



New Product

**SUD50N06-16**  
Vishay Siliconix

## N-Channel 60-V (D-S) 175 °C MOSFET

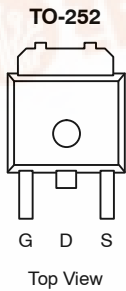
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>c</sup>
60	0.016 @ V <sub>GS</sub> = 10 V	50

### FEATURES

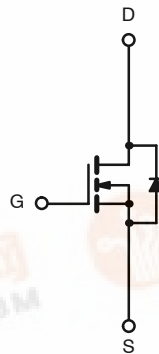
- TrenchFET® Power MOSFET

### APPLICATIONS

- Automotive
  - ABS
  - EPS
  - Motor Drives
- Industrial



Drain Connected to Tab



N-Channel MOSFET

Ordering Information: SUD50N06-16

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	60	V	
Gate-Source Voltage	V <sub>GS</sub>	± 20		
Continuous Drain Current (T <sub>J</sub> = 175 °C) <sup>b</sup>	I <sub>D</sub>	T <sub>C</sub> = 25 °C	50 <sup>c</sup>	
		T <sub>C</sub> = 125 °C	28	
Pulsed Drain Current	I <sub>DM</sub>	100	A	
Continuous Source Current (Diode Conduction)	I <sub>S</sub>	50 <sup>c</sup>		
Avalanche Current, Single Pulse	I <sub>AS</sub>	35		
Avalanche Energy	E <sub>AS</sub>	L = 0.1 mH	61	mJ
Maximum Power Dissipation		T <sub>C</sub> = 25 °C	88 <sup>b</sup>	
		T <sub>A</sub> = 25 °C	3 <sup>a</sup>	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 175	°C	

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 10 sec	20	°C/W
		Steady State	40	
Junction-to-Case	R <sub>thJC</sub>	1.4	1.7	

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

# SUD50N06-16

Vishay Siliconix

New Product



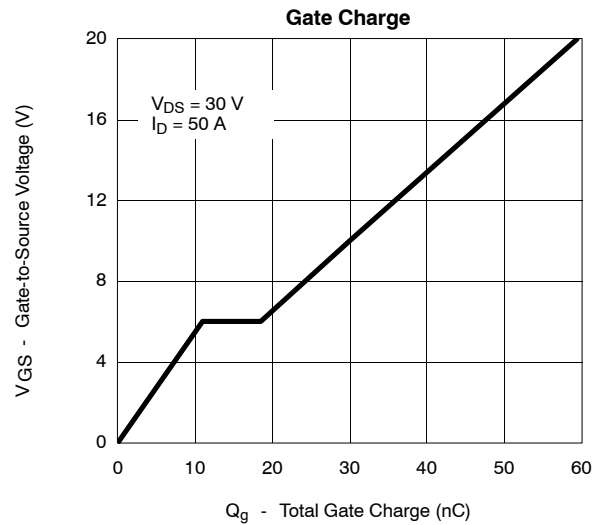
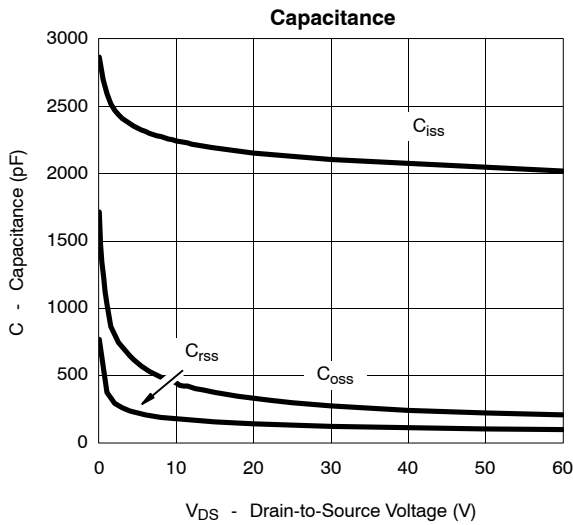
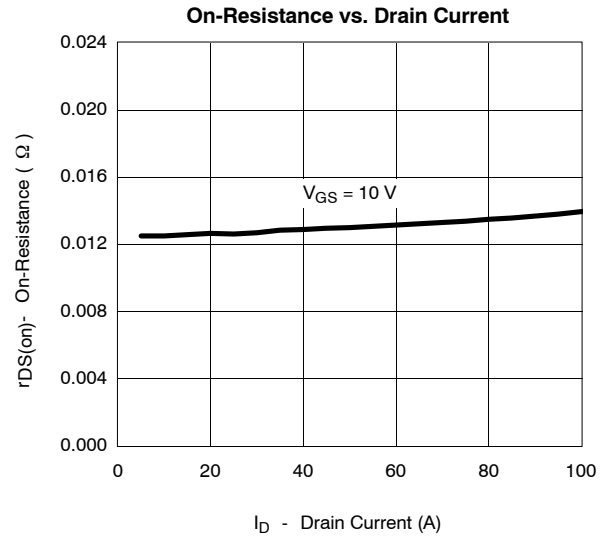
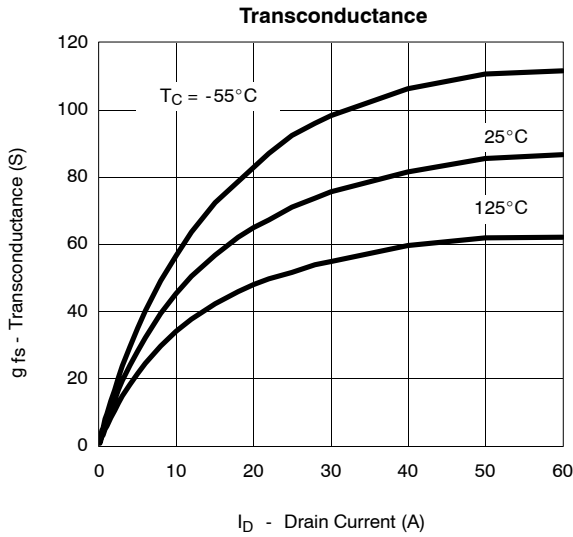
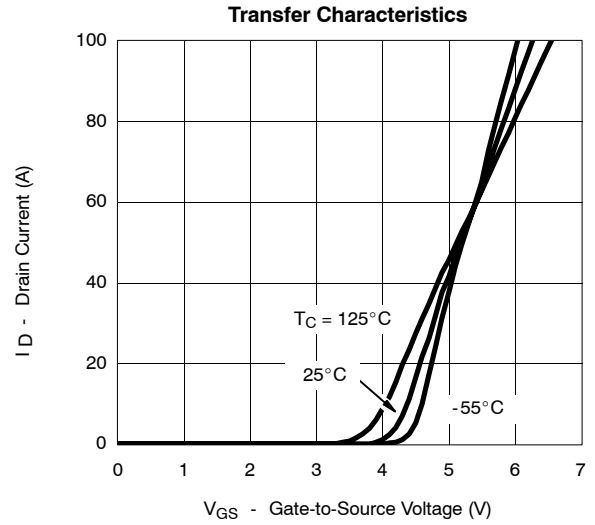
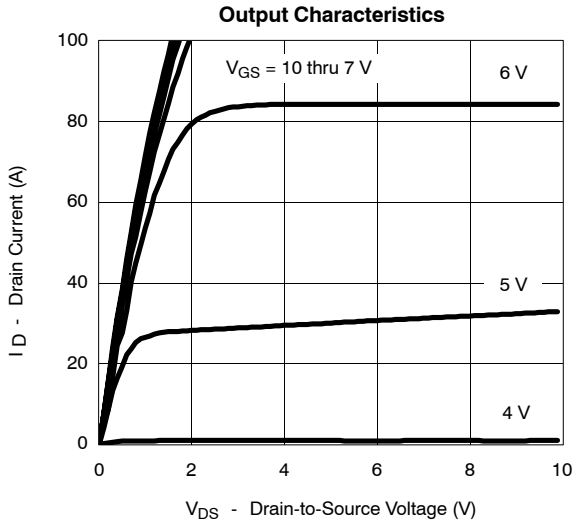
SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2.0		4.0	
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> = 60 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			250	
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		0.0128	0.016	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C			0.027	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C			0.032	
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A		20		S
<b>Dynamic<sup>a</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, F = 1 MHz		2100		pF
Output Capacitance	C <sub>oss</sub>			300		
Reverse Transfer Capacitance	C <sub>rss</sub>			125		
Gate Resistance	R <sub>g</sub>	f = 1 MHz		1.7		Ω
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 50 A		30	45	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			11		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			8		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 30 V, R <sub>L</sub> = 0.6 Ω I <sub>D</sub> ≅ 50 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		10	15	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			12	20	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			20	30	
Fall Time <sup>c</sup>	t <sub>f</sub>			10	15	
<b>Source-Drain Diode Ratings and Characteristic (T<sub>C</sub> = 25 °C)</b>						
Pulsed Current	I <sub>SM</sub>				100	A
Diode Forward Voltage <sup>b</sup>	V <sub>SD</sub>	I <sub>F</sub> = 30 A, V <sub>GS</sub> = 0 V		1.0	1.5	V
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 50 A, di/dt = 100 A/μs		50	85	ns

**Notes**

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



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



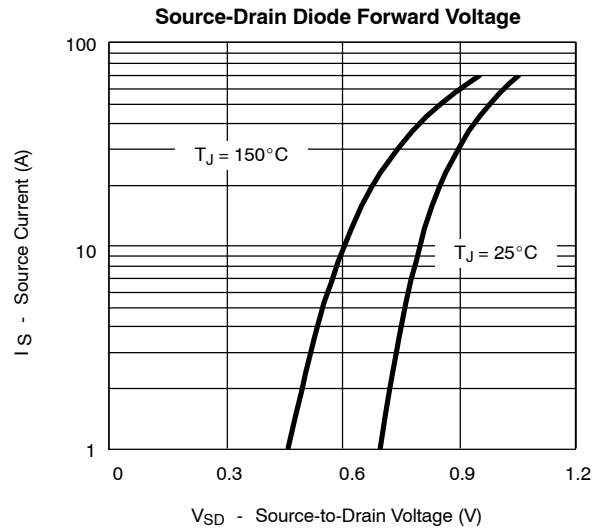
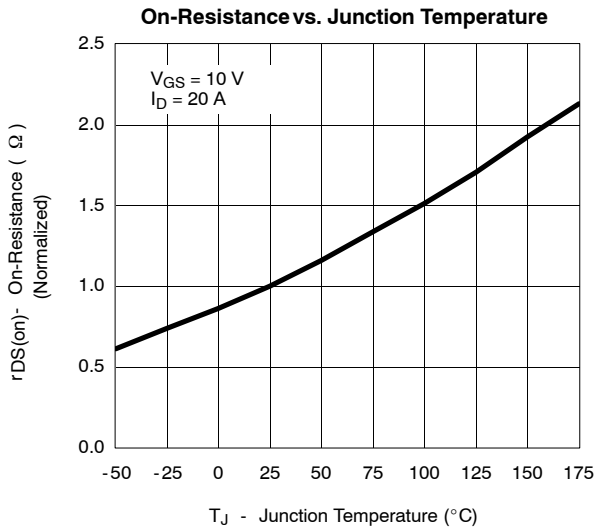
# SUD50N06-16

Vishay Siliconix

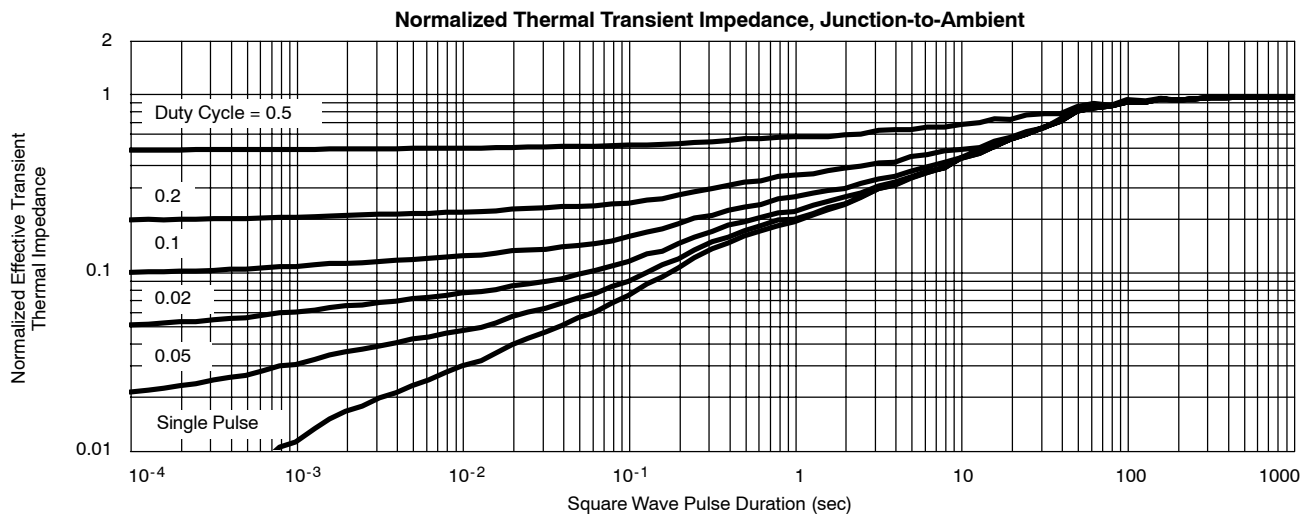
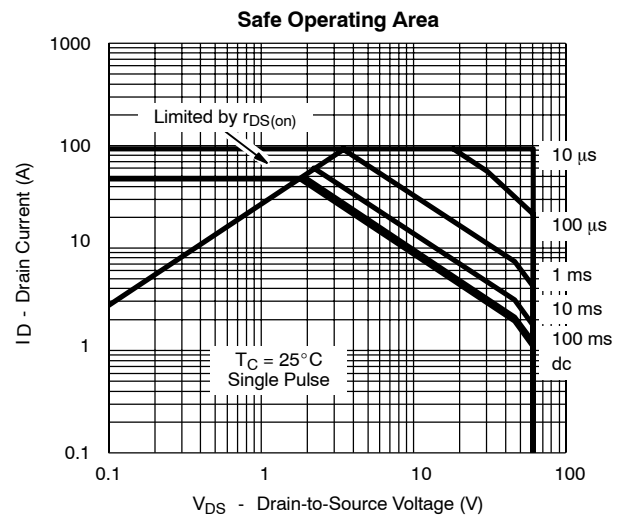
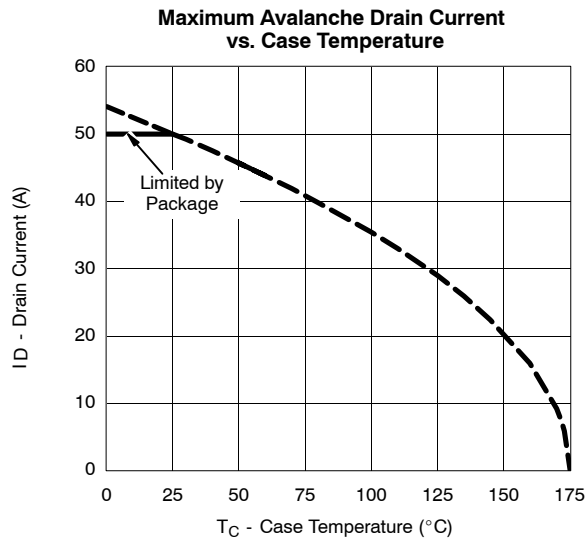
New Product



## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



## THERMAL RATINGS





New Product

SUD50N06-16  
Vishay Siliconix

**THERMAL RATINGS**

