



**THE DATASHEET OF  
SUD50P04-15-E3**

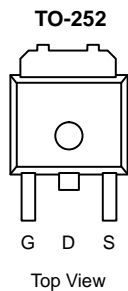




## P-Channel 40-V (D-S), 175°C MOSFET

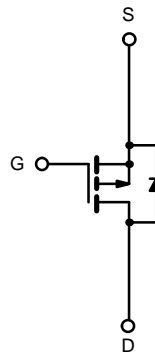
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-40	0.015 @ $V_{GS} = -10$ V	-50
	0.023 @ $V_{GS} = -4.5$ V	-45

**175°C Rated**  
Maximum Junction Temperature  
**TrenchFET®**  
Power MOSFETs



Order Number:  
SUD50P04-15

Drain Connected to Tab



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		$V_{DS}$	-40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>b</sup>	$T_C = 25^\circ\text{C}$	$I_D$	-50	A
	$T_C = 100^\circ\text{C}$		-40	
Pulsed Drain Current		$I_{DM}$	-150	
Continuous Source Current (Diode Conduction)		$I_S$	-50	
Maximum Power Dissipation <sup>b</sup>	$T_C = 25^\circ\text{C}$	$P_D$	100 <sup>b</sup>	W
	$T_A = 25^\circ\text{C}$		3 <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>	$t \leq 10$ sec.	$R_{thJA}$	15	18	$^\circ\text{C/W}$
	Steady State		40	50	
Maximum Junction-to-Case		$R_{thJC}$	1.2	1.5	

Notes

- a. Surface Mounted on 1" x 1" FR4 Board.
- b. See SOA curve for voltage derating.



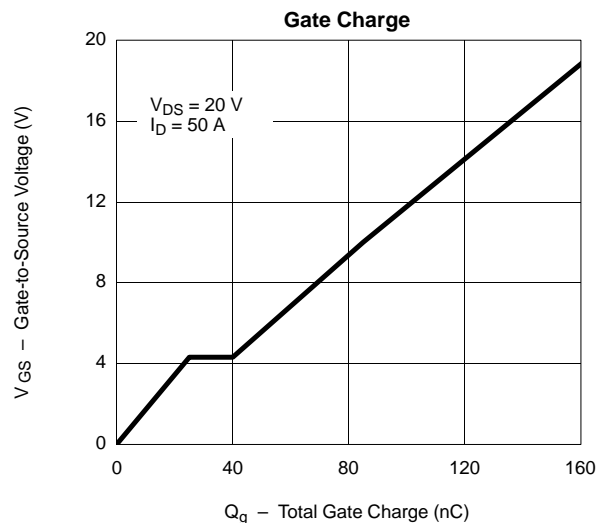
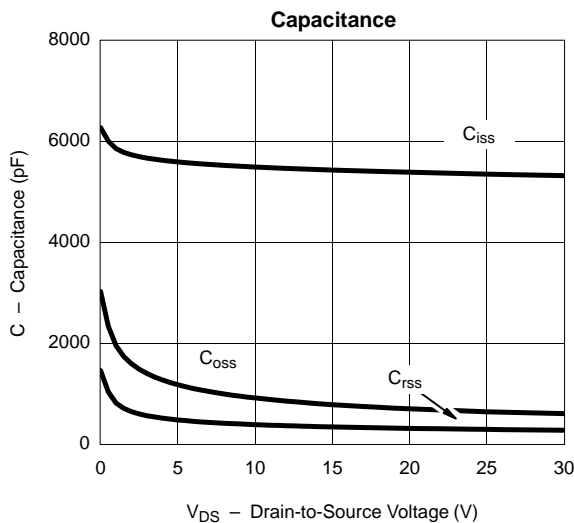
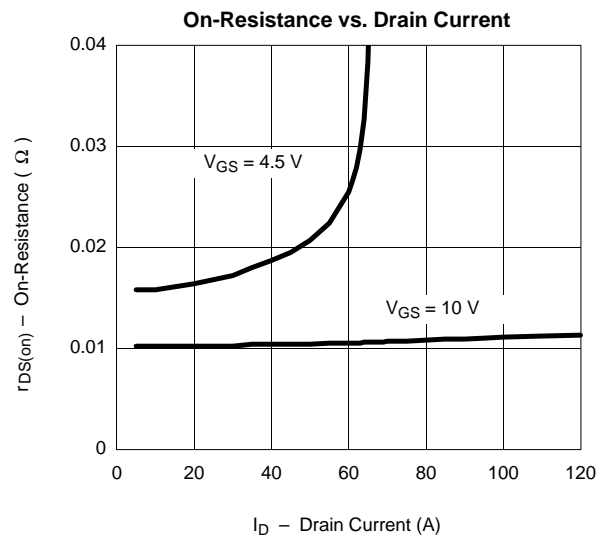
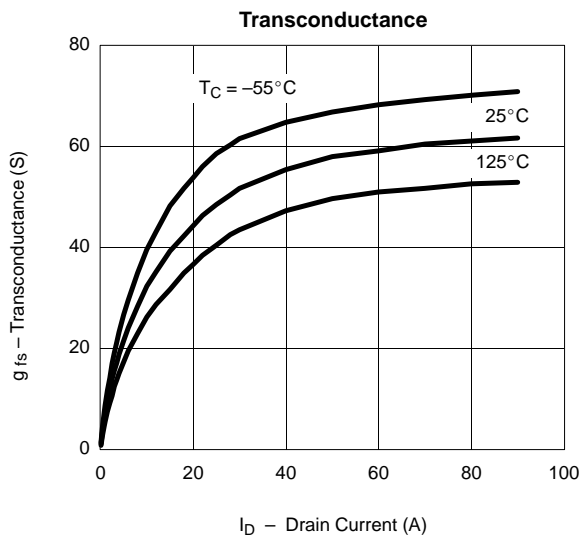
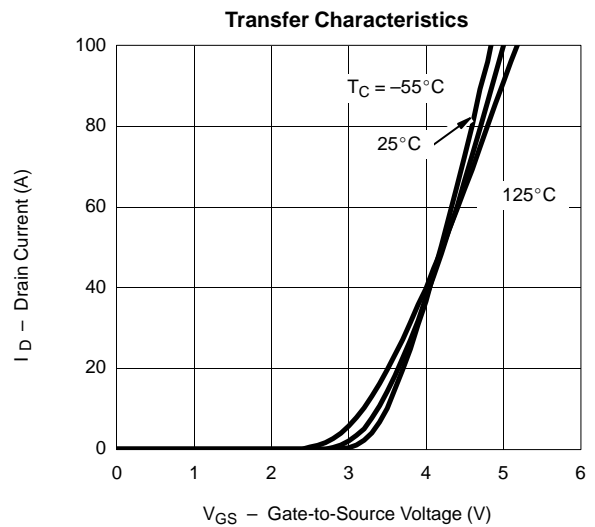
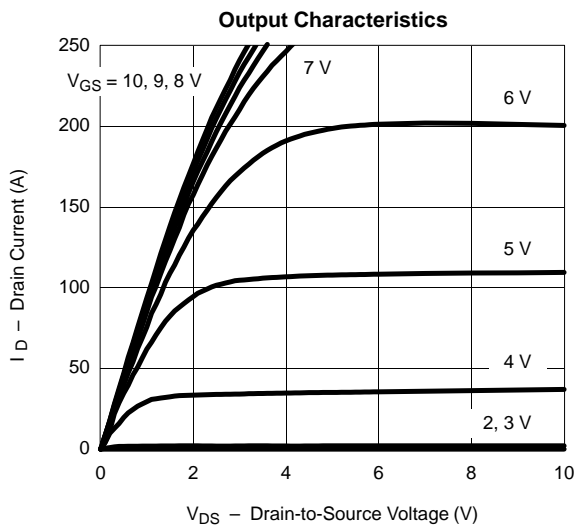
<b>SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)</b>						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = -250 μA	-40			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA	-1.0			
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> = -40 V, V <sub>GS</sub> = 0 V			-1	μA
		V <sub>DS</sub> = -40 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			-50	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -10 V	-120			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -30 A		0.012	0.015	Ω
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -30 A, T <sub>J</sub> = 125 °C			0.024	
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -20 A		0.018	0.023	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -15 V, I <sub>D</sub> = -30 A	20			S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = -25 V, f = 1 MHz		5400		pF
Output Capacitance	C <sub>oss</sub>			640		
Reverse Transfer Capacitance	C <sub>rss</sub>			300		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = -20 V, V <sub>GS</sub> = -10 V, I <sub>D</sub> = -50 A		85	130	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			25		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			15		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = -20 V, R <sub>L</sub> = 0.4 Ω I <sub>D</sub> ≅ -50 A, V <sub>GEN</sub> = -10 V, R <sub>G</sub> = 2.5 Ω		15	25	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			380	580	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			75	115	
Fall Time <sup>c</sup>	t <sub>f</sub>			140	210	
<b>Source-Drain Diode Ratings and Characteristic (T<sub>C</sub> = 25 °C)</b>						
Pulsed Current	I <sub>SM</sub>				-150	A
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = -50 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		40	80	ns

**Notes**

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

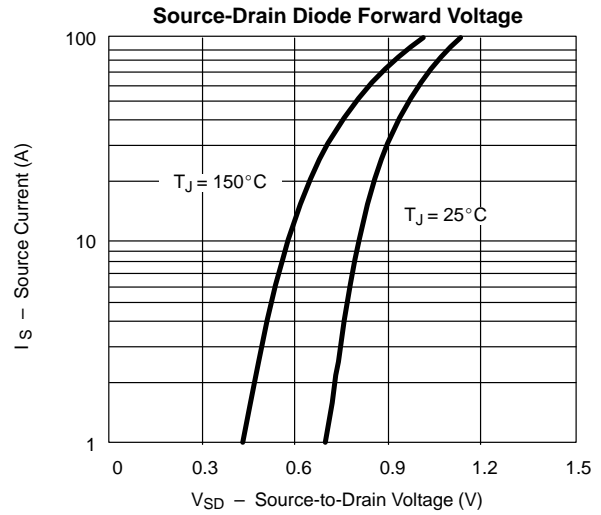
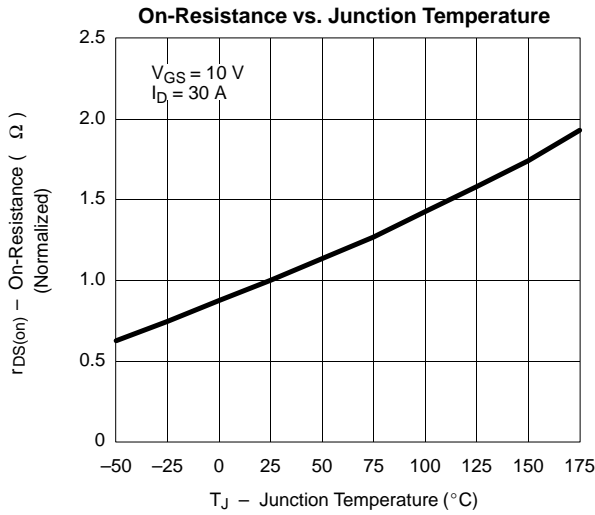


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

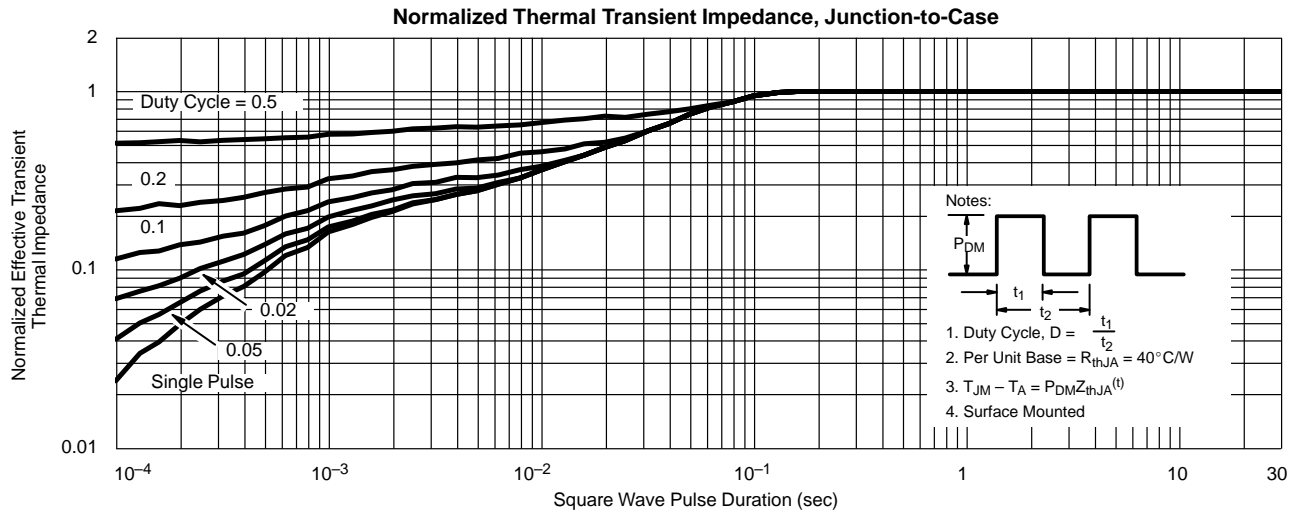
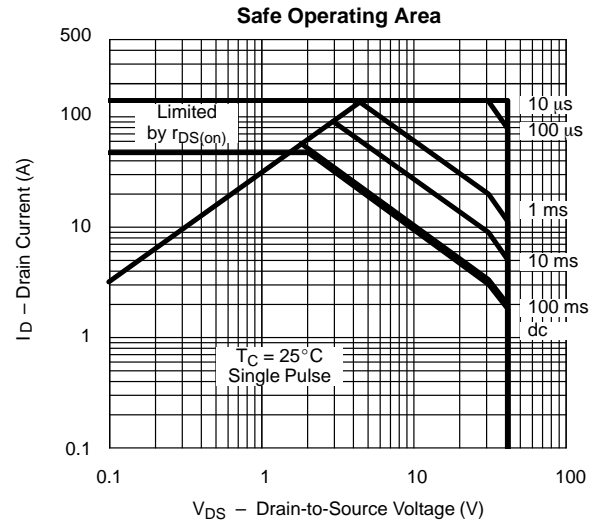
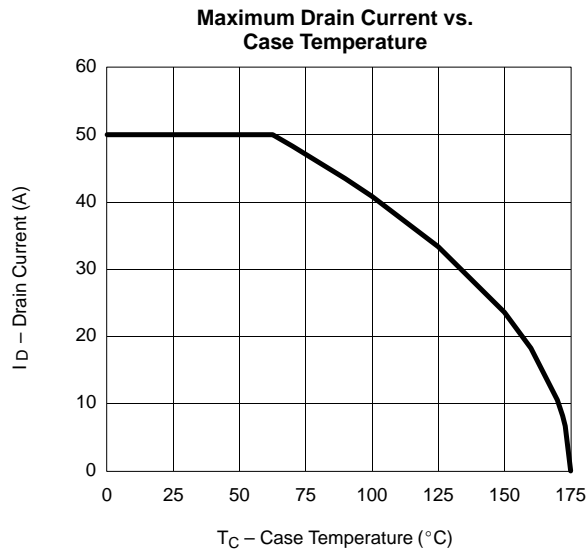




**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**



**THERMAL RATINGS**





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