



N-Channel 60-V (D-S) 175 °C MOSFET

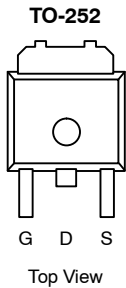
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^c
60	0.012 @ $V_{GS} = 10$ V	63

FEATURES

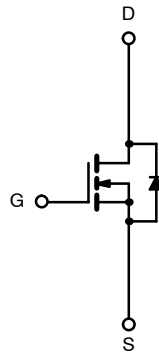
- TrenchFET® Power MOSFET
- 175 °C Junction Temperature

APPLICATIONS

- Automotive and Industrial



Drain Connected to Tab



Ordering Information: SUD50N06-12

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$) ^b	$T_C = 25^\circ\text{C}$	I_D	63 ^c	A
	$T_C = 125^\circ\text{C}$		36	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction)		I_S	63 ^c	
Avalanche Current, Single Pulse		I_{AS}	35	
Avalanche Energy	$L = 0.1$ mH	E_{AS}	61	mJ
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	107 ^b	W
	$T_A = 25^\circ\text{C}$		3 ^a	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient ^a	$t \leq 10$ sec	R_{thJA}	16	20	$^\circ\text{C}/\text{W}$
	Steady State		40	50	
Junction-to-Case		R_{thJC}	1.1	1.4	

Notes

- Surface Mounted on 1" x1" FR4 Board.
- See SOA curve for voltage derating.
- Calculate continuous current based on maximum allowable junction temperature when using infinite heat sink. Package limitation current is 50 A.

SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ ^a	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 _D = 250 μA	2.0		4.0	
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			250	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	50			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0095	0.012	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.021	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C			0.027	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A		25		S
Dynamic^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, F = 1 MHz		2500		pF
Output Capacitance	C _{oss}			400		
Reverse Transfer Capacitance	C _{rss}			165		
Gate Resistance	R _g	f = 1 MHz		2.1		Ω
Total Gate Charge ^c	Q _g	V _{DS} = 30 V, V _{GS} = 10 V, I _D = 50 A		40	60	nC
Gate-Source Charge ^c	Q _{gs}			13		
Gate-Drain Charge ^c	Q _{gd}			12		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 30 V, R _L = 0.6 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _G = 2.5 Ω		15	25	ns
Rise Time ^c	t _r			11	20	
Turn-Off Delay Time ^c	t _{d(off)}			30	50	
Fall Time ^c	t _f			7	15	
Source-Drain Diode Ratings and Characteristic (T_C = 25 °C)						
Pulsed Current	I _{SM}				100	A
Diode Forward Voltage ^b	V _{SD}	I _F = 50 A, V _{GS} = 0 V		1.0	1.5	V
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		40	80	ns

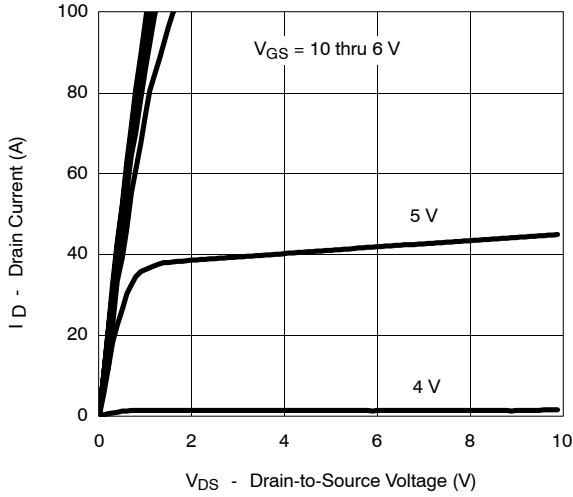
Notes

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

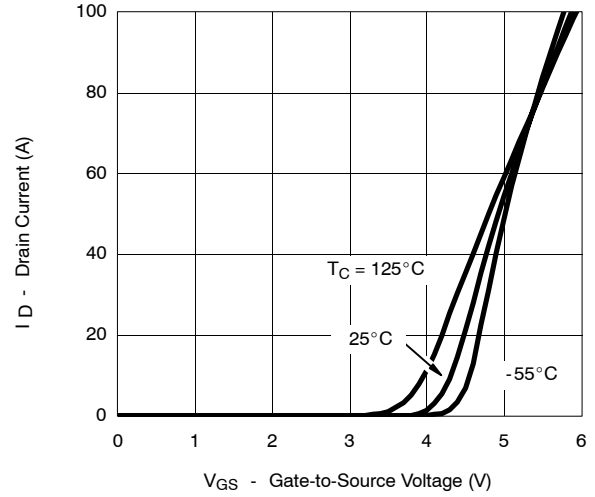


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

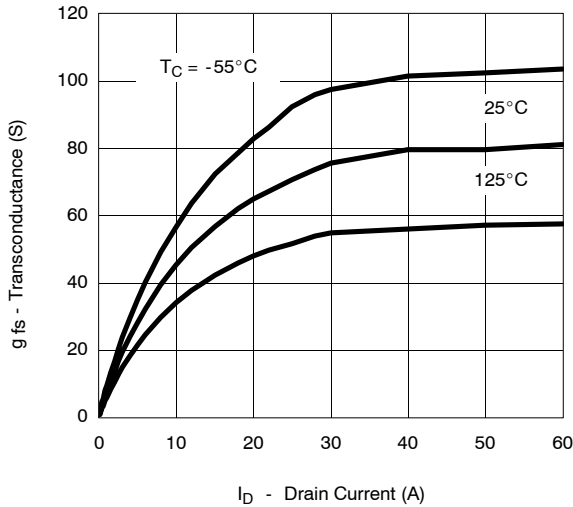
Output Characteristics



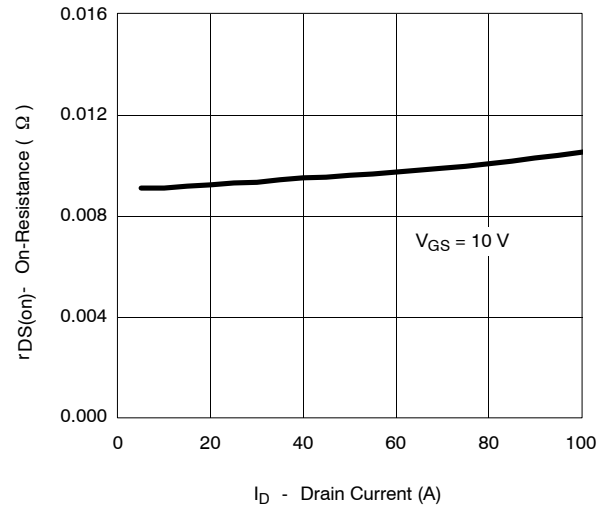
Transfer Characteristics



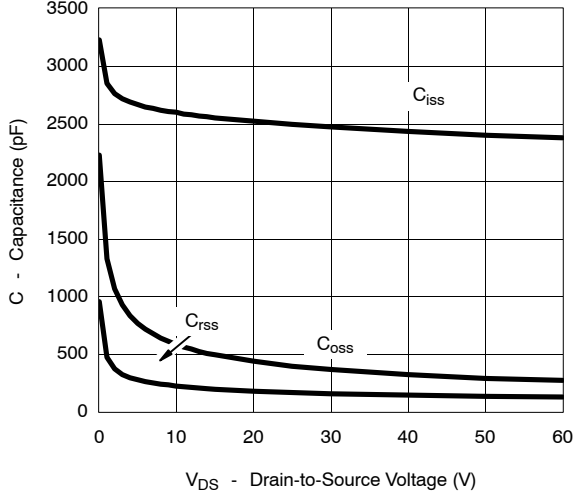
Transconductance



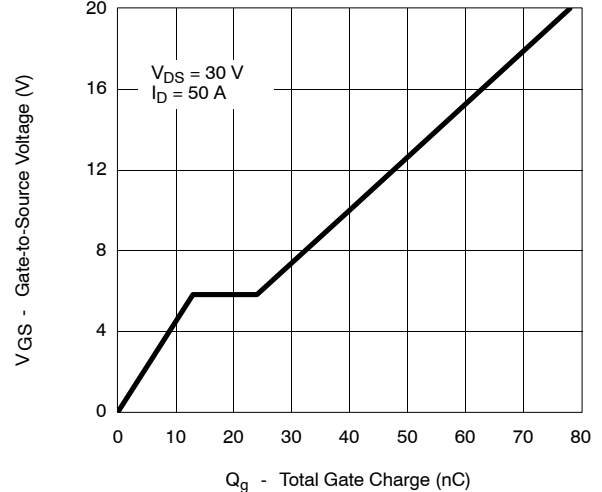
On-Resistance vs. Drain Current



Capacitance

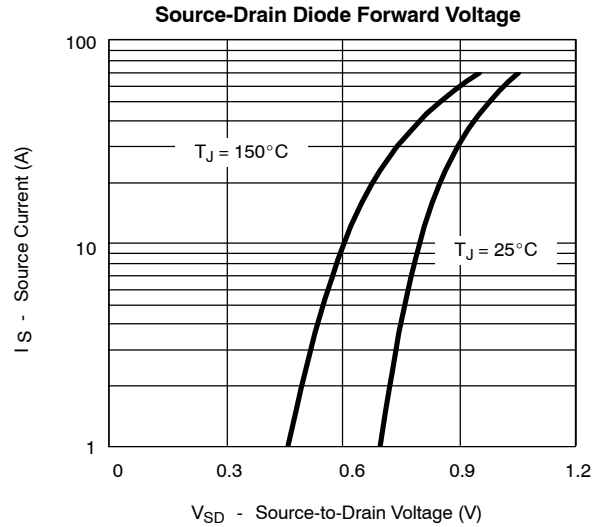
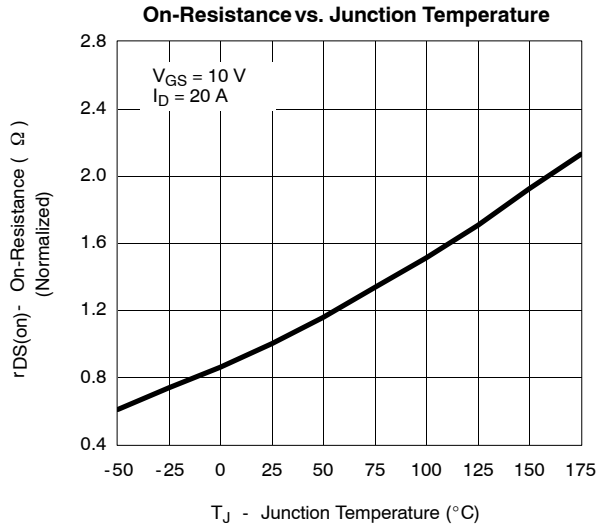


Gate Charge

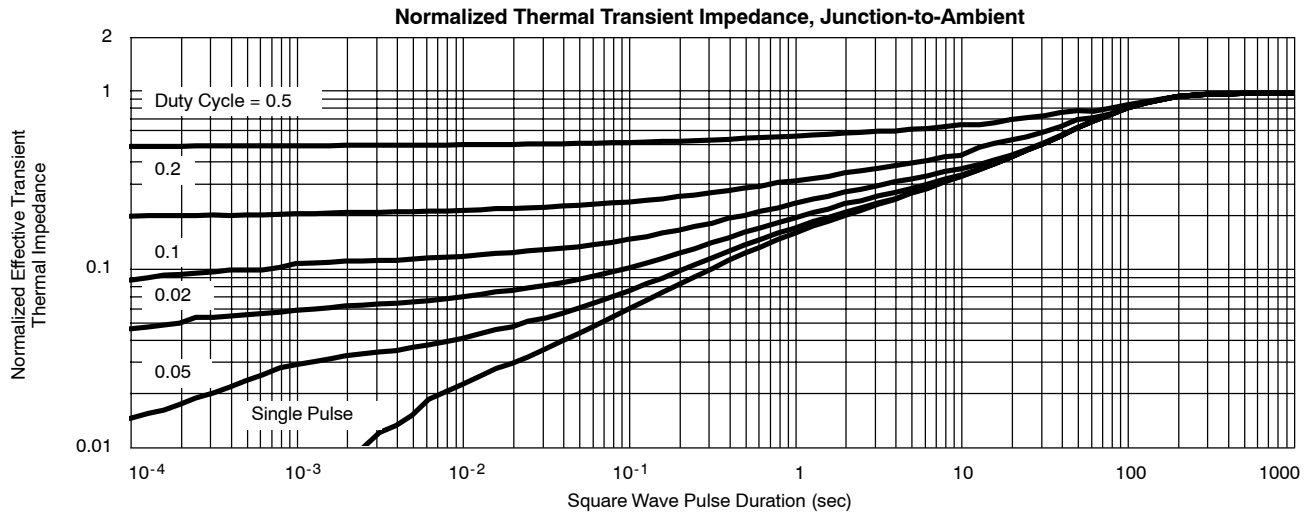
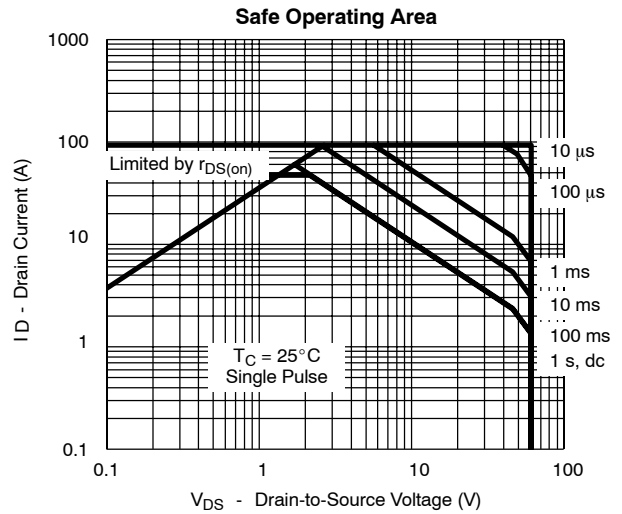
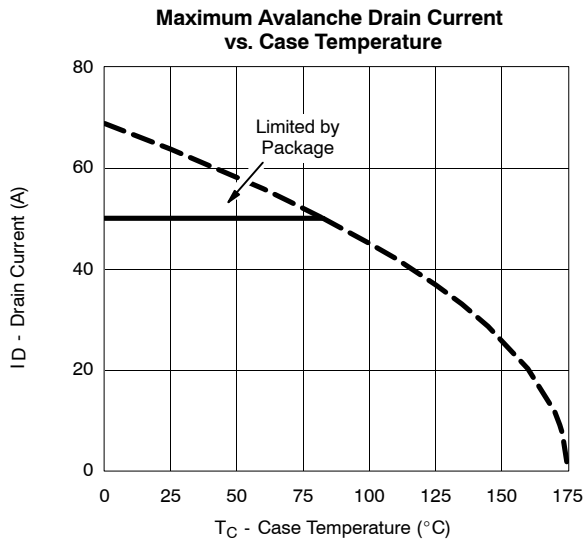




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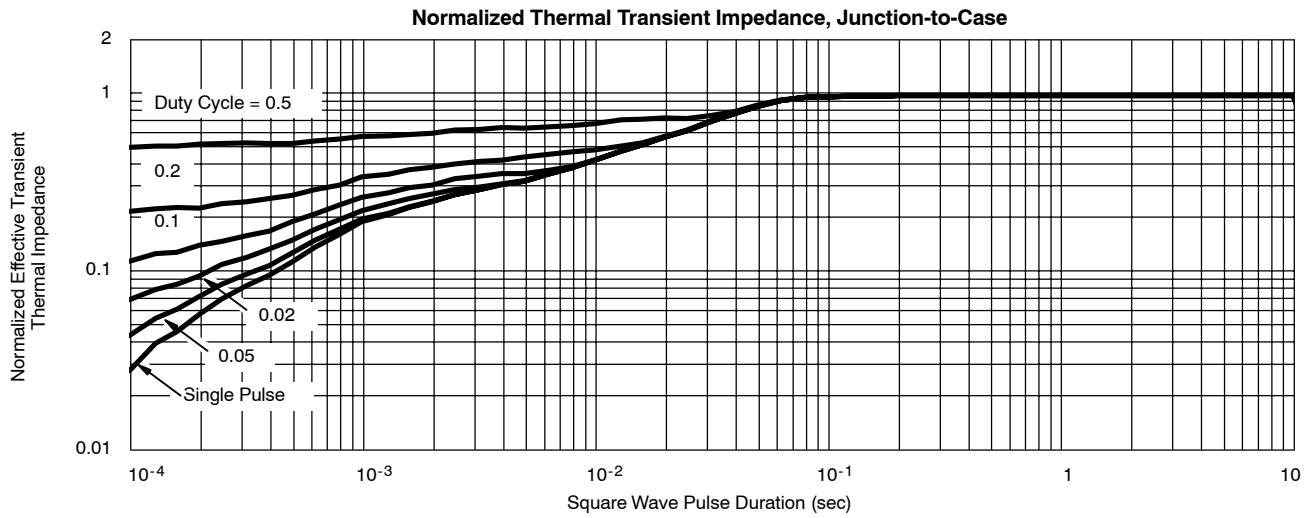


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