N-Channel 40-V (D-S) 175 °C MOSFET

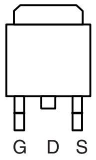
PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.0023 at V_{GS} = 10 V	110^a
	0.003 at V_{GS} = 4.5 V	

FEATURES

- TrenchFET® Power MOSFET
- 100 % R_g Tested

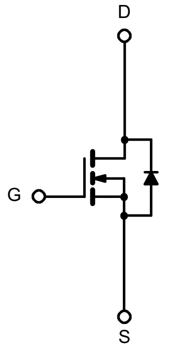
RoHS
COMPLIANT

TO-263



Top View

Ordering Information: SUM110N04-2m3L-E3 (Lead (Pb)-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	110^a	A
	T_C = 125 °C		110^a	
Pulsed Drain Current		I_{DM}	440	
Avalanche Current, Single Pulse		I_{AS}	75	
Repetitive Avalanche Energy, Single Pulse	L = 0.1 mH	E_{AS}	280	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	375^b	W
	T_A = 25 °C		3.75	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Typical**	**Unit**
Junction-to-Ambient	PCB Mount[c]	R_{thJA}	40	°C/W
Junction-to-Case (Drain)		R_{thJC}	0.4	

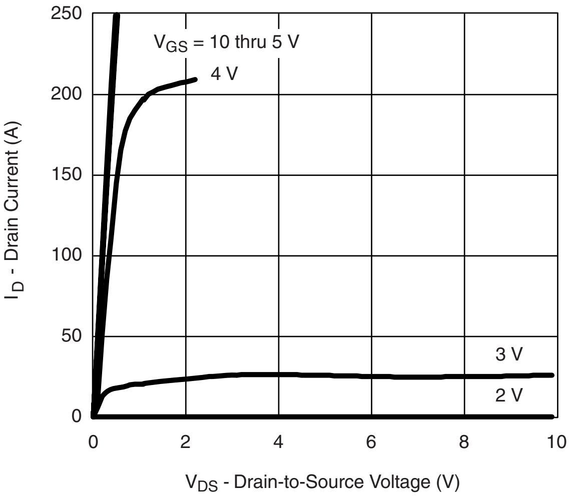
Notes:
a. Package limited.
b. See SOA curve for voltage derating.
c. When Mounted on 1" square PCB (FR-4 material).

SPECIFICATIONS T_J = 25 °C, unless otherwise noted

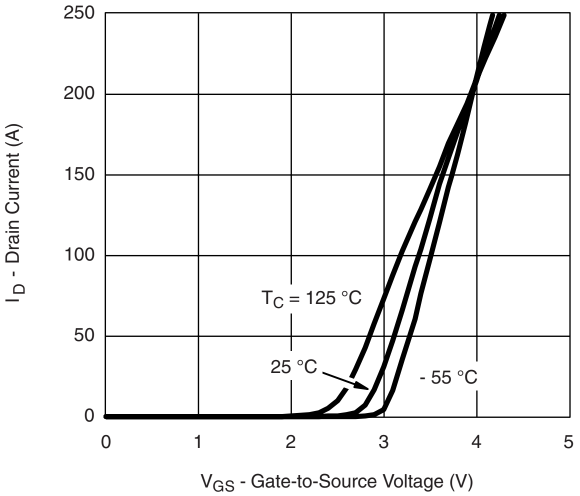
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA	40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1		3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V			1	µA
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 175 °C			10	mA
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq 5$ V, V_{GS} = 10 V	120			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A		0.0019	0.0023	Ω
		V_{GS} = 4.5 V, I_D = 20 A		0.0024	0.003	
		V_{GS} = 10 V, I_D = 30 A, T_J = 125 °C			0.0035	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175 °C			0.0044	
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		13600		pF
Output Capacitance	C_{oss}			1420		
Reverse Transfer Capacitance	C_{rss}			1040		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 110 A		240	360	nC
Gate-Source Charge[c]	Q_{gs}			53		
Gate-Drain Charge[c]	Q_{gd}			55		
Gate Resistance	R_g	f = 1.0 MHz	0.65	1.3	2	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.27 Ω $I_D \cong$ 110 A, V_{GEN} = 10 V, R_g = 2.5 Ω		25	40	ns
Rise Time[c]	t_r			100	150	
Turn-Off Delay Time[c]	$t_{d(off)}$			125	190	
Fall Time[c]	t_f			200	300	
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 = 85 A, V_{GS} = 0 V		1.1	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 85 A, di/dt = 100 A/µs		56	85	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$			3.1	4.7	A
Reverse Recovery Charge	Q_{rr}			0.087	0.2	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.

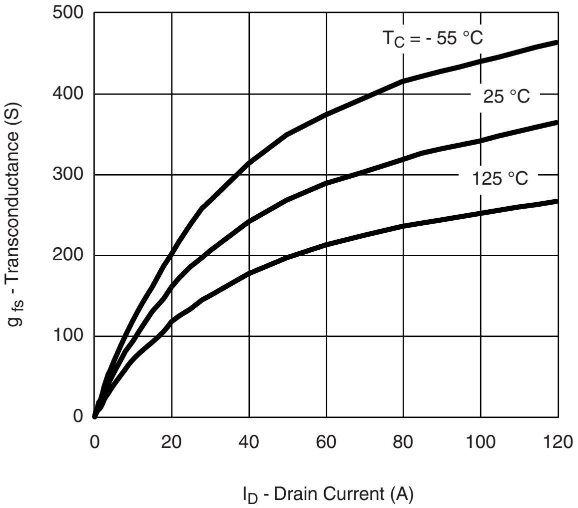
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



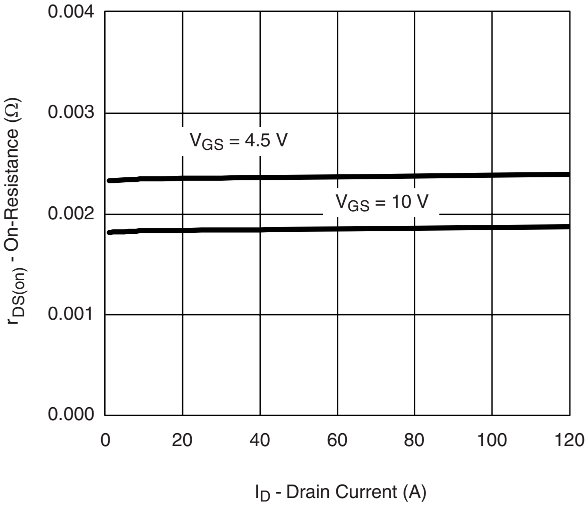
Output Characteristics



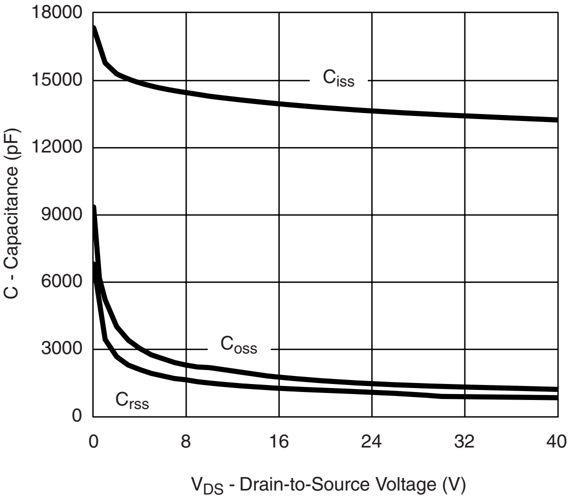
Transfer Characteristics



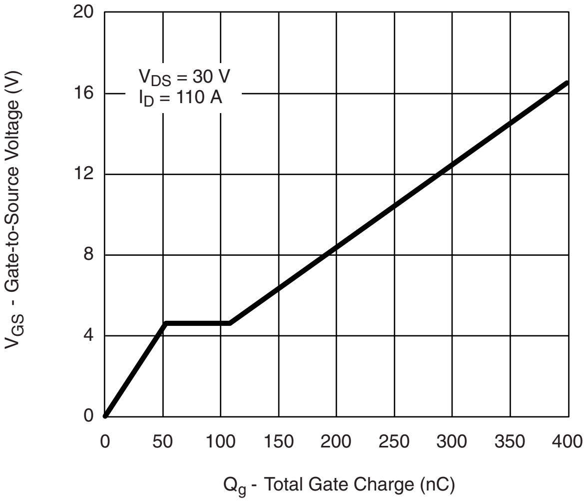
Transconductance



On-Resistance vs. Drain Current

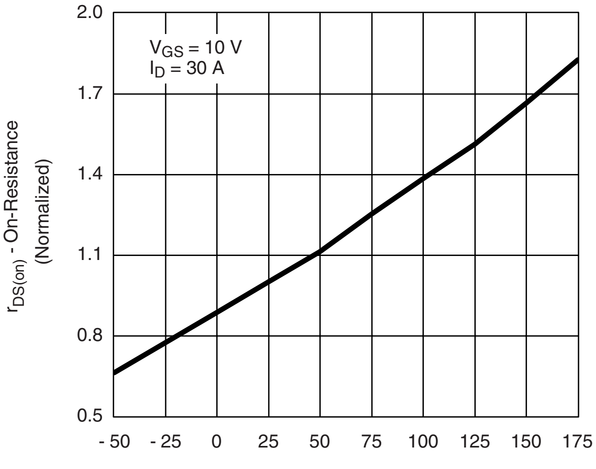


Capacitance

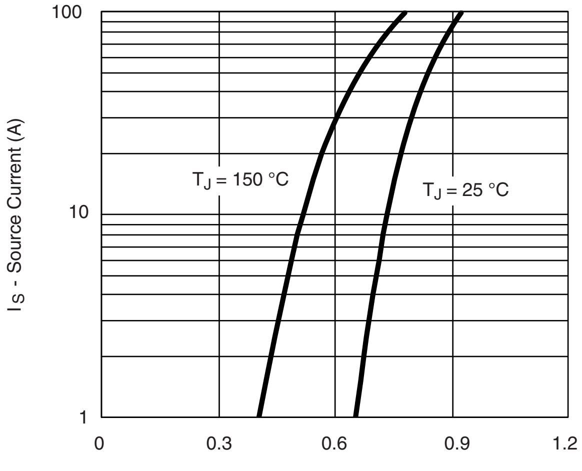


Gate Charge

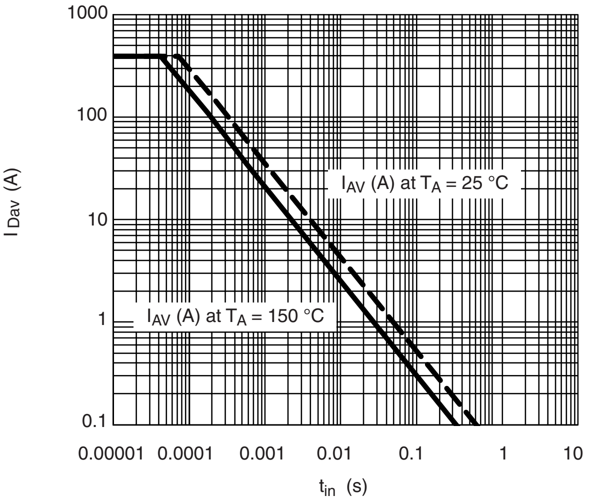
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



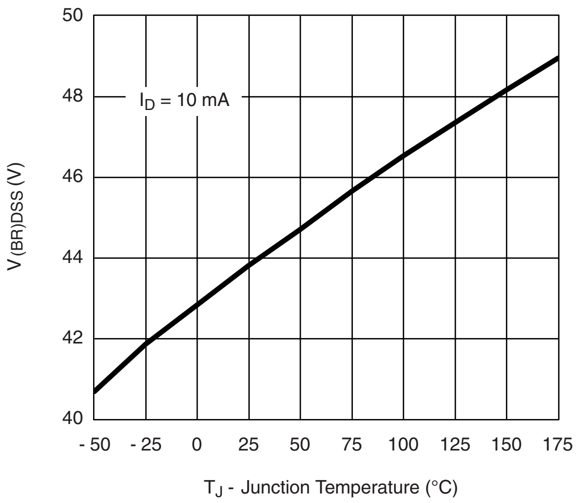
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

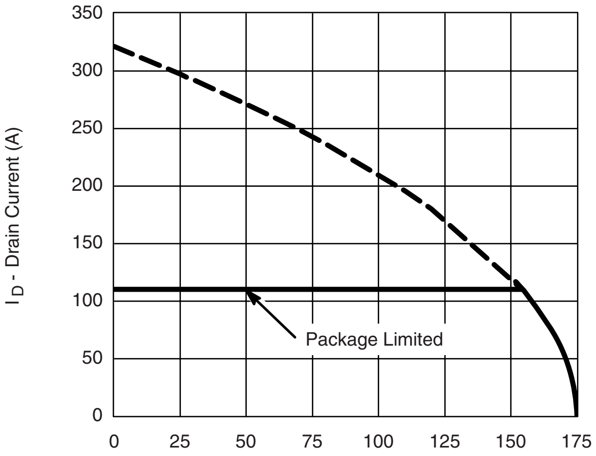


Avalanche Current vs. Time

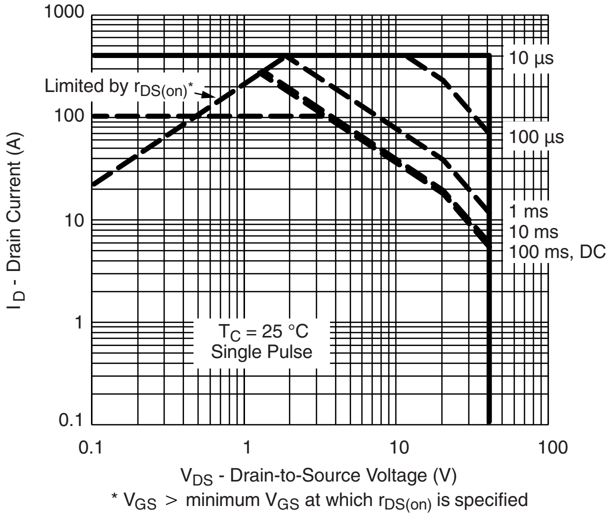


Drain Source Breakdown vs. Junction Temperature

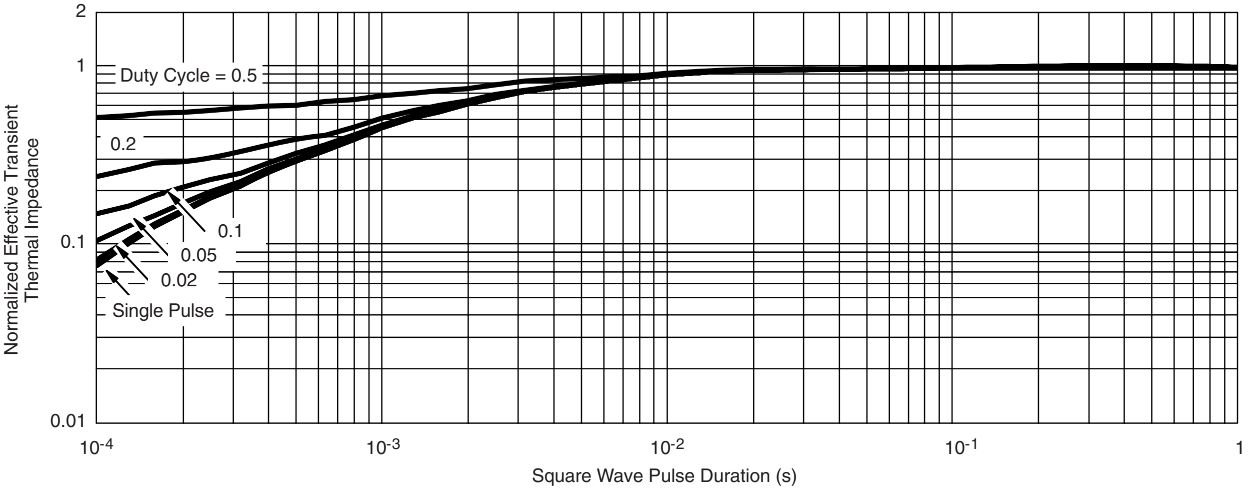
THERMAL RATINGS



Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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