N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY			
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
100	0.0082 at V_{GS} = 10 V	90[d]	97

FEATURES

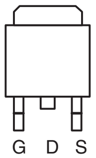
- TrenchFET® Power MOSFETS
- 175 °C Junction Temperature
- 100 % R_g and UIS Tested

RoHS
COMPLIANT

APPLICATIONS

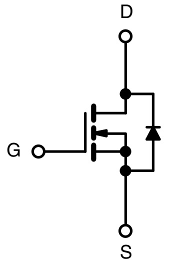
- Power Supply
  - Secondary Synchronous Rectification
- Industrial
- Primary Switch

TO-263



Top View

Ordering Information: SUM90N10-8m2P-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}	100	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}	60	
Single Avalanche Energy[a]	L = 0.1 mH	E_{AS}	180	mJ
Maximum Power Dissipation[a]	T_C = 25 °C	P_D	300[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}	0.5	

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.

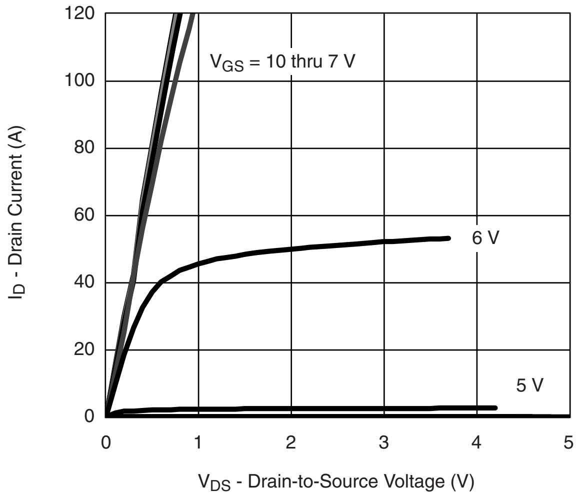
SPECIFICATIONS T_J = 25 °C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{DS} = 0 V, I_D = 250 µA	100			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} = 100 V, V_{GS} = 0 V			1	µA
		V_{DS} = 100 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 100 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		0.0067	0.0082	Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125 °C		0.0127	0.0170	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A		62		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 50 V, f = 1 MHz		6290		pF
Output Capacitance	C_{oss}			535		
Reverse Transfer Capacitance	C_{rss}			182		
Total Gate Charge[c]	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D = 85 A		97	150	nC
Gate-Source Charge[c]	Q_{gs}			32		
Gate-Drain Charge[c]	Q_{gd}			25		
Gate Resistance	R_g	f = 1 MHz		1.4	2.8	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 50 V, R_L = 0.588 Ω $I_D \cong$ 85 A, V_{GEN} = 10 V, R_g = 1 Ω		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			9	18	
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 = 30 A, V_{GS} = 0 V		0.85	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 75 A, di/dt = 100 A/µs		61	100	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			3.0	4.5	A
Reverse Recovery Charge	Q_{rr}			91	130	µC

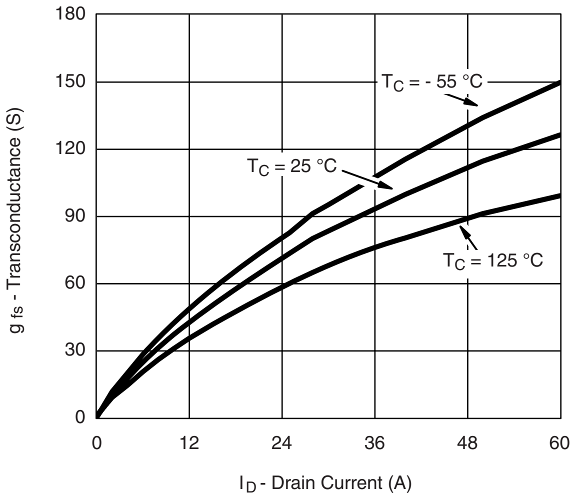
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

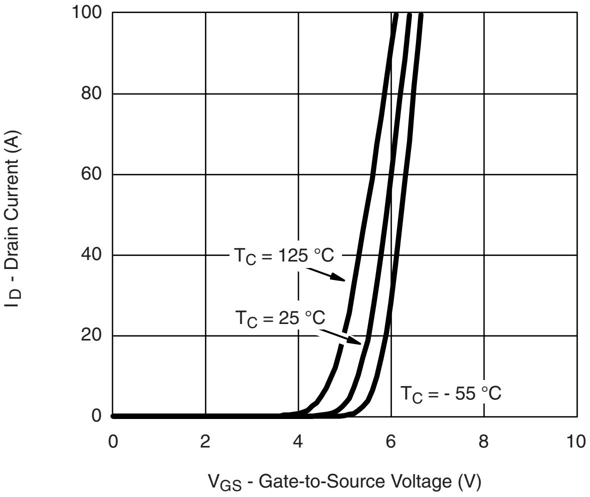
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



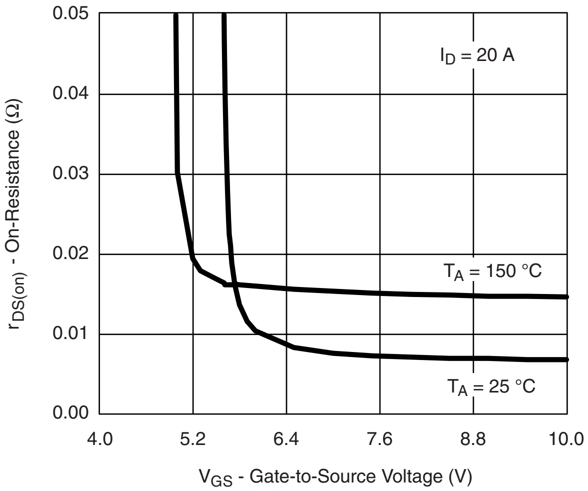
Output Characteristics



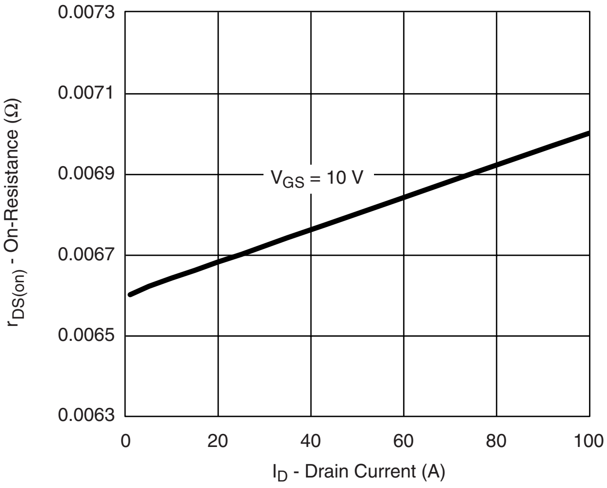
Transconductance



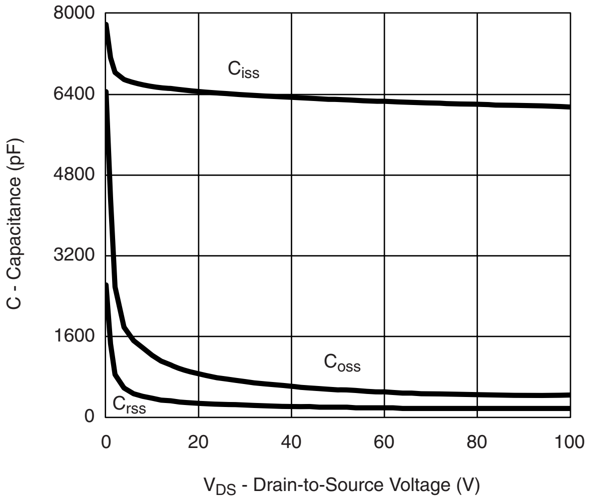
Transfer Characteristics



On-resistance vs. Gate-to-Source Voltage

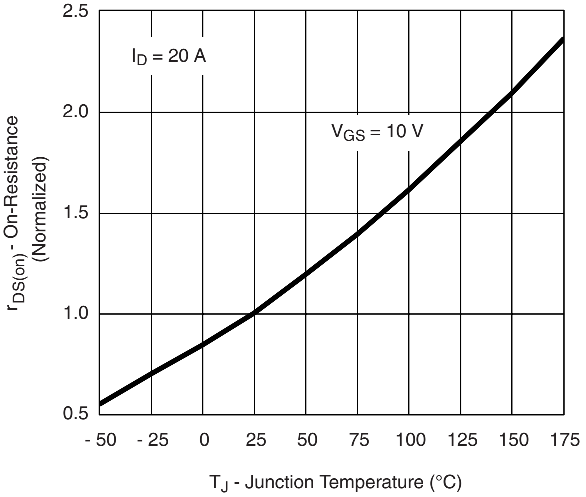


On-Resistance vs. Drain Current

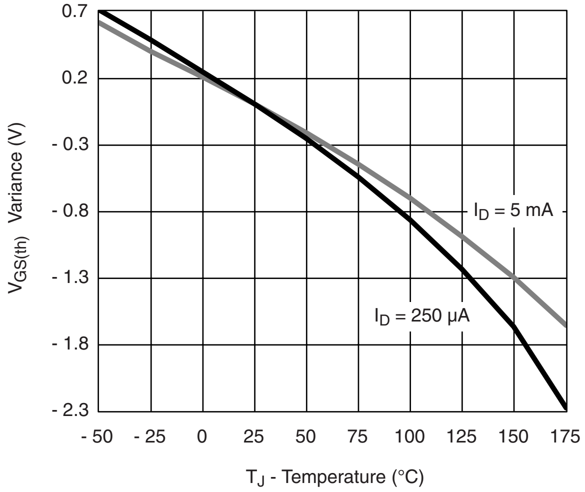


Capacitance

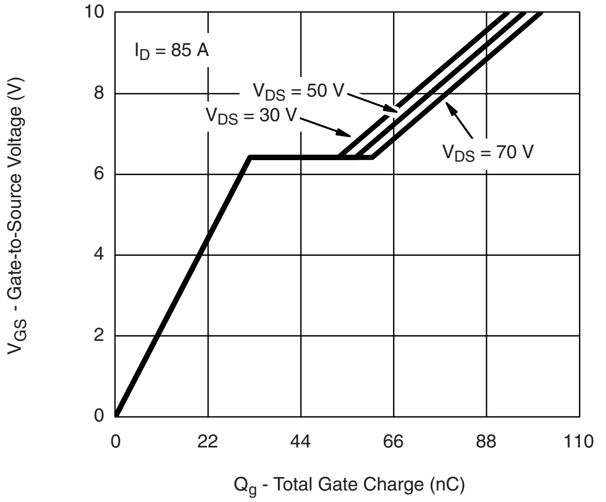
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



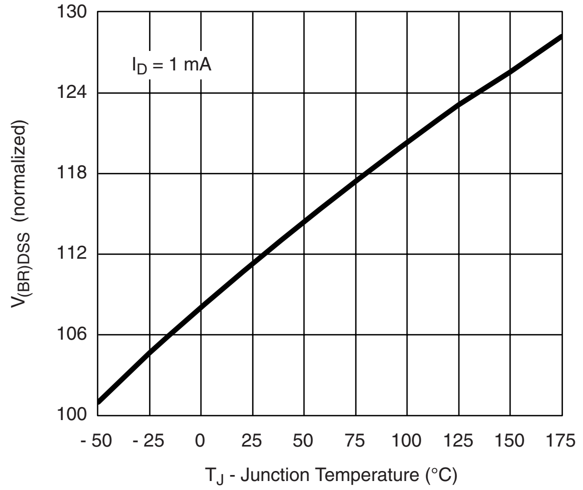
On-Resistance vs. Junction Temperature



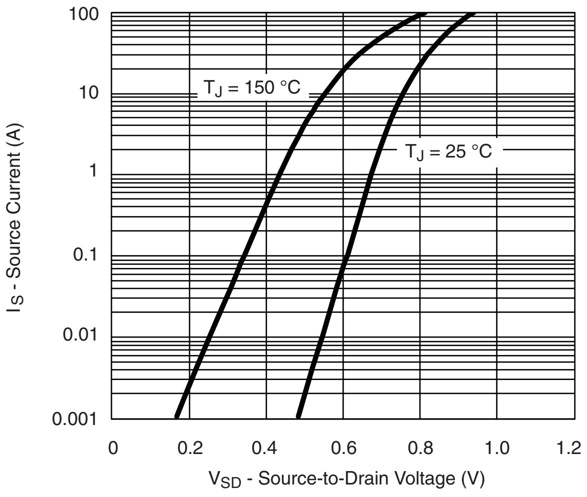
Threshold Voltage



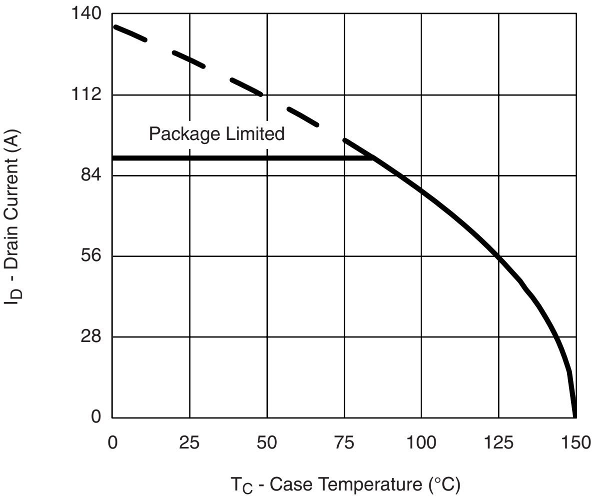
Gate Charge



Drain Source Breakdown vs. Junction Temperature

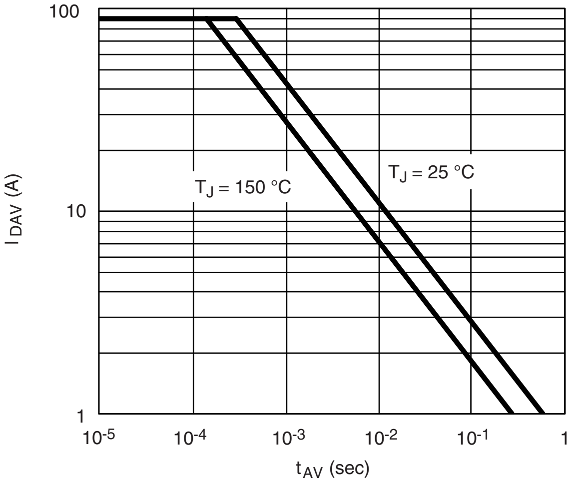


Source-Drain Diode Forward Voltage

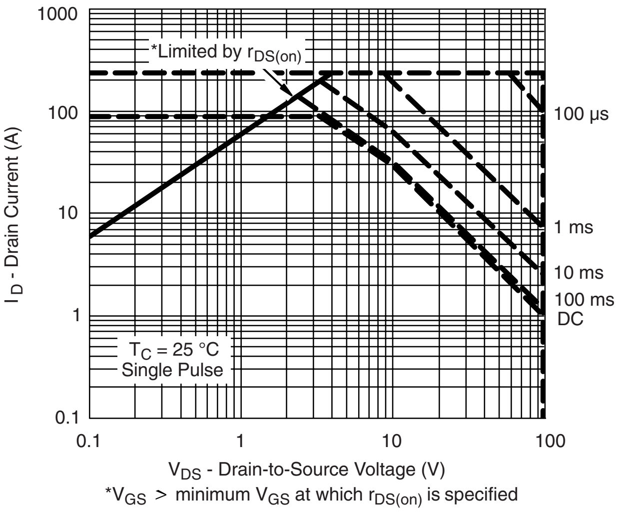


Maximum Drain Current vs. Case Temperature

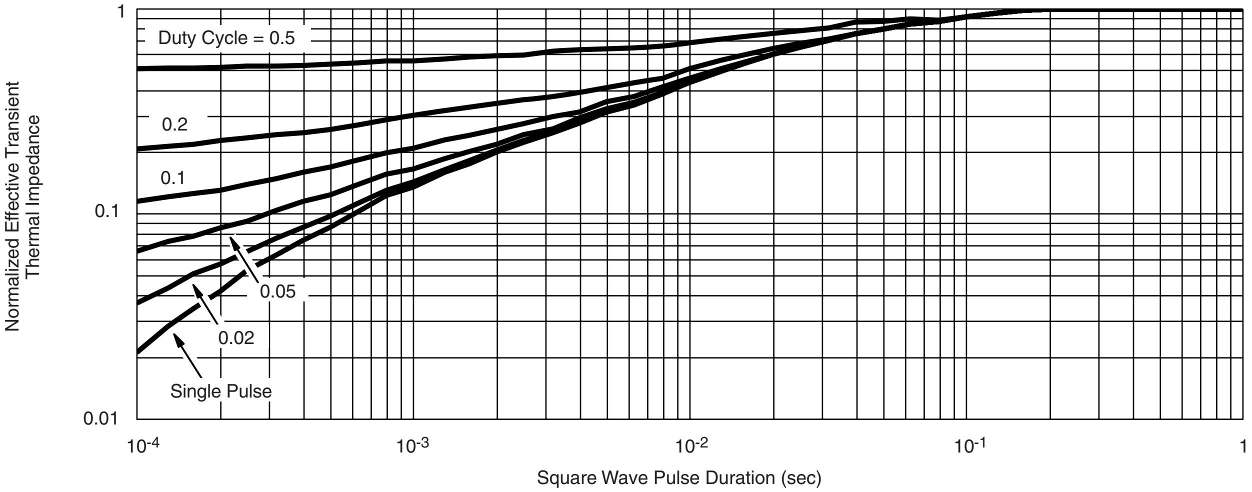
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Single Pulse Avalanche Current Capability vs. Time



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?74643.

Notice