N-Channel 40-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.0035 at V_{GS} = 10 V	110[a]
	0.0053 at V_{GS} = 4.5 V	

FEATURES

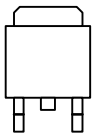
- TrenchFET® Power MOSFET
- 175 °C Junction Temperature

Available
RoHS* COMPLIANT

APPLICATIONS

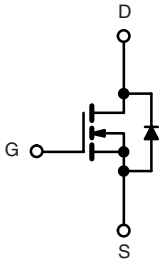
- Industrial

TO-263



Top View

Ordering Information: SUM110N04-03L
SUM110N04-03L-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}	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		102[a]	
Pulsed Drain Current		I_{DM}	300	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	55	
Single Pulse Avalanche Energy		E_{AS}	151	mJ
Maximum Power Dissipation[b]	T_C = 25 °C	P_D	230[c]	W
	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	PCB Mount[d]	R_{thJA}	40	°C/W
Junction-to-Case		R_{thJC}	0.65	

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).

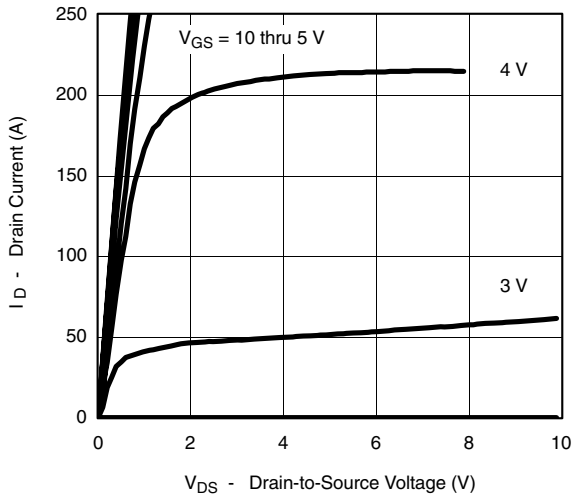
* Pb containing terminations are not RoHS compliant, exemptions may apply.

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			250	
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		0.0029	0.0035	Ω
		V_{GS} = 4.5 V, I_D = 20 A		0.0042	0.0053	
		V_{GS} = 10 V, I_D = 30 A, T_J = 125 °C			0.0055	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175 °C			0.0066	
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		4800		pF
Output Capacitance	C_{oss}			1010		
Reverse Transfer Capacitance	C_{rss}			560		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 110 A		110	165	nC
Gate-Source Charge[c]	Q_{gs}			17		
Gate-Drain Charge[c]	Q_{gd}			35		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.35 Ω $I_D \cong$ 110 A, V_{GEN} = 10 V, R_g = 2.5 Ω		15	25	ns
Rise Time[c]	t_r			20	30	
Turn-Off Delay Time[c]	$t_{d(off)}$			50	75	
Fall Time[c]	t_f			100	150	
Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)[b]						
Continuous Current	I_S				110	A
Pulsed Current	I_{SM}				300	
Forward Voltage[a]	V_{SD}	I_F = 110 A, V_{GS} = 0 V		1.1	1.4	V
Reverse Recovery Time	t_{rr}	I_F = 110 A, di/dt = 100 A/µs		45	70	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$			1.5	2.3	A
Reverse Recovery Charge	Q_{rr}			0.034	0.081	µC

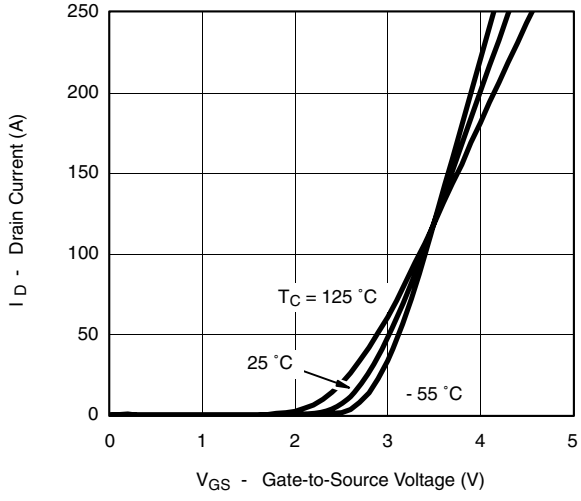
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

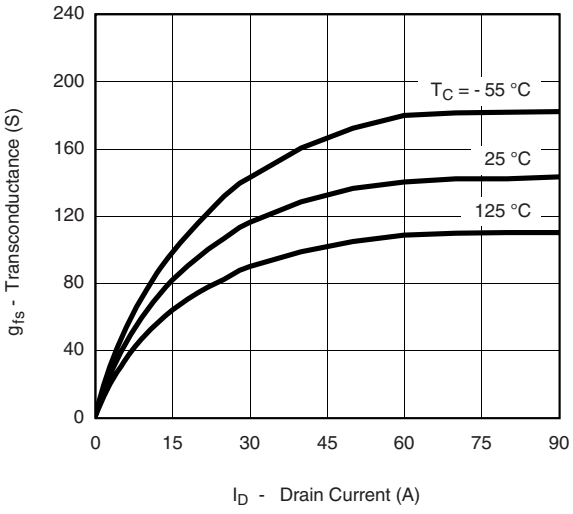
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



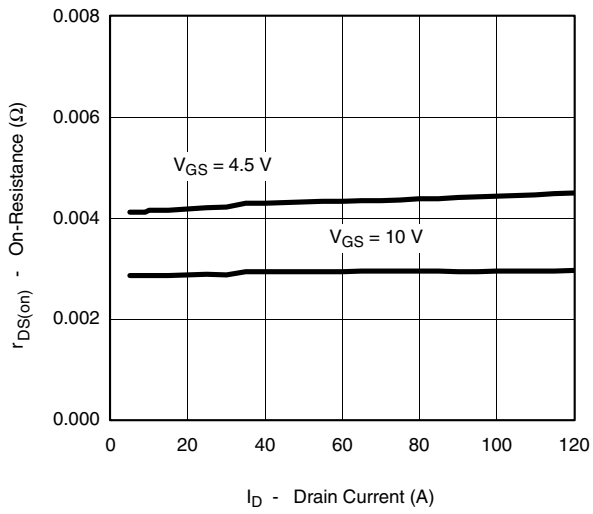
Output Characteristics



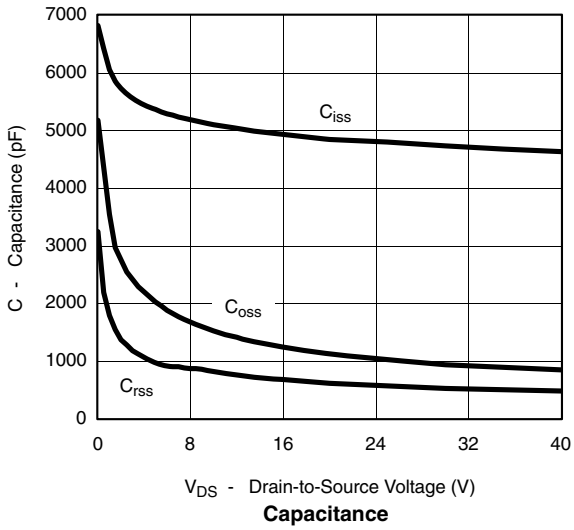
Transfer Characteristics



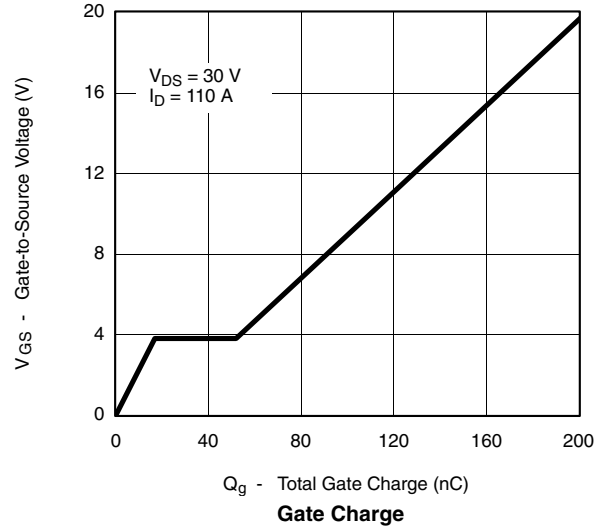
Transconductance



On-Resistance vs. Drain Current

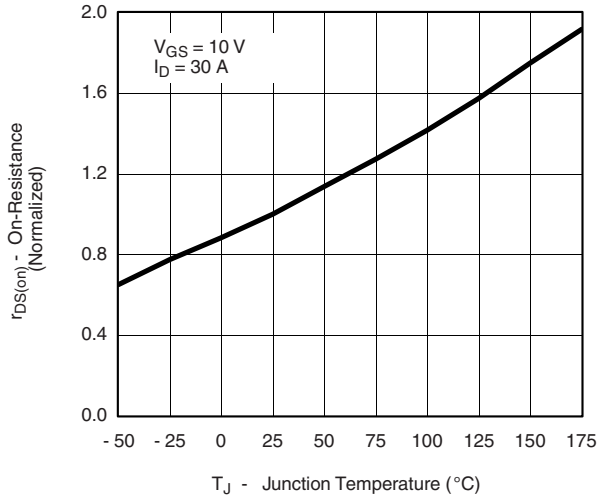


Capacitance

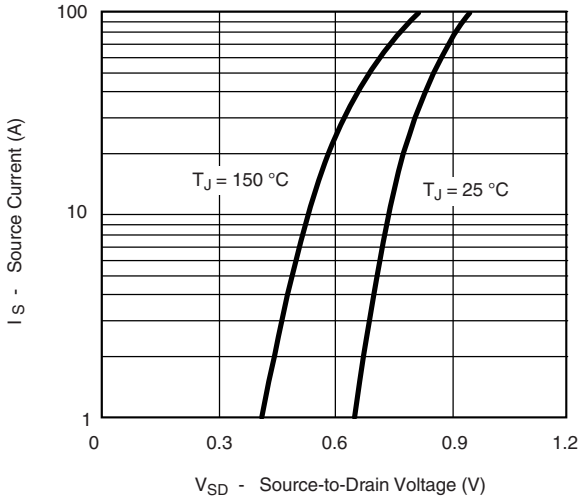


Gate Charge

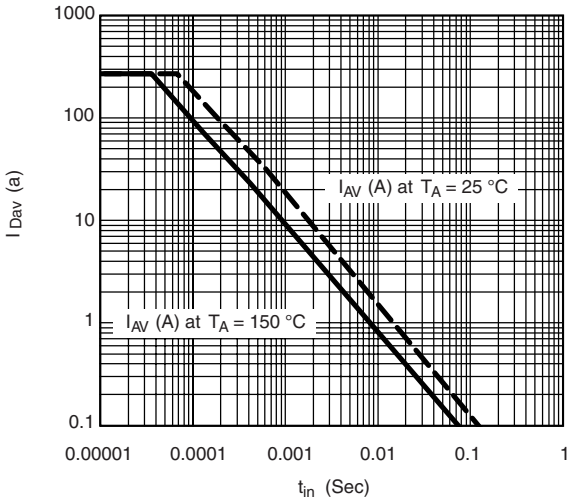
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



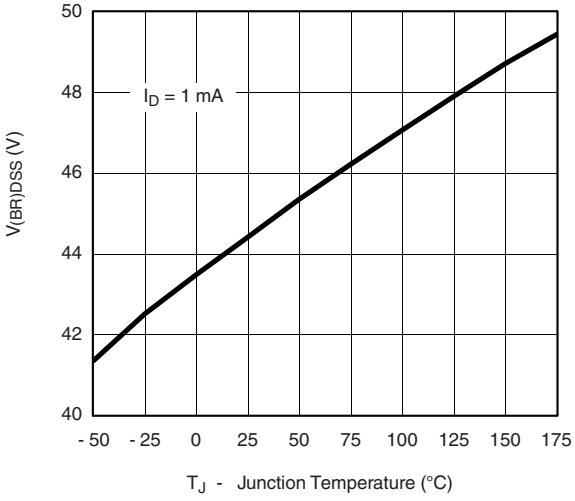
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

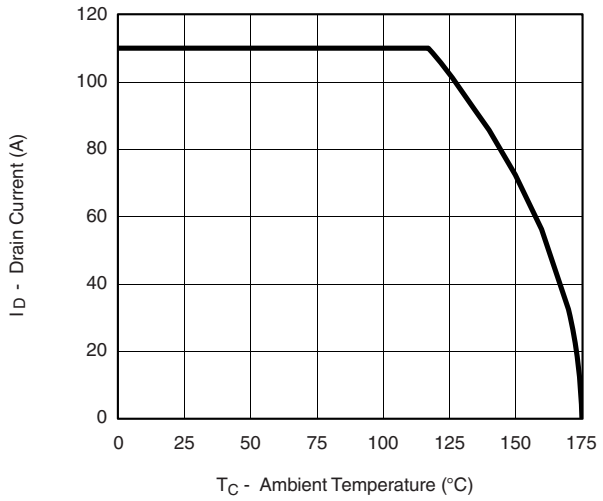


Typical Single Pulse Avalanche Current vs. Time

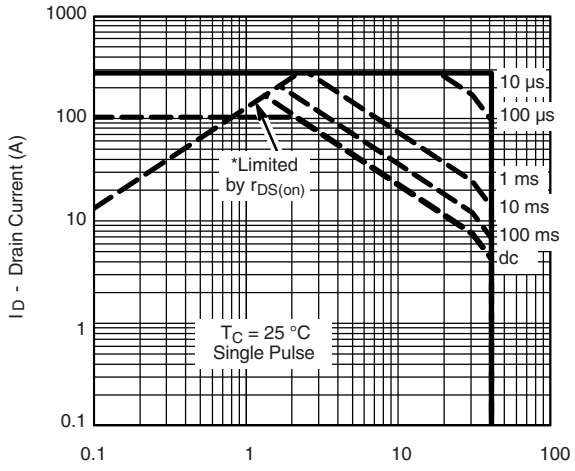


Drain Source Breakdown vs. Junction Temperature

THERMAL RATINGS

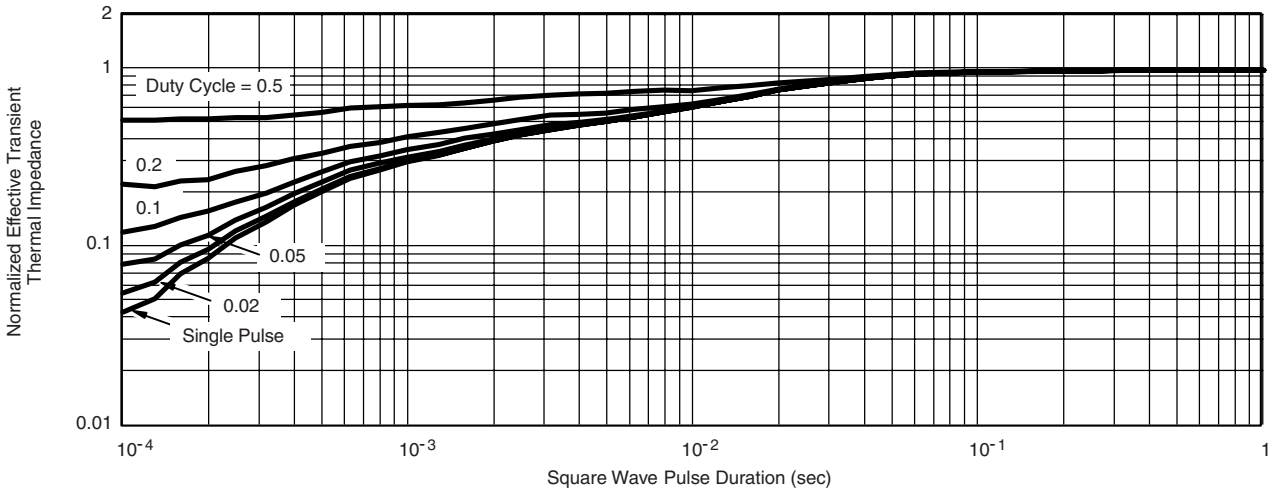


Maximum Drain Current vs. Case Temperature



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

Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Case

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