



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

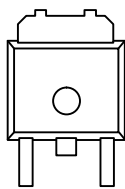
FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature

APPLICATIONS

- Automotive and Industrial

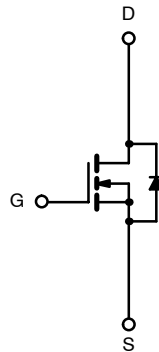
TO-252



G D S

Top View

Drain Connected to Tab



N-Channel MOSFET

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°C) ^b	T _C = 25°C	I _D	63 ^c	A
	T _C = 125°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°C	P _D	107 ^b	W
	T _A = 25°C		3 ^a	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 175	°C

THERMAL RESISTANCE RATINGS

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

Notes

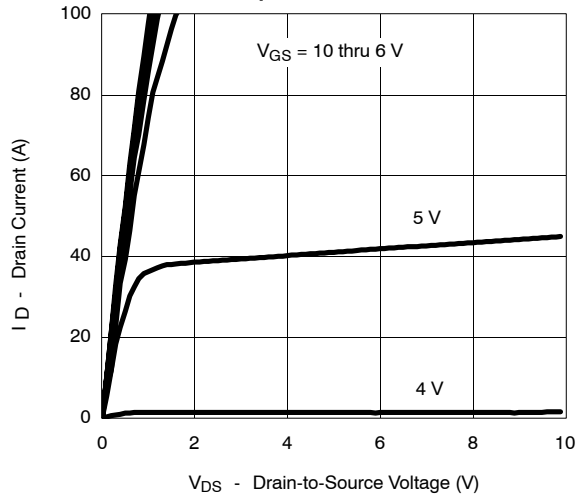
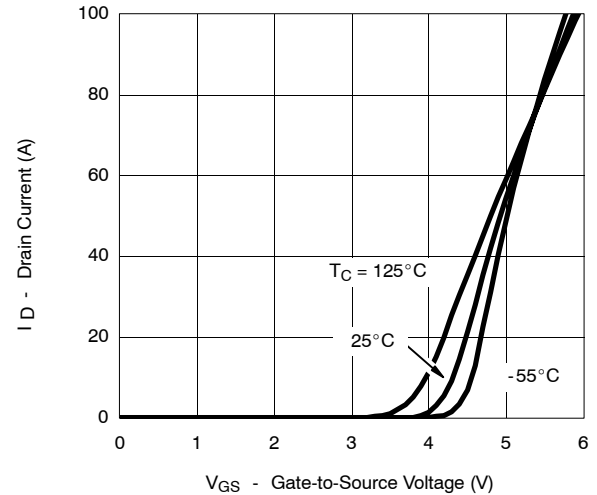
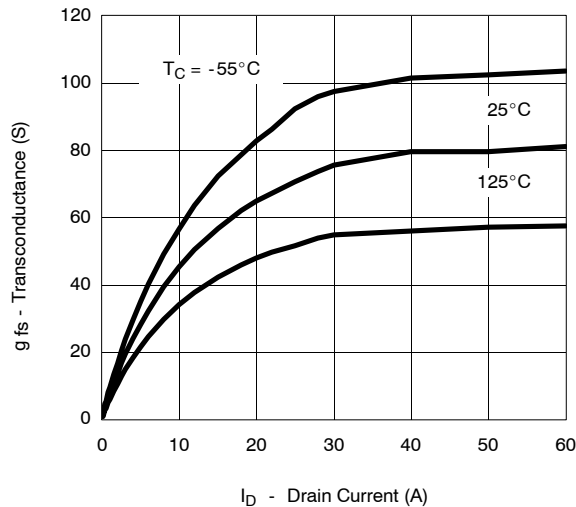
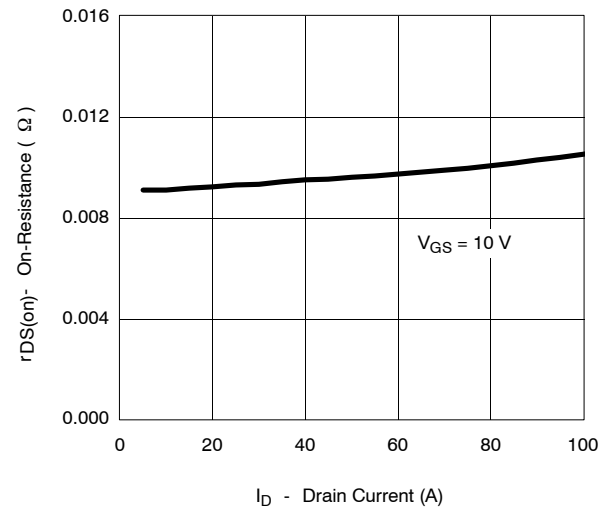
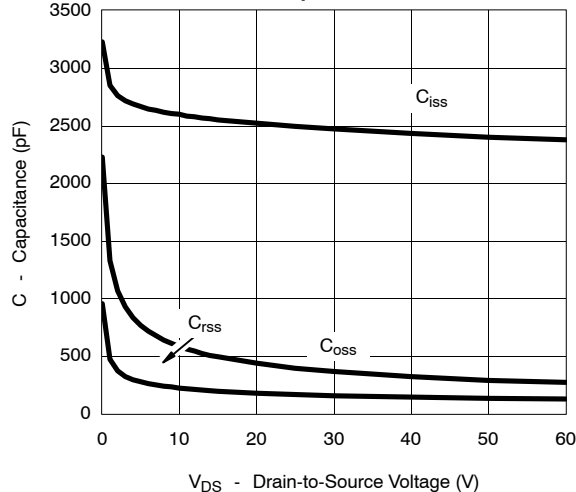
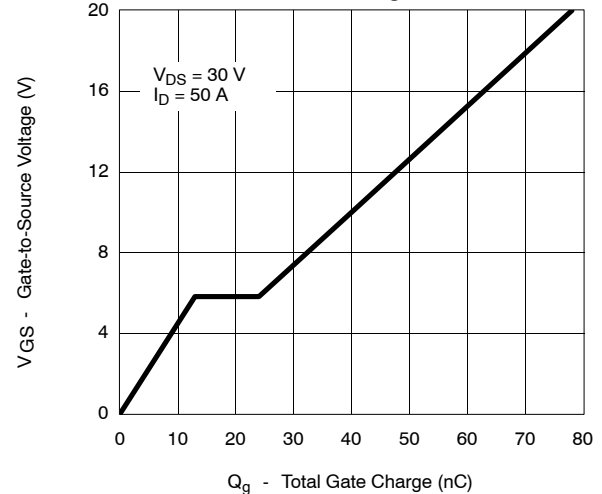
- Surface Mounted on 1" x 1" FR4 Board.
- See SOA curve for voltage derating.
- Calculate continuous current based on maximum allowable junction temperature when using infinite heat sink. Package limitation current is 50 A.

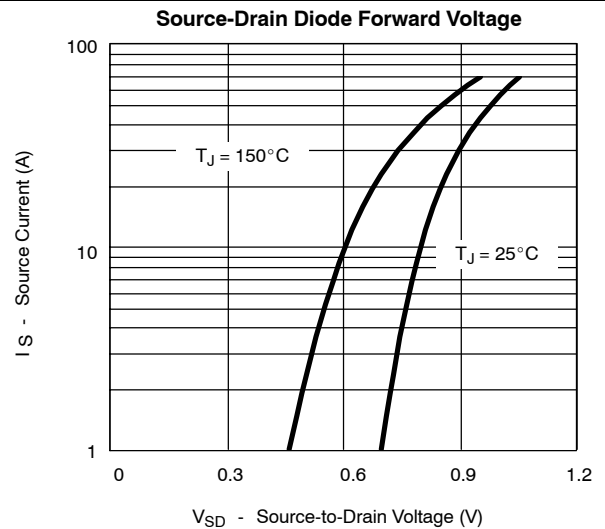
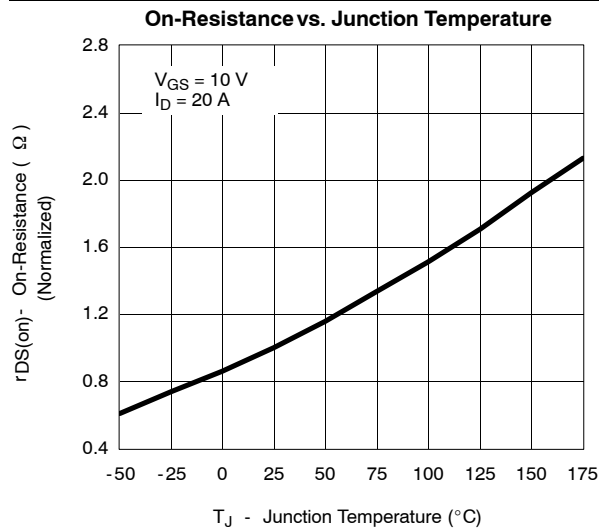
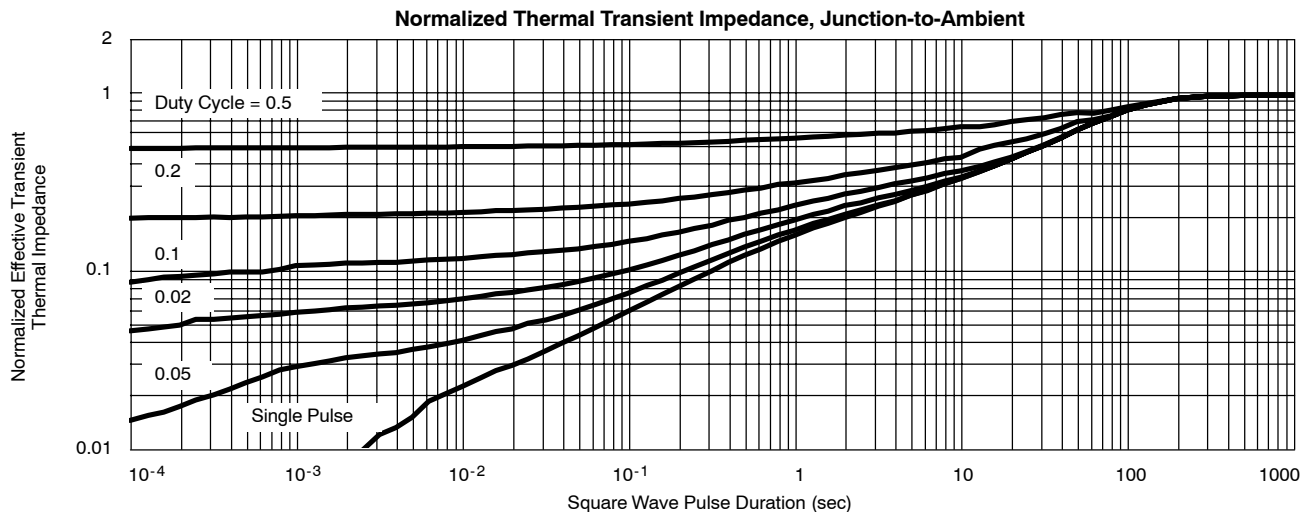
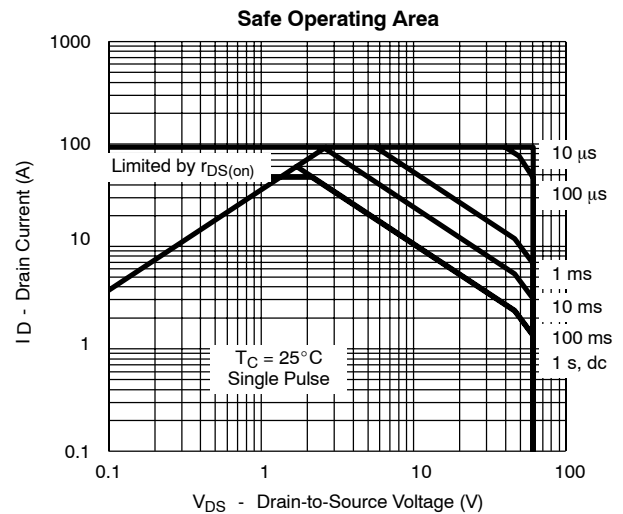
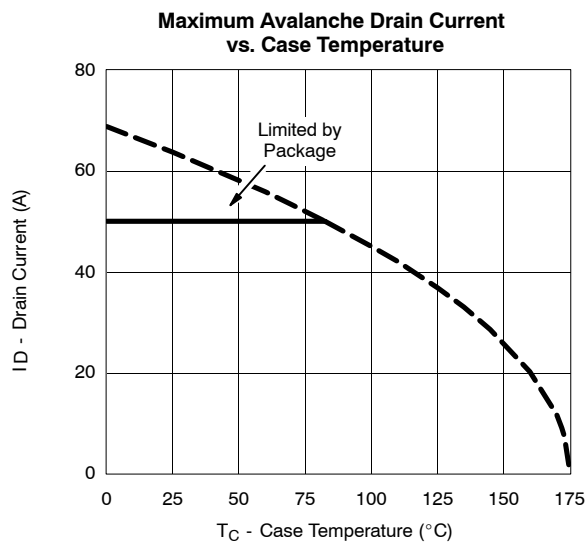
SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

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

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

**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)****Output Characteristics****Transfer Characteristics****Transconductance****On-Resistance vs. Drain Current****Capacitance****Gate Charge**

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**THERMAL RATINGS**



THERMAL RATINGS

