N-Channel 60-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
60	0.0035 at V_{GS} = 10 V	110[a]
	0.005 at V_{GS} = 4.5 V	

FEATURES

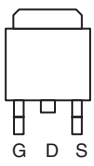
- TrenchFET® Power MOSFETS
- New Low Thermal Resistance Package

Available
RoHS* COMPLIANT

APPLICATIONS

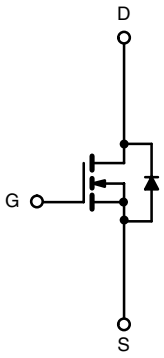
- High Current
- DC/DC Converters

TO-263



Top View

Ordering Information: SUM110N06-04L
SUM110N06-04L (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)	T_C = 25 °C	I_D	110[a]	A
	T_C = 125 °C		110[a]	
Pulsed Drain Current		I_{DM}	440	
Avalanche Current		I_{AR}	75	
Repetitive Avalanche Energy[b]	L = 0.1 mH	E_{AR}	280	mJ
Maximum Power Dissipation[b]	T_C = 25 °C	P_D	437.5[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 (Drain)		R_{thJC}	0.4	

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).

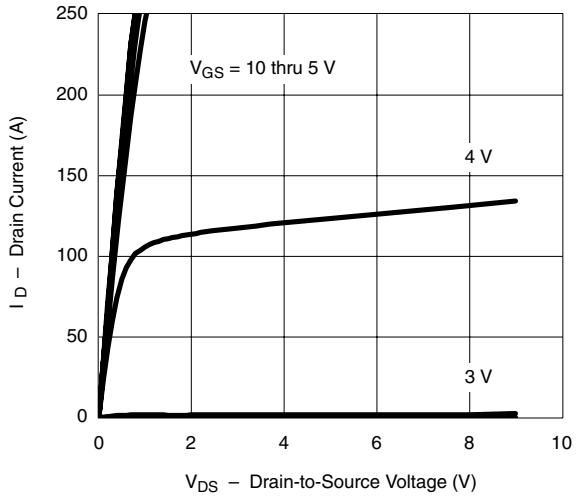
* Pb containing terminations are not RoHS compliant, exemptions may apply.

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_{DS} = 0 V, I_D = 250 µA	60			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} = 60 V, V_{GS} = 0 V			1	µA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 60 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		0.0028	0.0035	Ω
		V_{GS} = 4.5 V, I_D = 20 A		0.004	0.005	
		V_{GS} = 10 V, I_D = 30 A, T_J = 125 °C			0.0058	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175 °C			0.0088	
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		7500		pF
Output Capacitance	C_{oss}			1050		
Reverse Transfer Capacitance	C_{rss}			700		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 110 A		150	220	nC
Gate-Source Charge[c]	Q_{gs}			25		
Gate-Drain Charge[c]	Q_{gd}			45		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.4 Ω $I_D \cong$ 110 A, V_{GEN} = 10 V, R_G = 2.5 Ω		20	30	ns
Rise Time[c]	t_r			135	200	
Turn-Off Delay Time[c]	$t_{d(off)}$			80	120	
Fall Time[c]	t_f			150	220	
Source-Drain Diode Ratings and Characteristics T_C = 25 °C[b]						
Continuous Current	I_S				110	A
Pulsed Current	I_{SM}				440	
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		75	120	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$			2.5	5	A
Reverse Recovery Charge	Q_{rr}			0.09	0.25	µC

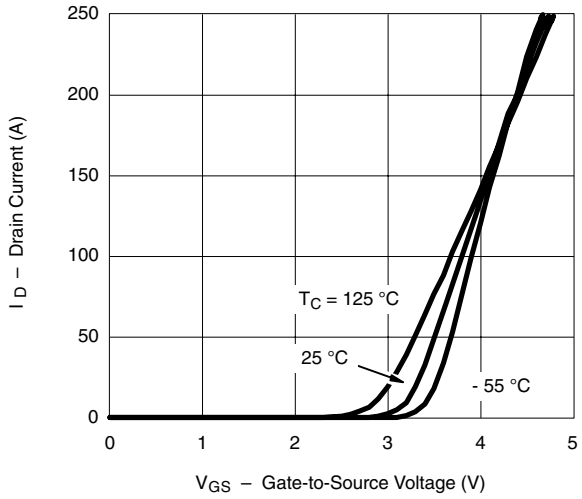
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

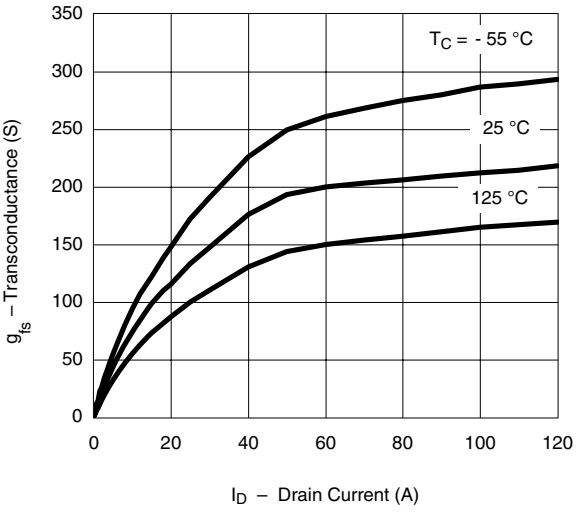
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



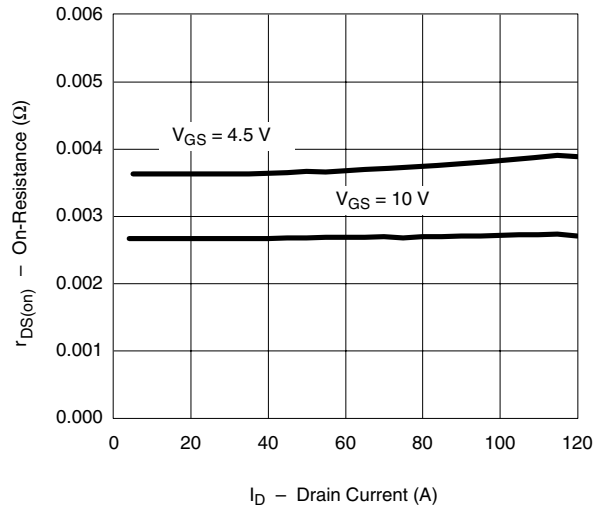
Output Characteristics



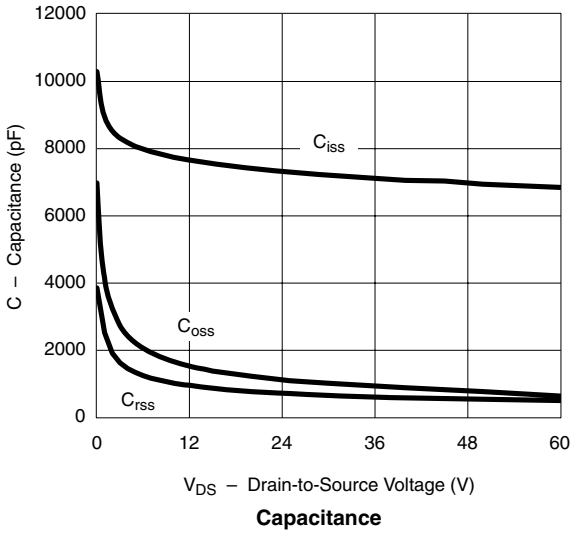
Transfer Characteristics



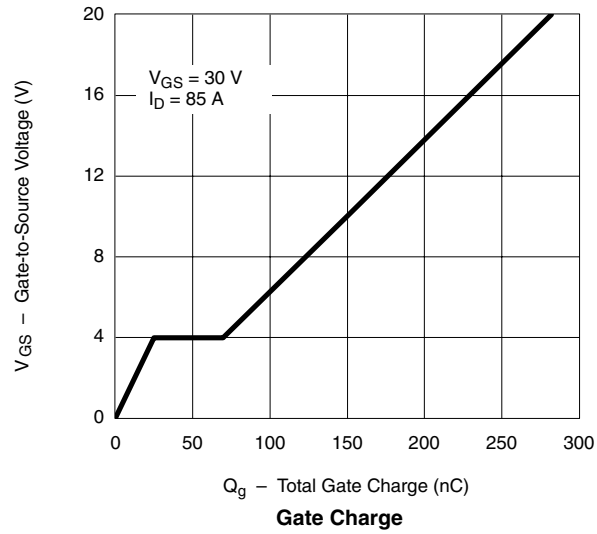
Transconductance



On-Resistance vs. Drain Current

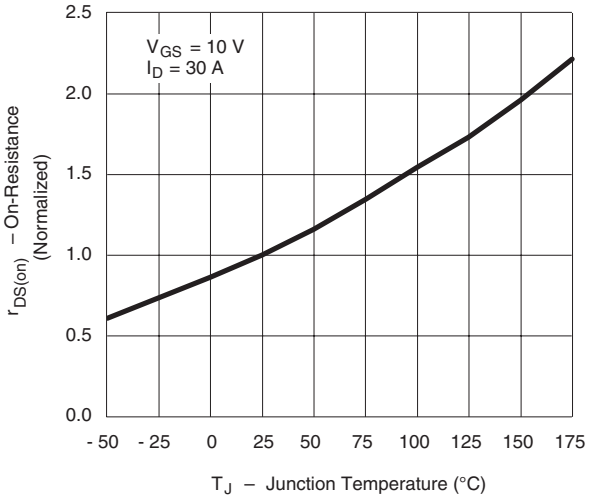


Capacitance

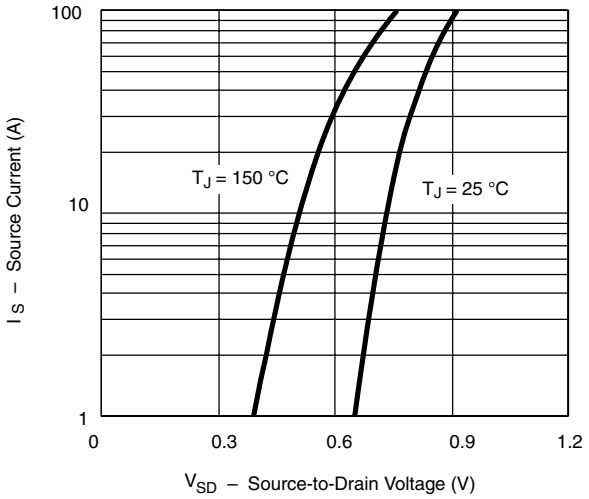


Gate Charge

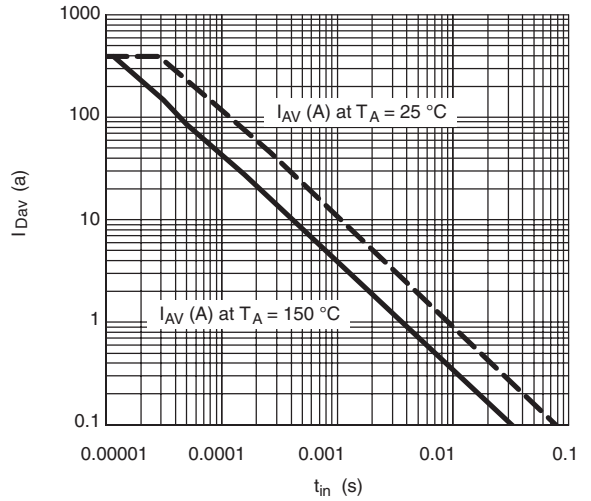
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



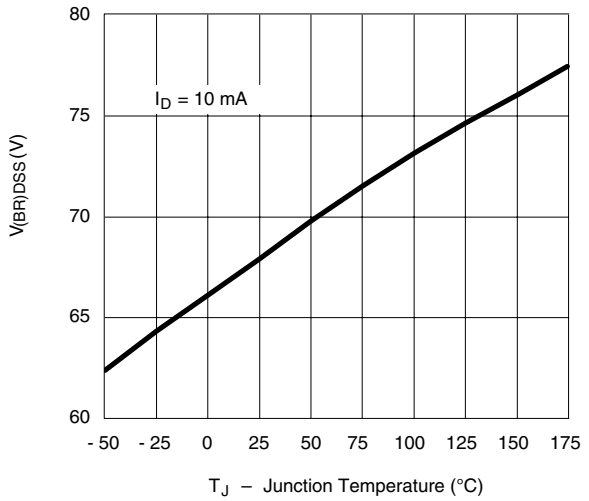
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

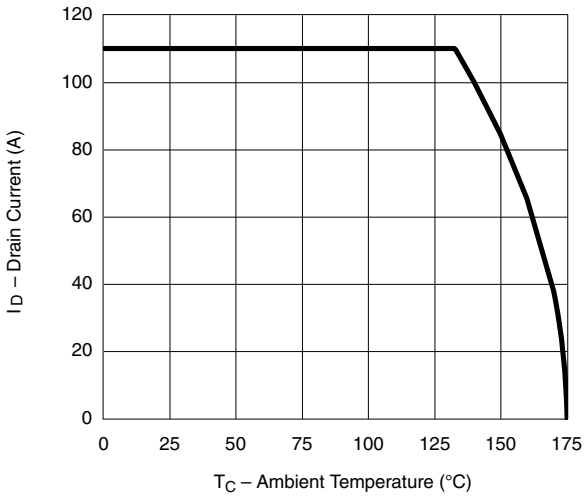


Avalanche Current vs. Time

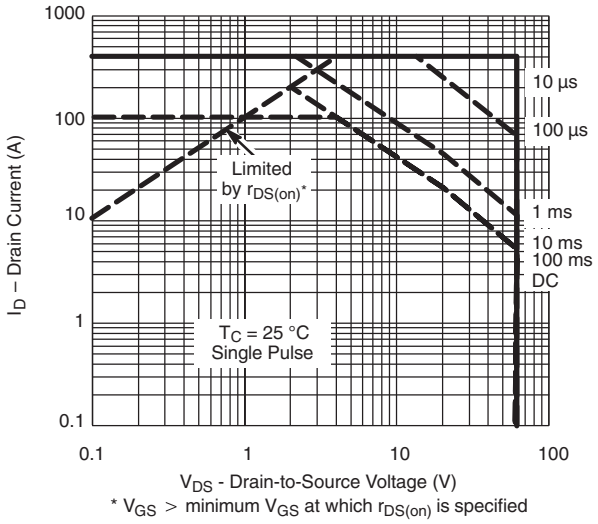


Drain Source Breakdown vs. Junction Temperature

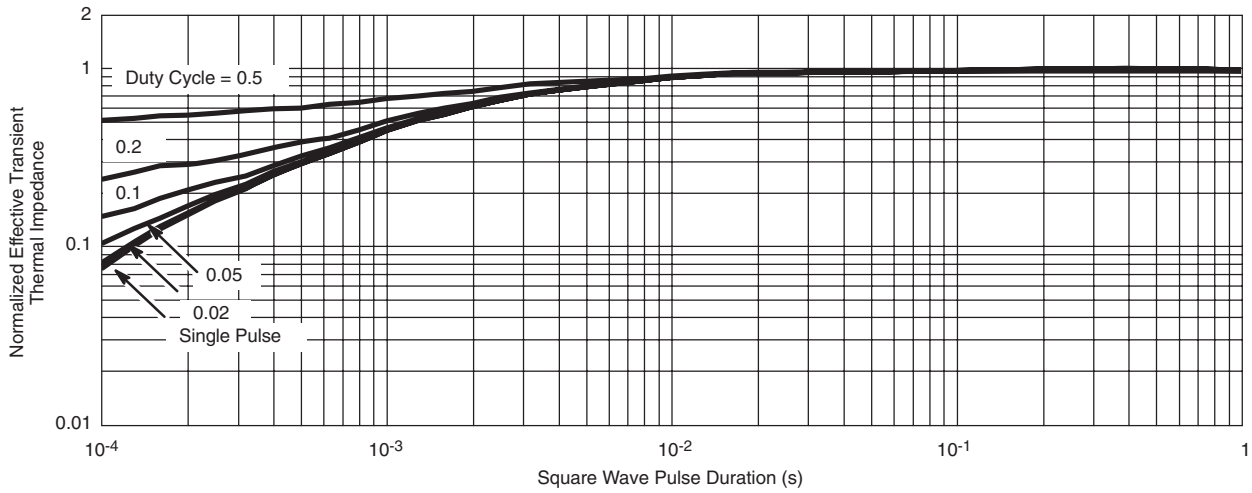
THERMAL RATINGS



Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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