

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 at $V_{GS} = 10$ V	110	65
	0.0085 at $V_{GS} = 4.5$ V	92	

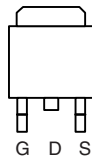
FEATURES

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


 Available
RoHS*
 COMPLIANT

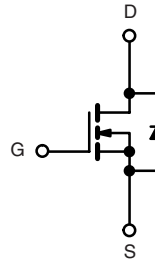
APPLICATIONS

- 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				

Notes:

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

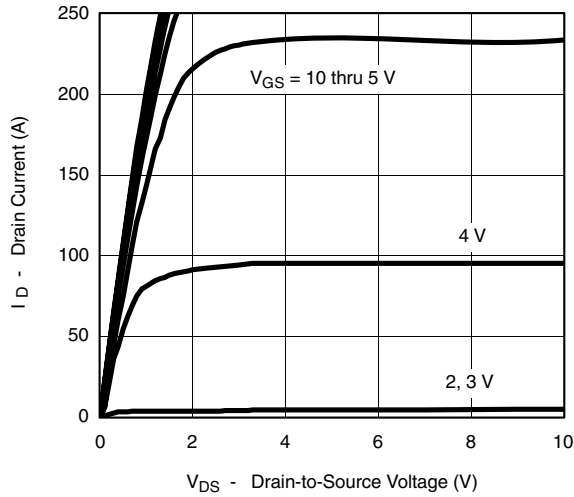
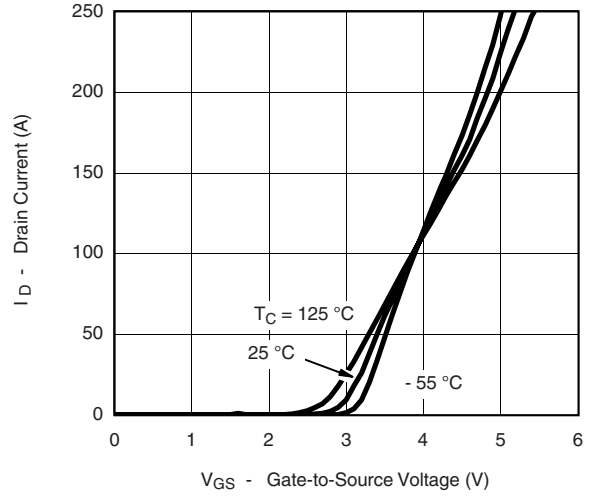
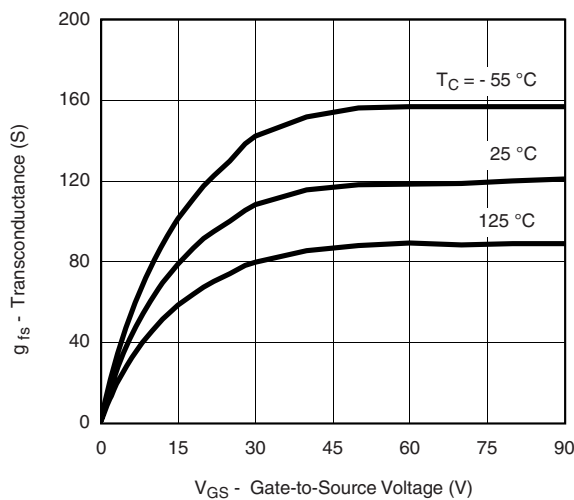
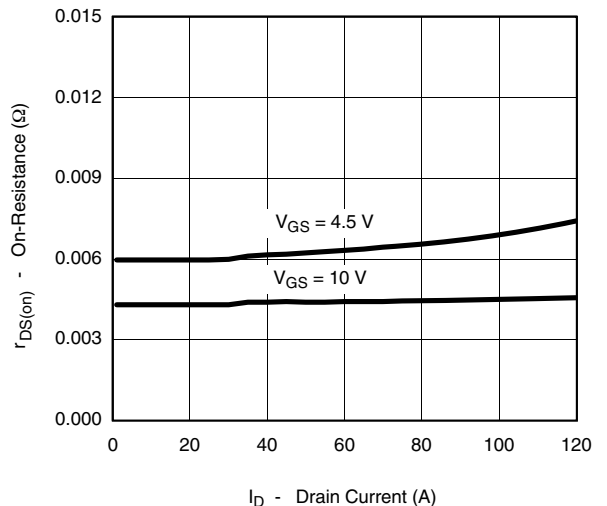
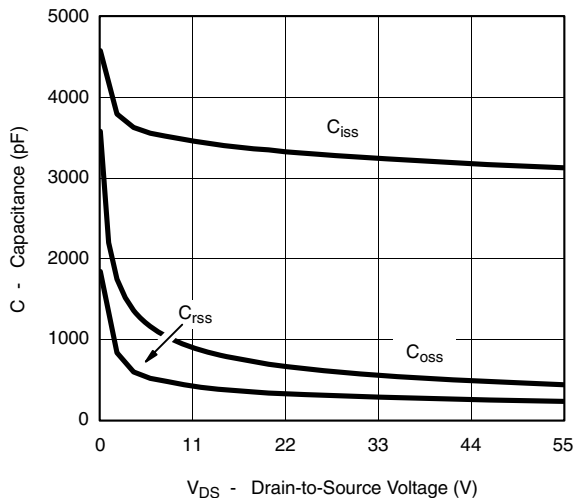
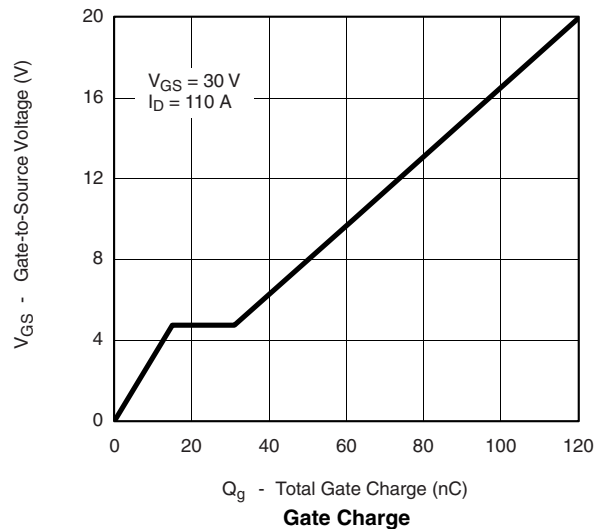
* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{DS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	55			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	
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}	$V_{DS} = 55\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 55\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 55\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			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	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		0.0047	0.006	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		0.0066	0.0085	
		$V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.0102	
		$V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.0132	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 30\text{ A}$	30			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		3300		μF
Output Capacitance	C_{oss}			625		
Reverse Transfer Capacitance	C_{rss}			310		
Total Gate Charge ^c	Q_g	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 110\text{ A}$		65	100	nC
Gate-Source Charge ^c	Q_{gs}			15		
Gate-Drain Charge ^c	Q_{gd}			16		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.27\text{ }\Omega$ $I_D \approx 110\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$		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 $T_C = 25\text{ }^\circ\text{C}$ ^b						
Continuous Current	I_S				110	A
Pulsed Current	I_{SM}				240	
Forward Voltage ^a	V_{SD}	$I_F = 110\text{ A}, V_{GS} = 0\text{ V}$		1.0	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 110\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		70	125	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$			2.5	5	A
Reverse Recovery Charge	Q_{rr}			0.09	0.31	μC

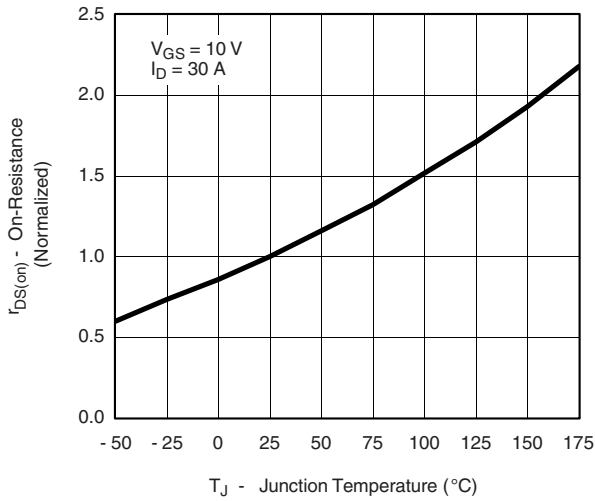
Notes:

- 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.

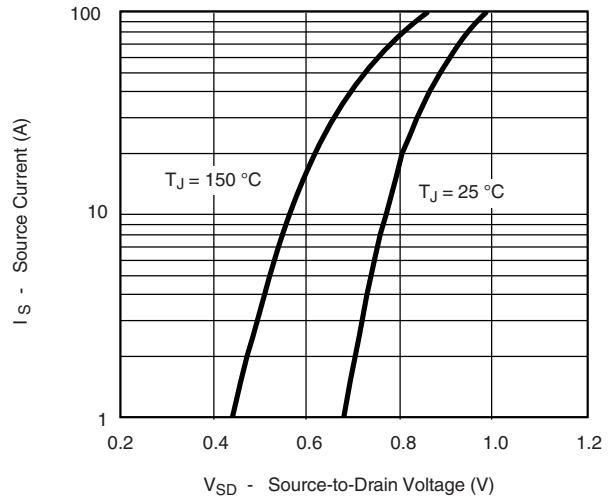
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

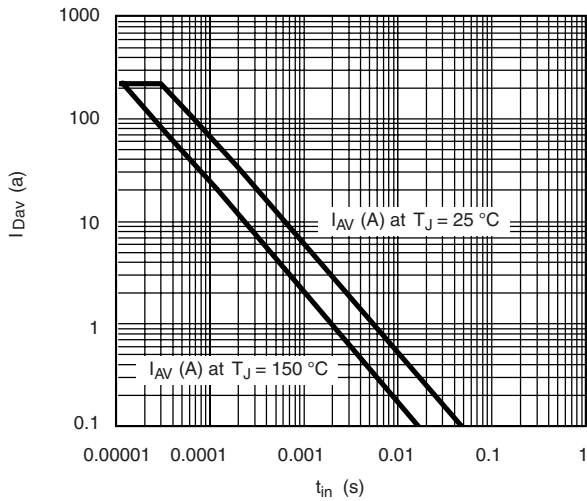
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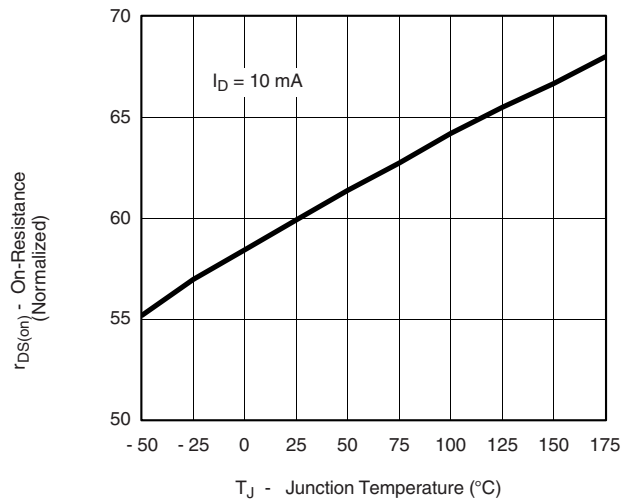
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



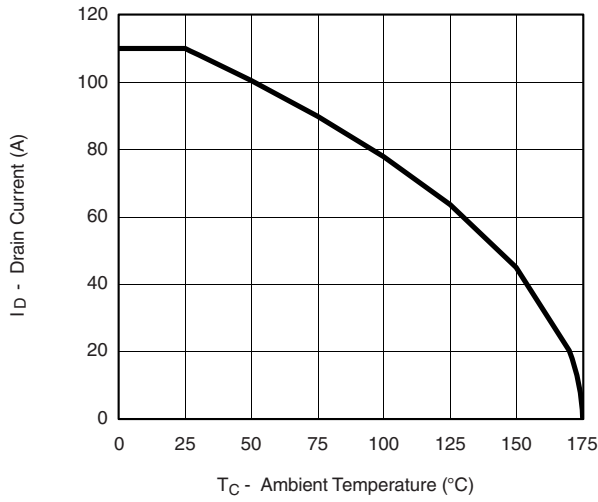
Avalanche Current vs. Time



On-Resistance vs. Junction Temperature

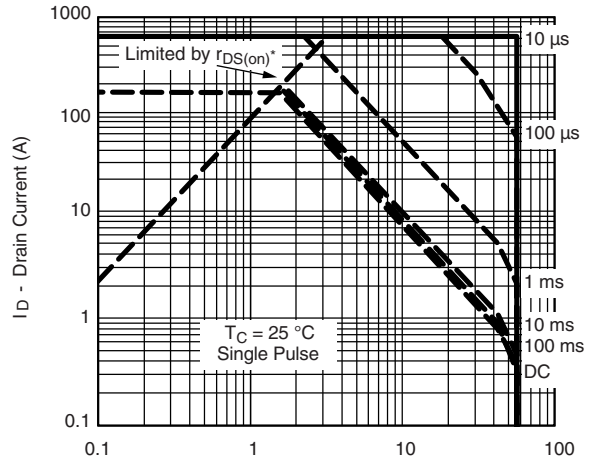


THERMAL RATINGS



T_C - Ambient Temperature (°C)

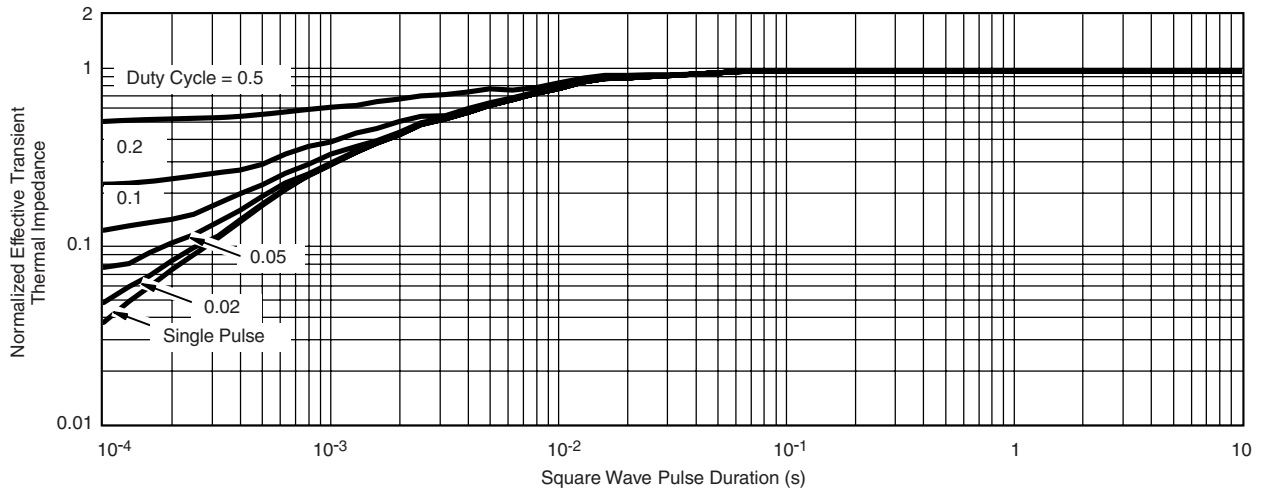
Maximum Drain Current vs. Case Temperature



V_{DS} - Drain-to-Source Voltage (V)

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

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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