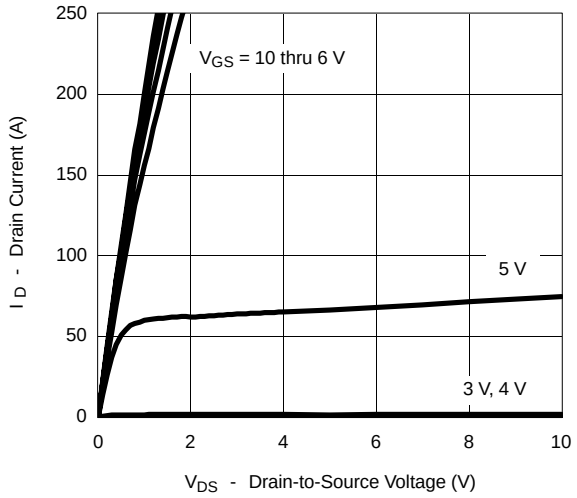
SPECIFICATIONS (T_J =25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	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		4.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	μA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 125°C			50	
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 175°C			250	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	120			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A		0.0048	0.006	Ω
		V_{GS} = 10 V, I_D = 30 A, T_J = 125°C			0.0115	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175°C			0.00145	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 30 A	30			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		7900		pF
Output Capacitance	C_{oss}			950		
Reverse Transfer Capacitance	C_{rss}			550		
Total Gate Charge[c]	Q_g	V_{DS} = 35 V, V_{GS} = 10 V, I_D = 90 A		145	215	nC
Gate-Source Charge[c]	Q_{gs}			30		
Gate-Drain Charge[c]	Q_{gd}			45		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 35 V, R_L ≃ 0.39 Ω I_D ≅ 90 A, V_{GEN} = 10 V, R_G = 2.5 Ω		25	40	ns
Rise Time[c]	t_r			200	300	
Turn-Off Delay Time[c]	$t_{d(off)}$			65	100	
Fall Time[c]	t_f			165	250	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)[b]						
Continuous Current	I_S				90	A
Pulsed Current	I_{SM}				240	
Forward Voltage[a]	V_{SD}	I_F = 60 A, V_{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 85 A, di/dt = 100 A/μs		80	120	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			4	7	A
Reverse Recovery Charge	Q_{rr}			0.16	0.30	μC

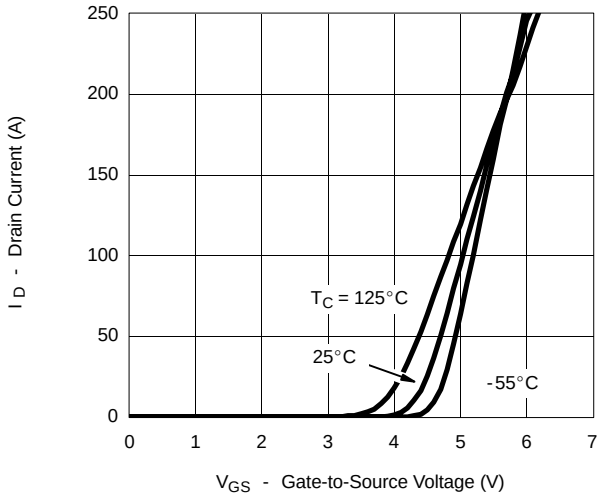
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

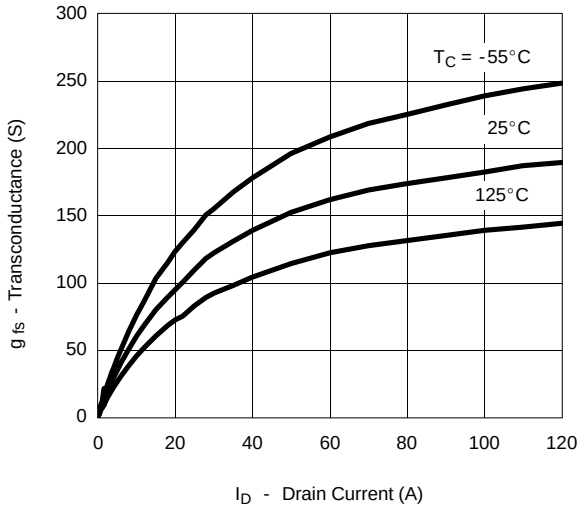
Output Characteristics



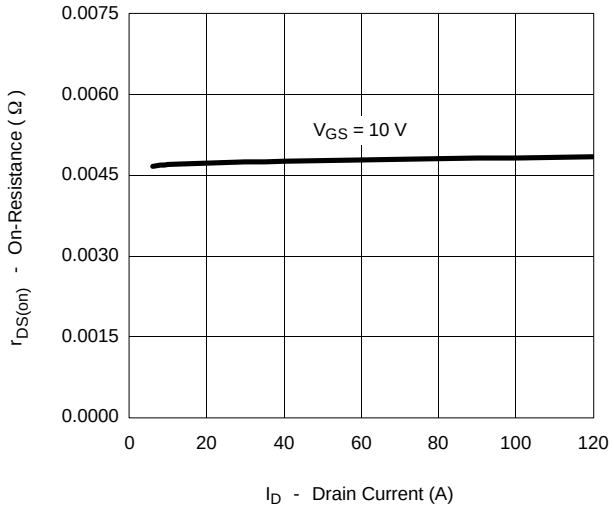
Transfer Characteristics



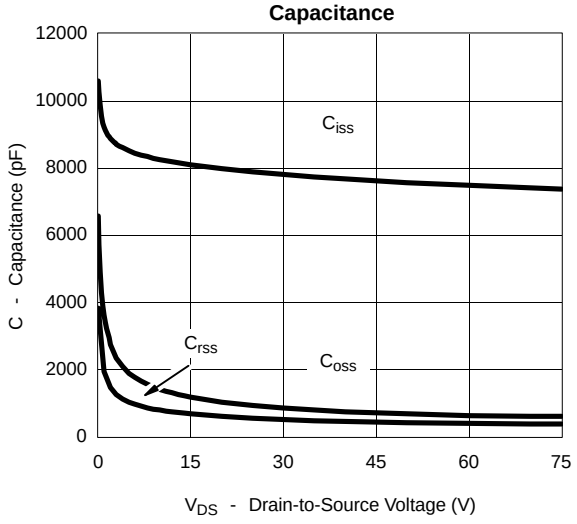
Transconductance



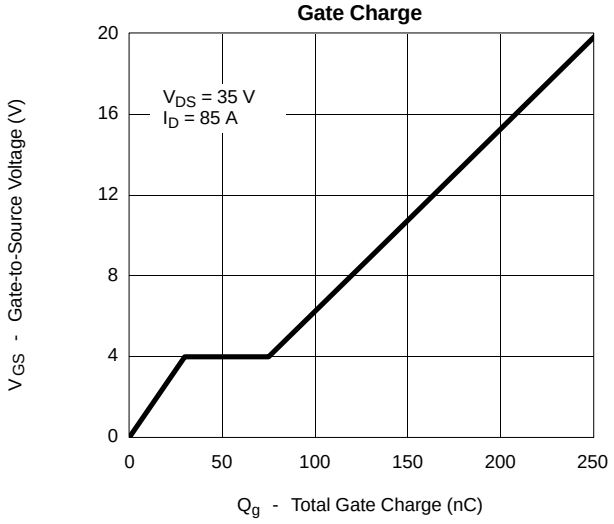
On-Resistance vs. Drain Current



Capacitance

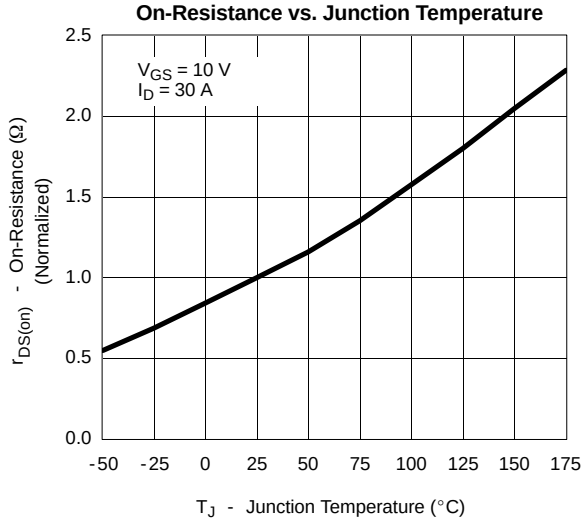


Gate Charge

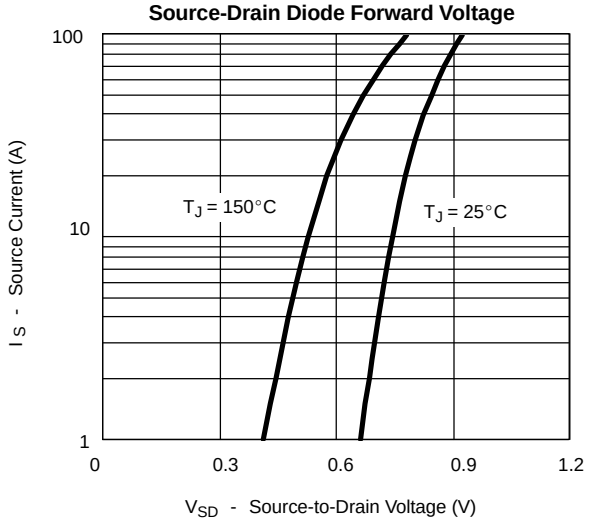


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

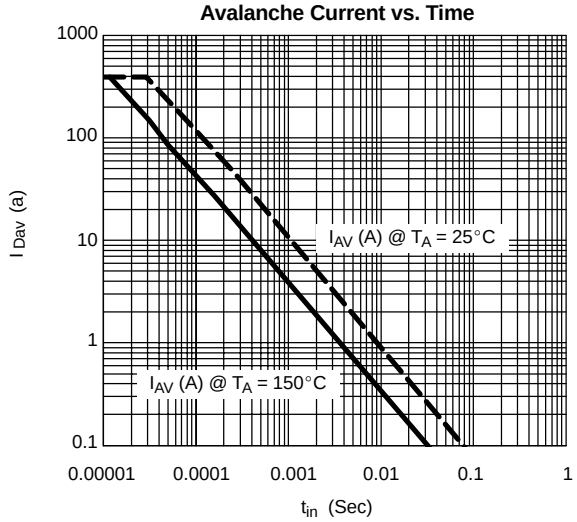
On-Resistance vs. Junction Temperature



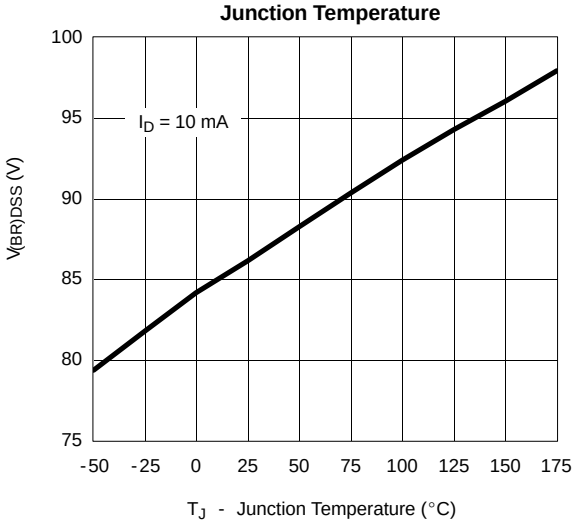
Source-Drain Diode Forward Voltage



Avalanche Current vs. Time

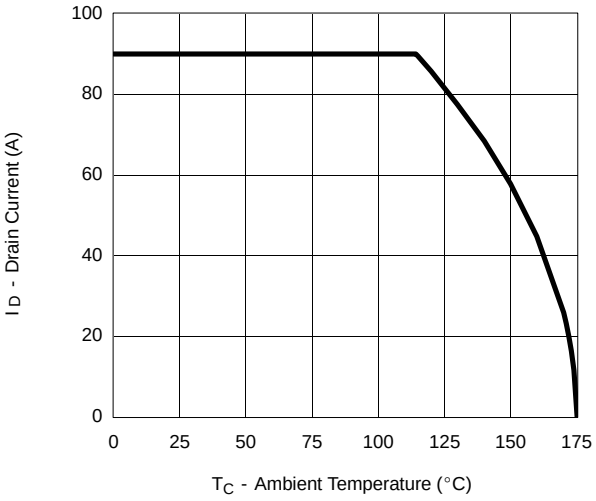


Drain Source Breakdown vs. Junction Temperature

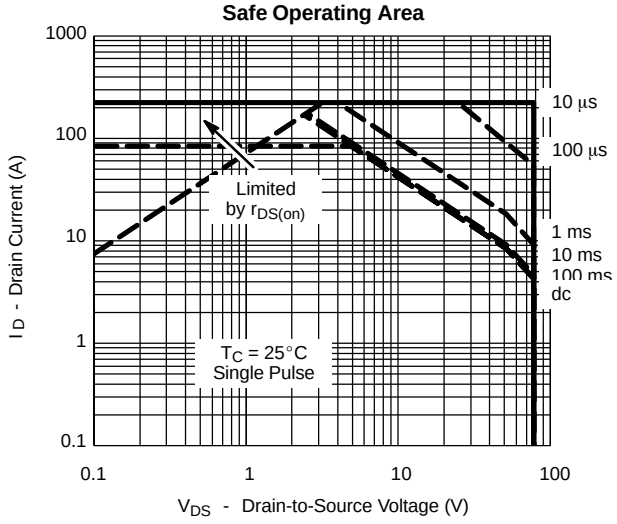


THERMAL RATINGS

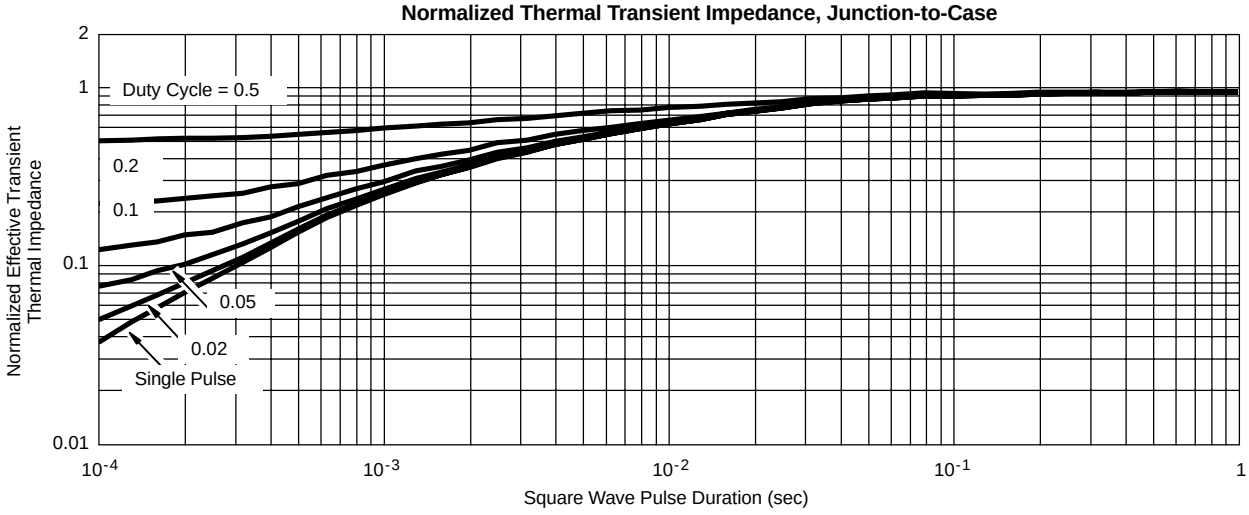
Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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