

N-Channel 60-V (D-S) 175 °C MOSFET

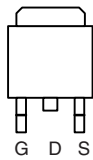
PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
60	0.0039 at $V_{GS} = 10$ V	110 ^a	200

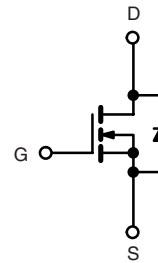
FEATURES

- TrenchFET[®] Power MOSFET
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- High Threshold Voltage At High Temperature
- 100 % R_g Tested


RoHS
COMPLIANT

TO-263


Top View

Ordering Information: SUM110N06-3m9H-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}	60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	$T_C = 25$ °C	110 ^a
		$T_C = 125$ °C	110 ^a
Pulsed Drain Current	I_{DM}	440	A
Single Pulse Avalanche Current	I_{AS}	70	
Single Pulse Avalanche Energy	E_{AS}	245	mJ
Maximum Power Dissipation ^b	P_D	$T_C = 25$ °C	375 ^c
		$T_A = 25$ °C ^d	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	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.4	

Notes:

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

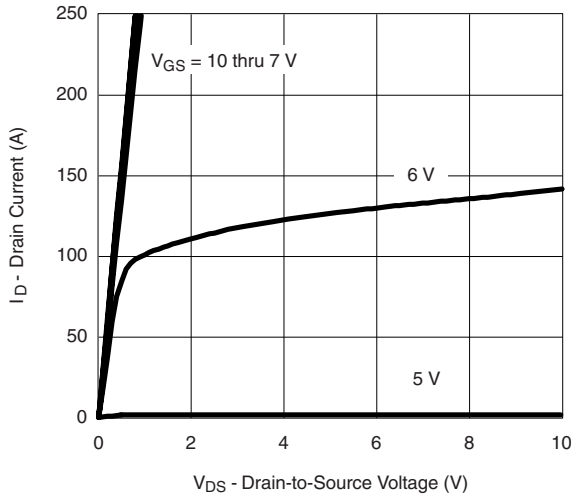
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	3.4		4.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	120			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		0.00325	0.0039	Ω
		$V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.0063	
		$V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.0082	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 30\text{ A}$	30			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		15 800		μF
Output Capacitance	C_{oss}			1050		
Reverse Transfer Capacitance	C_{rss}			600		
Gate Resistance	R_g	$f = 1\text{ MHz}$	0.6	1.2	1.8	Ω
Total Gate Charge ^c	Q_g	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 110\text{ A}$		200	300	nC
Gate-Source Charge ^c	Q_{gs}			80		
Gate-Drain Charge ^c	Q_{gd}			45		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.27\text{ }\Omega$ $I_D \approx 110\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$		45	70	ns
Rise Time ^c	t_r			160	240	
Turn-Off Delay Time ^c	$t_{d(off)}$			75	115	
Fall Time ^c	t_f			14	25	
Source-Drain Diode Ratings and Characteristics ($T_C = 25\text{ }^\circ\text{C}$) ^b						
Continuous Current	I_S				110	A
Pulsed Current	I_{SM}				240	
Forward Voltage ^a	V_{SD}	$I_F = 85\text{ A}, V_{GS} = 0\text{ V}$		1.1	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 85\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		65	100	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			4.4	6.6	A
Reverse Recovery Charge	Q_{rr}				143	330

Notes:

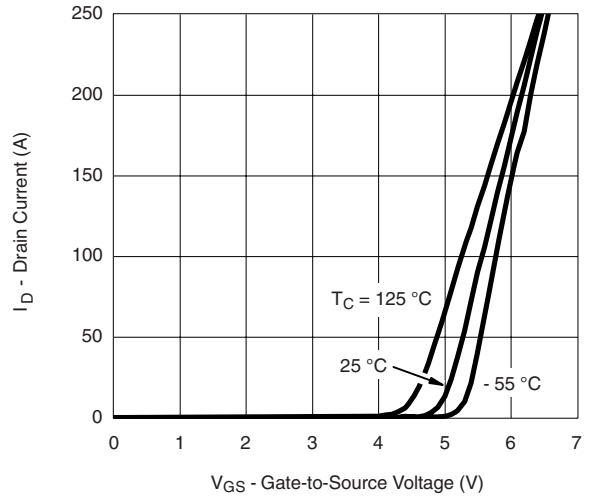
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

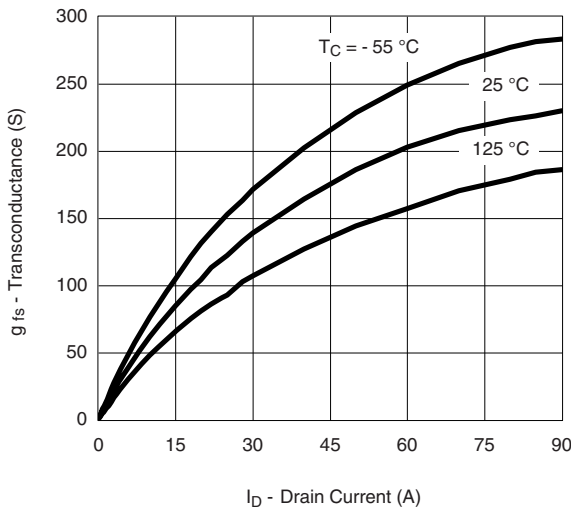
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



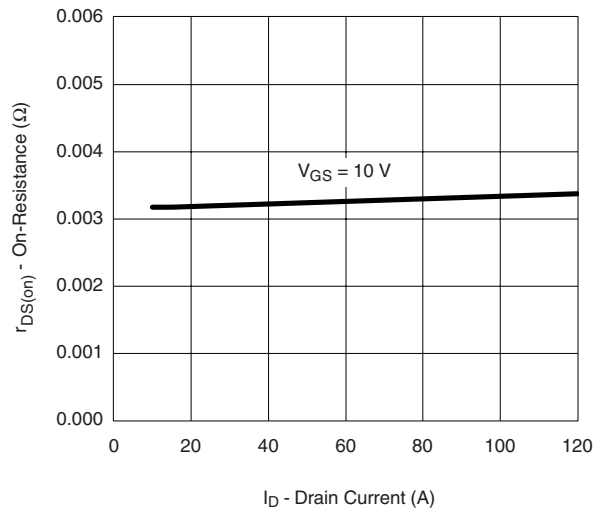
Output Characteristics



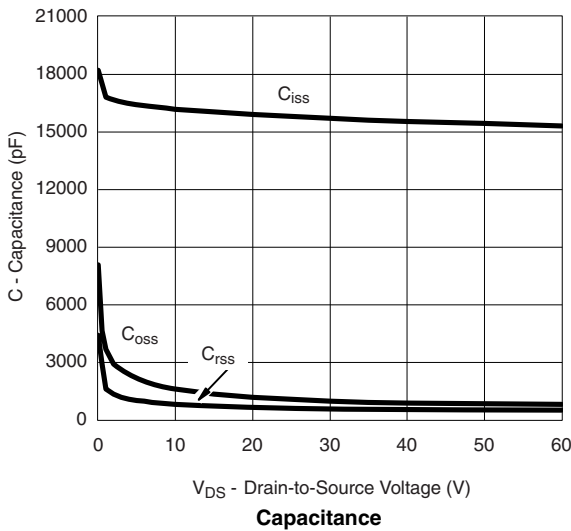
Transfer Characteristics



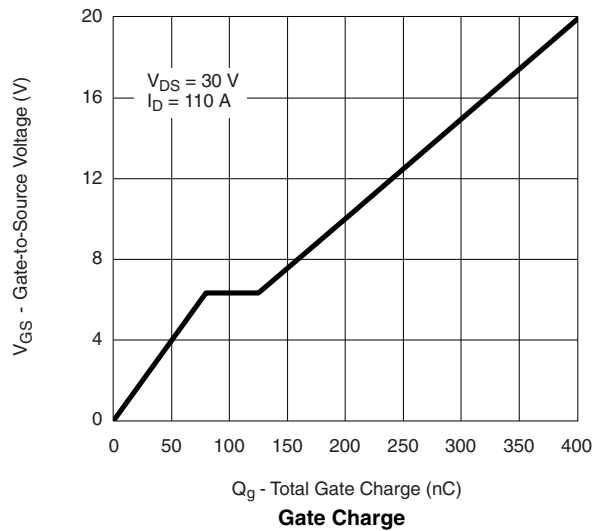
Transconductance



On-Resistance vs. Drain Current

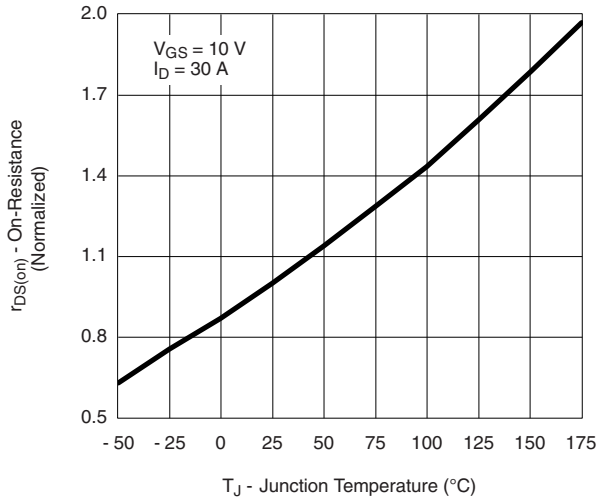


Capacitance

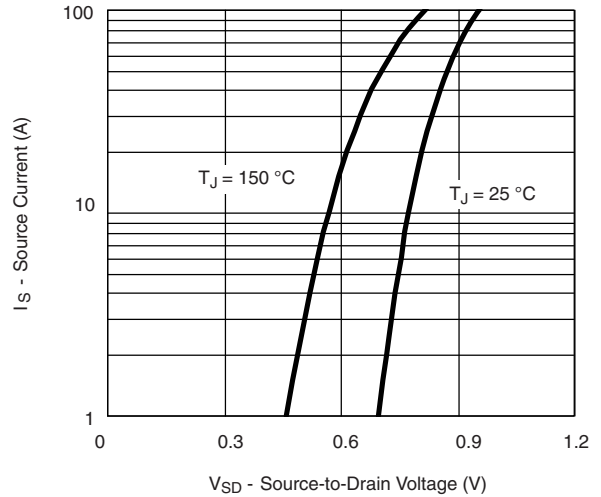


Gate Charge

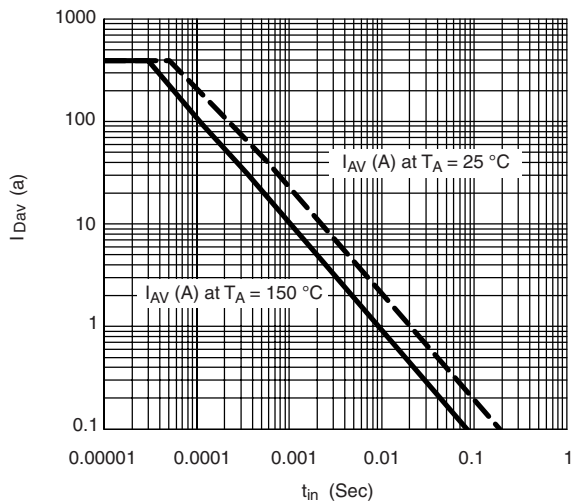
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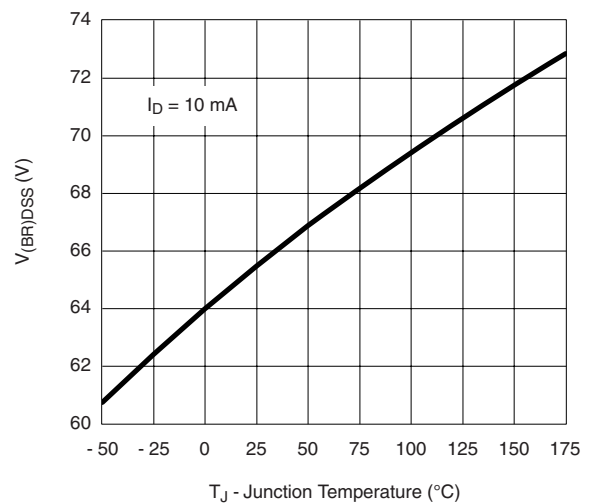
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

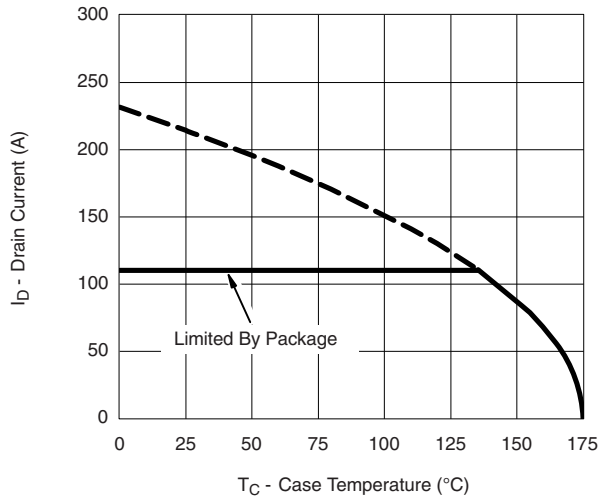


Avalanche Current vs. Time

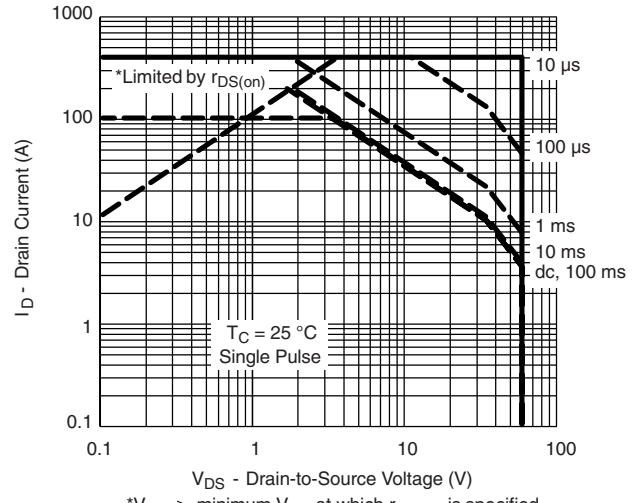


Drain Source Breakdown vs. Junction Temperature

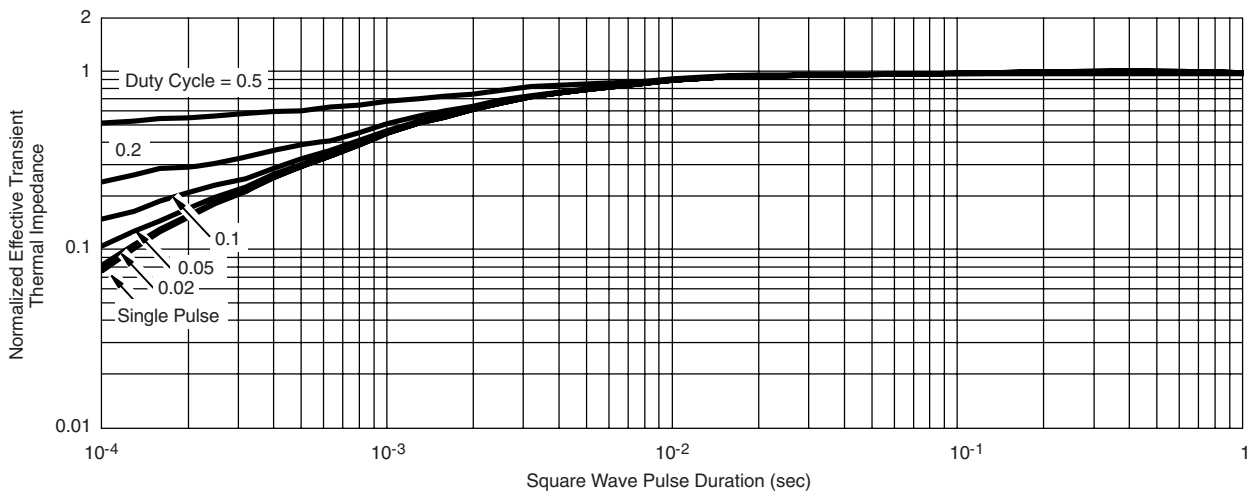
THERMAL RATINGS



Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area
* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified



Normalized Thermal Transient Impedance, Junction-to-Case

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