N-Channel 55-V (D-S), 175°C MOSFET

PRODUCT SUMMARY			
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
55	0.006 @ V_{GS} = 10 V	110	65
	0.0085 @ V_{GS} = 4.5 V	92	

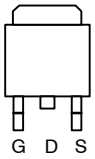
FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- New Low Thermal Resistance Package

APPLICATIONS

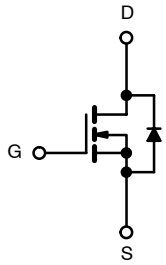
- Automotive and Industrial

TO-263



Top View

Ordering Information: SUM110N05-06L
SUM110N05-06L—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}	55	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 175°C)	T_C = 25°C	I_D	110	A
	T_C = 125°C		63	
Pulsed Drain Current		I_{DM}	240	
Avalanche Current		I_{AR}	60	
Repetitive Avalanche Energy[a]	L = 0.1 mH	E_{AR}	180	mJ
Maximum Power Dissipation	T_C = 25°C	P_D	158[b]	W
	T_A = 25°C [c]		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[c]	R_{thJA}	40	°C/W
Junction-to-Case	R_{thJC}	0.95	

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

SPECIFICATIONS (T_J =25°C UNLESS OTHERWISE NOTED)

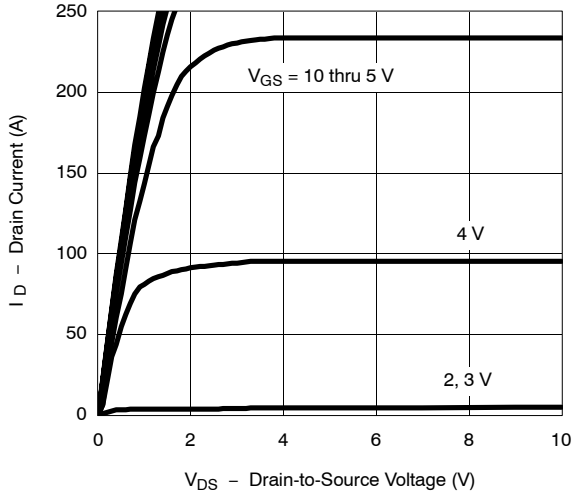
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{DS} = 0 V, I_D = 250 μA	55			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1		3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 55 V, V_{GS} = 0 V			1	μA
		V_{DS} = 55 V, V_{GS} = 0 V, T_J = 125°C			50	
		V_{DS} = 55 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		0.0047	0.006	Ω
		V_{GS} = 4.5 V, I_D = 20 A		0.0066	0.0085	
		V_{GS} = 10 V, I_D = 30 A, T_J = 125°C			0.0102	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175°C			0.0132	
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		3300		pF
Output Capacitance	C_{oss}			625		
Reverse Transfer Capacitance	C_{rss}			310		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 110 A		65	100	nC
Gate-Source Charge[c]	Q_{gs}			15		
Gate-Drain Charge[c]	Q_{gd}			16		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.27 Ω I_D ≅ 110 A, V_{GEN} = 10 V, R_g = 2.5 Ω		15	25	ns
Rise Time[c]	t_r			15	25	
Turn-Off Delay Time[c]	$t_{d(off)}$			35	55	
Fall Time[c]	t_f			15	25	
Source-drain Diode Ratings and Characteristics (T_C = 25°C)[b]						
Continuous Current	I_S				110	A
Pulsed Current	I_{SM}				240	
Forward Voltage[a]	V_{SD}	I_F = 110 A, V_{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 110 A, di/dt = 100 A/μs		70	125	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2.5	5	A
Reverse Recovery Charge	Q_{rr}			0.09	0.31	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.

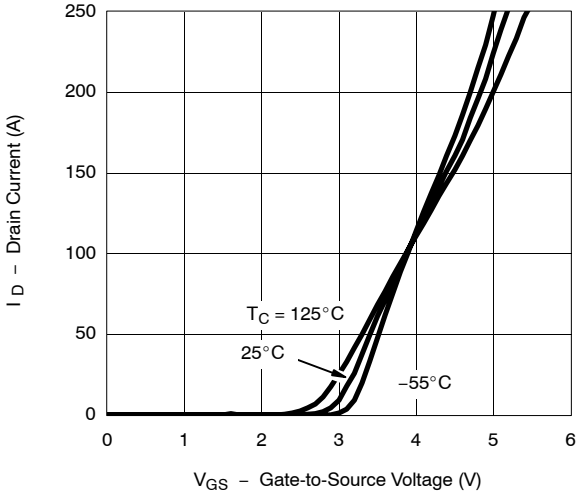
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

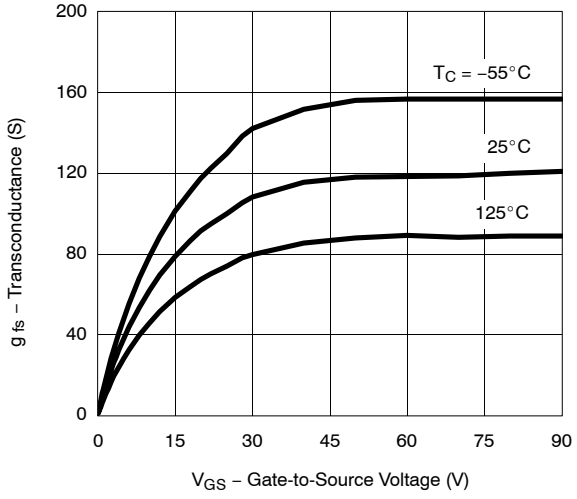
Output Characteristics



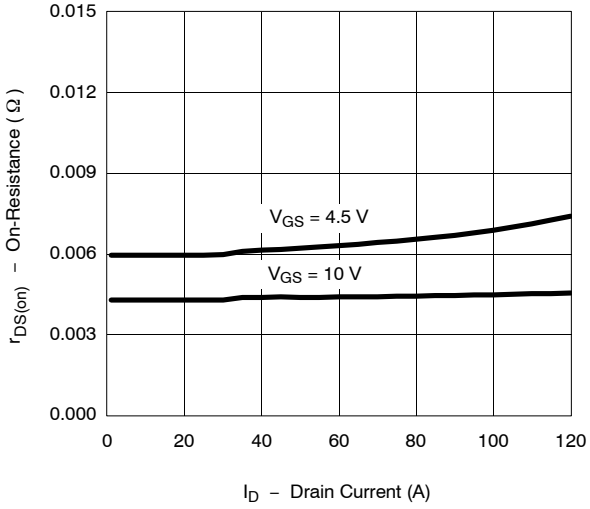
Transfer Characteristics



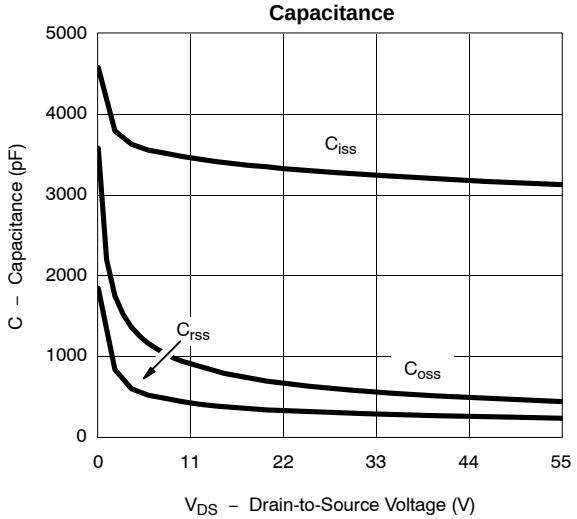
Transconductance



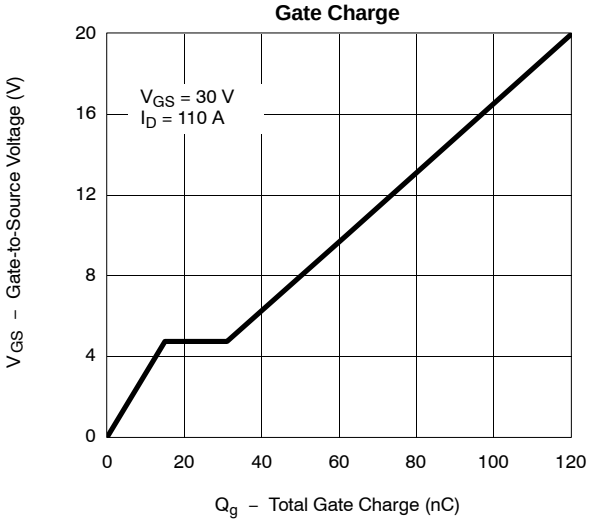
On-Resistance vs. Drain Current



Capacitance

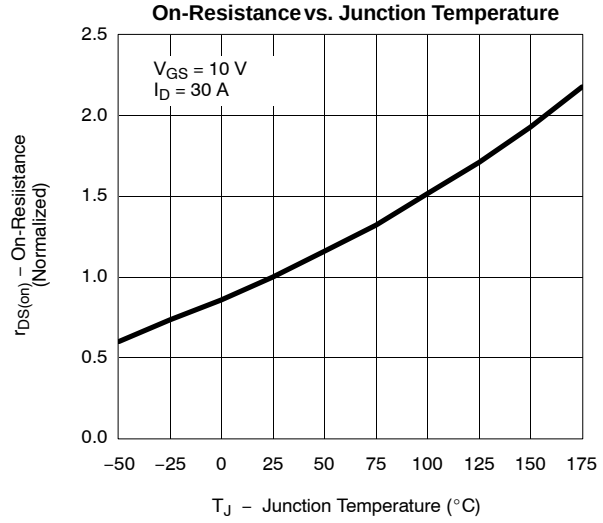


Gate Charge

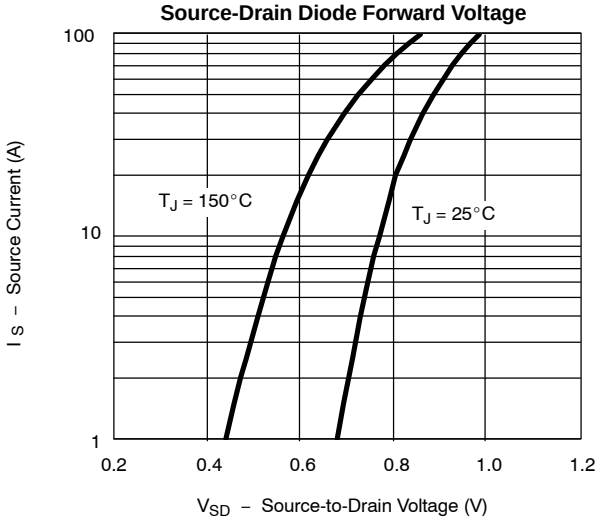


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

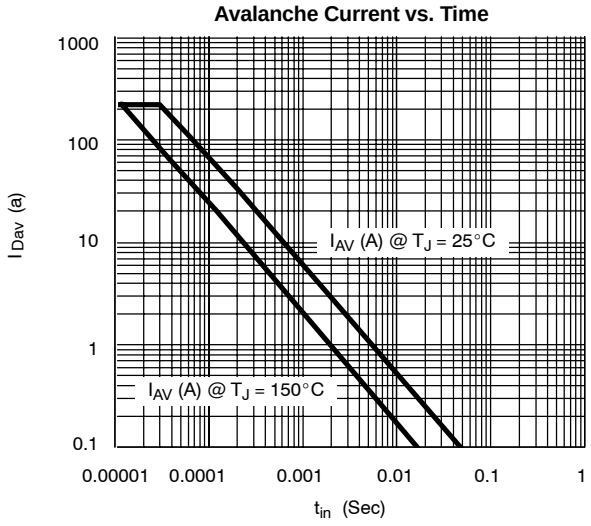
On-Resistance vs. Junction Temperature



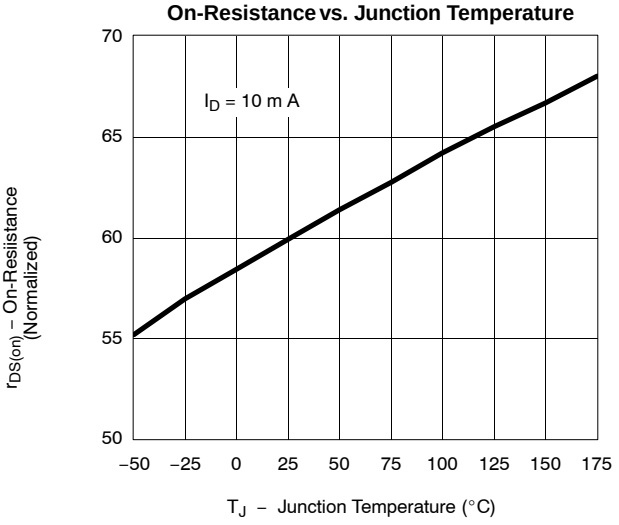
Source-Drain Diode Forward Voltage



Avalanche Current vs. Time

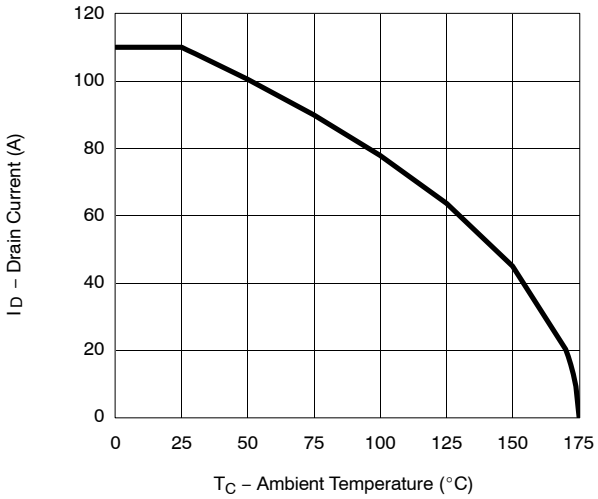


On-Resistance vs. Junction Temperature

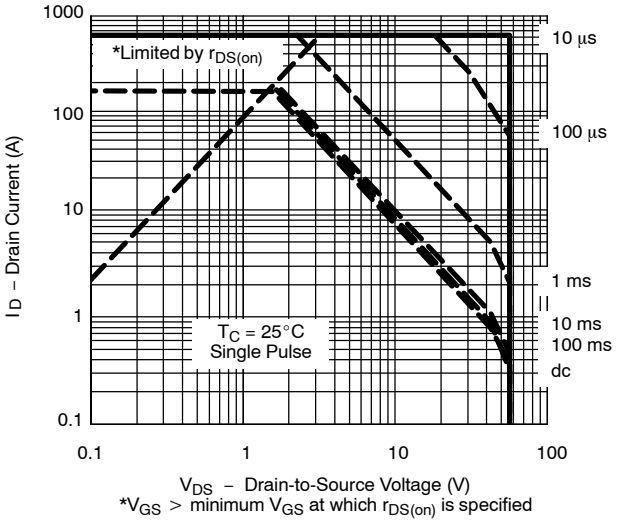


THERMAL RATINGS

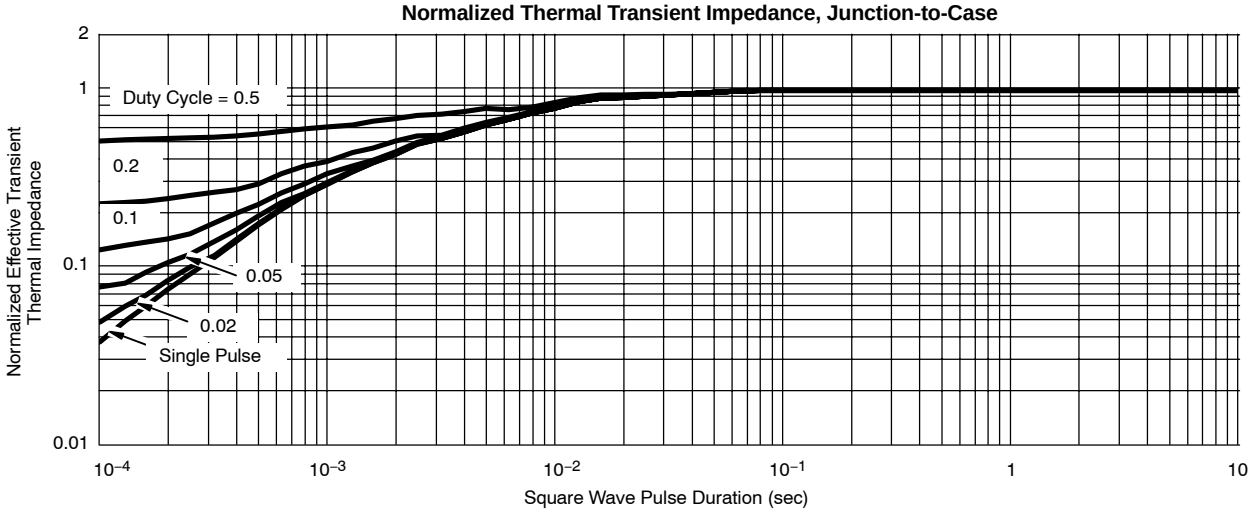
Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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