

N-Channel 60-V (D-S), 175 °C MOSFET, Logic Level

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
60	0.016 at $V_{GS} = 10$ V	50
	0.022 at $V_{GS} = 4.5$ V	43

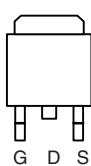
FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature



Available
RoHS*
COMPLIANT

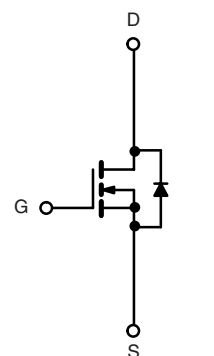
TO-263



Top View

DRAIN connected to TAB

Ordering Information: SUM50N06-16L
SUM50N06-16L-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}	60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	50	A
		35	
Pulsed Drain Current	I_{DM}	100	
Avalanche Current	I_{AR}	40	
Repetitive Avalanche Energy ^a	E_{AR}	80	mJ
Power Dissipation	P_D	93 ^b	W
		3.7 ^c	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient	R_{thJA}	40	°C/W
Junction-to-Case	R_{thJC}	1.6	

Notes:

a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

c. Surface mounted on FR4 Board, $t \leq 10$ s.

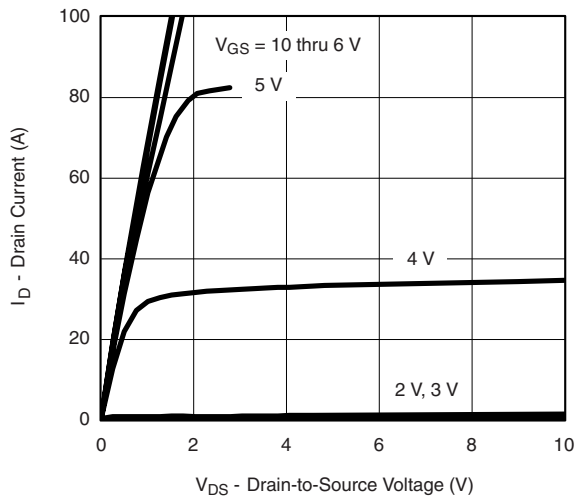
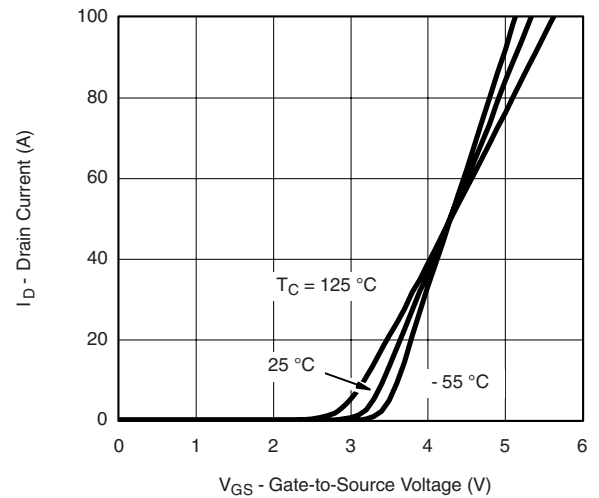
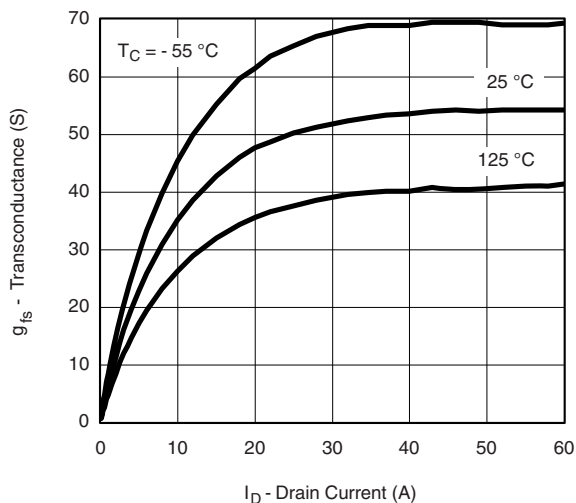
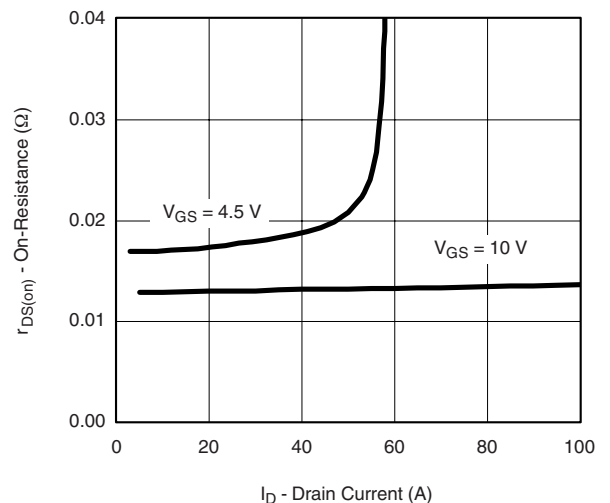
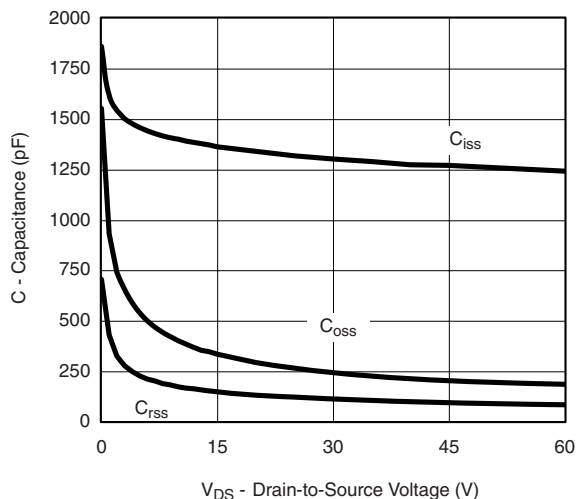
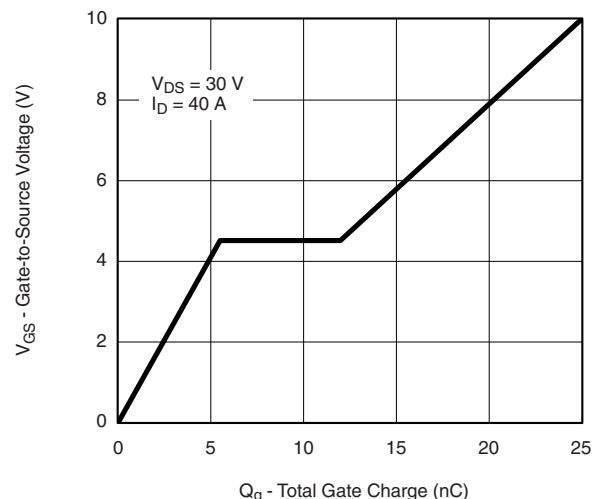
* Pb containing terminations are not RoHS compliant, exemptions may apply.

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	60			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _{DS} = 250 μA	1.0	2.0	3.0	
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			150	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	50			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.013	0.016	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.028	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C			0.036	
		V _{GS} = 4.5 V, I _D = 20 A		0.017	0.022	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 20 A		50		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		1325		pF
Output Capacitance	C _{oss}			265		
Reverse Transfer Capacitance	C _{rss}			115		
Total Gate Charge ^c	Q _g	V _{DS} = 30 V, V _{GS} = 10 V, I _D = 50 A		25	40	nC
Gate-Source Charge ^c	Q _{gs}			5.5		
Gate-Drain Charge ^c	Q _{gd}			6.5		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 30 V, R _L = 0.8 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _G = 2.5 Ω		10	20	ns
Rise Time ^c	t _r			9	20	
Turn-Off Delay Time ^c	t _{d(off)}			25	50	
Fall Time ^c	t _f			7	15	
Source-Drain Diode Ratings and Characteristics T _C = 25 °C ^b						
Continuous Current	I _S				50	A
Pulsed Current	I _{SM}				100	
Forward Voltage ^a	V _{SD}	I _F = 50 A, V _{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		35	70	ns
Peak Reverse Recovery Current	I _{RM(REC)}			2.3	4	A
Reverse Recovery Charge	Q _{rr}				0.04	0.14

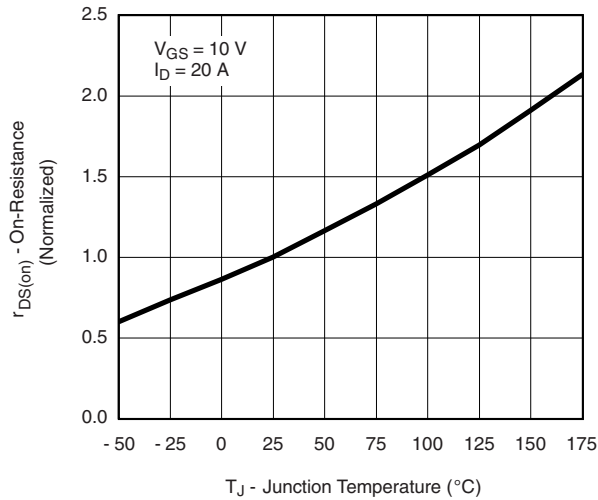
Notes:

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

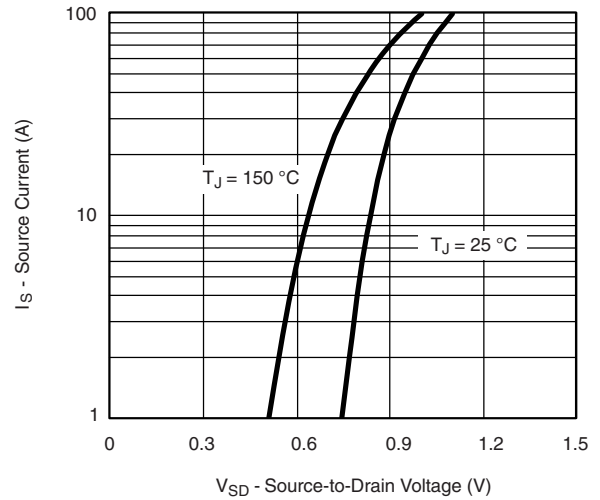
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

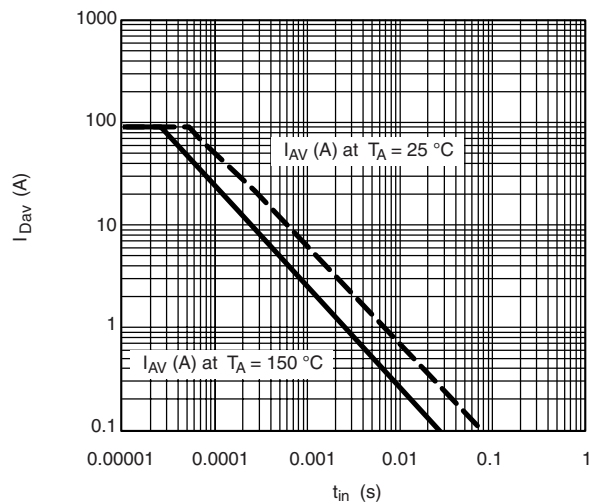
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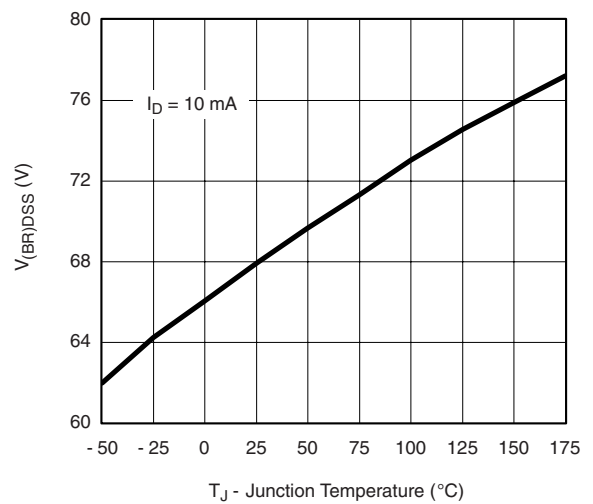
On-Resistance vs. Junction Temperature

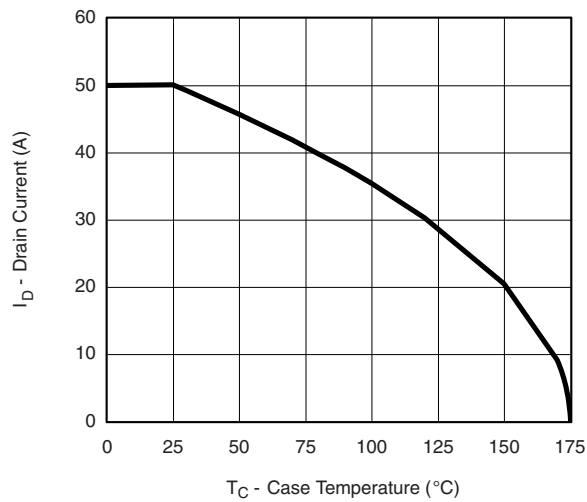
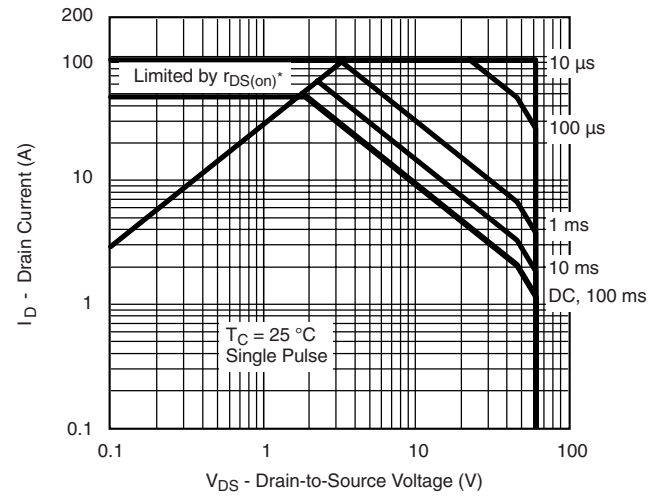
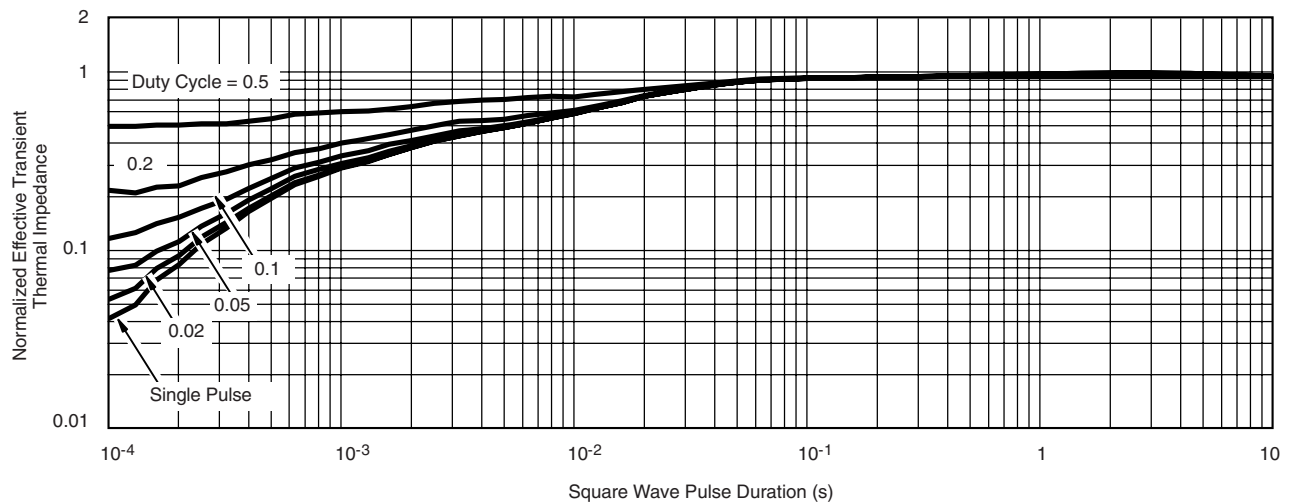


Source-Drain Diode Forward Voltage



Drain Source Breakdown vs. Junction Temperature



**THERMAL RATINGS****Drain Current vs. Case Temperature****Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Case**

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