



## N-Channel 30-V (D-S) 175°C MOSFET

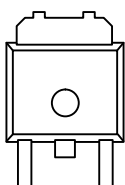
## PRODUCT SUMMARY

$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.007 @ $V_{GS} = 10$ V	20
	0.010 @ $V_{GS} = 4.5$ V	16

## FEATURES

- TrenchFET® Power MOSFET
- 175°C Maximum Junction Temperature
- 100%  $R_g$  Tested

TO-252



G D S

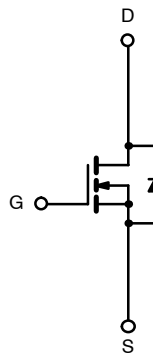
Top View

Ordering Information:

SUD50N03-07

SUD50N03-07—E3 (Lead Free)

Drain Connected to Tab



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		$V_{DS}$	30	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$T_A = 25^\circ\text{C}$	$I_D$	20	A
	$T_A = 100^\circ\text{C}$		14	
Pulsed Drain Current		$I_{DM}$	100	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	20	
Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	$P_D$	136	W
	$T_A = 25^\circ\text{C}$		5 <sup>a</sup>	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$

## THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$		30	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{thJC}$	0.85	1.1	

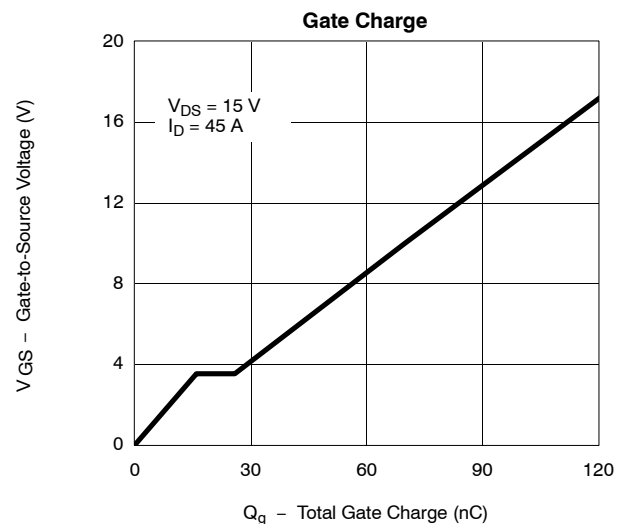
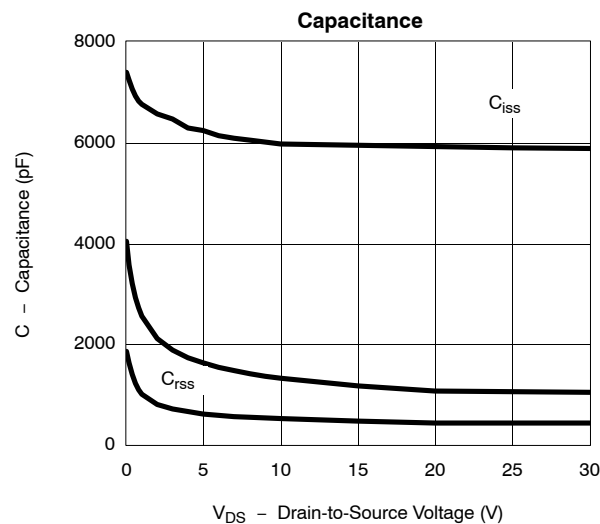
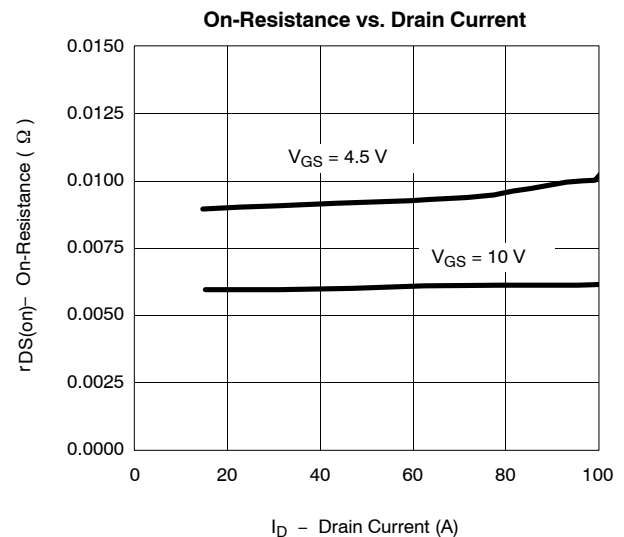
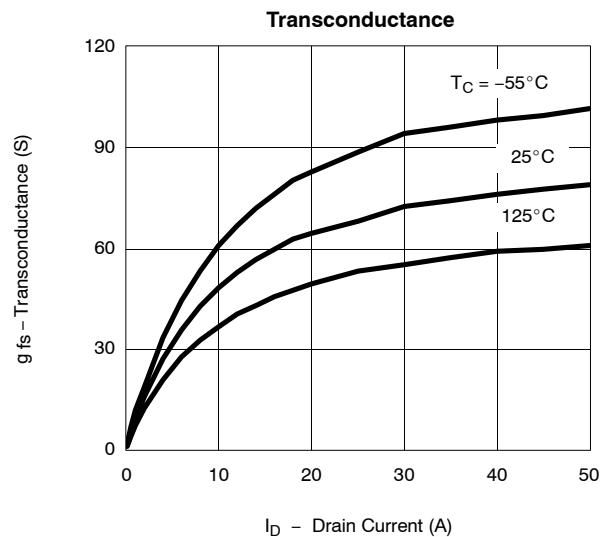
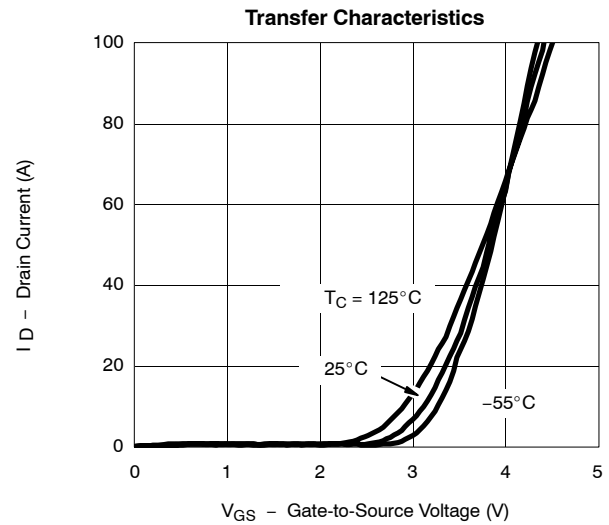
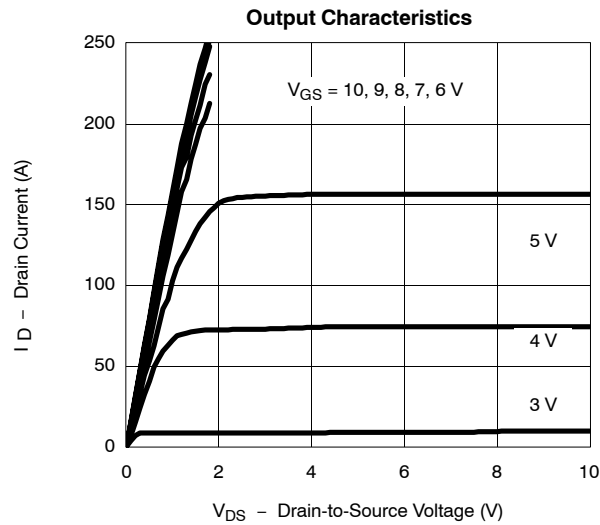
Notes

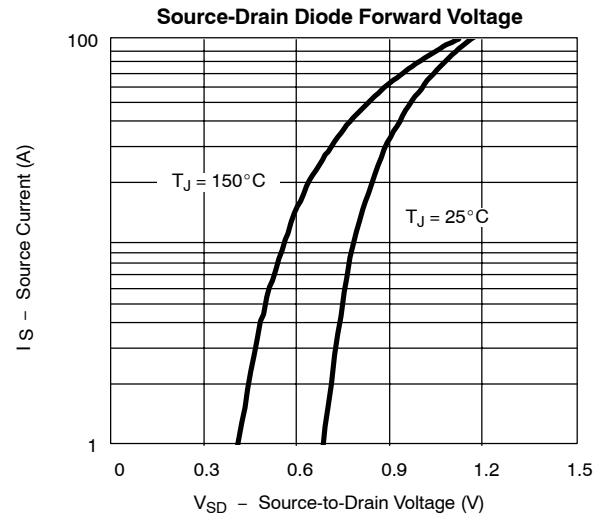
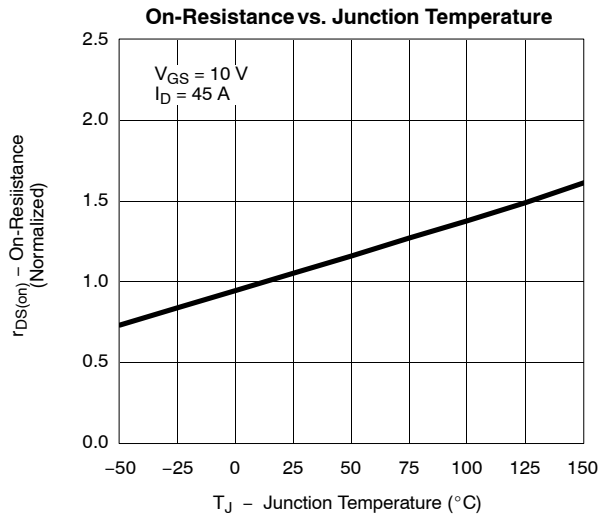
a. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	30			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1.0	2.0	3.0	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	50			A
Drain-Source On-State Resistance <sup>b</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> =20 A			0.007	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> =20 A, T <sub>J</sub> = 125 °C			0.011	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A			0.010	
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A	20			S
Dynamic <sup>a</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		5600		pF
Output Capacitance	C <sub>oss</sub>			1100		
Reverse Transfer Capacitance	C <sub>rss</sub>			450		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 50 A		70	130	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			16		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			10		
Gate Resistance	R <sub>g</sub>		0.5		3.1	Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 0.3 Ω I <sub>D</sub> ≅ 50 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 2.5 Ω		14	30	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			11	20	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			60	120	
Fall Time <sup>c</sup>	t <sub>f</sub>			15	40	
Source-Drain Diode Ratings and Characteristic (T <sub>C</sub> = 25 °C)						
Pulsed Current	I <sub>SM</sub>				100	A
Diode Forward Voltage <sup>b</sup>	V <sub>SD</sub>	I <sub>F</sub> = 100 A, V <sub>GS</sub> = 0 V		1.2	1.5	V
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 50 A, di/dt = 100 A/μs		55	100	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)**

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**THERMAL RATINGS**
