



## P-Channel 60-V (D-S), 175°C MOSFET

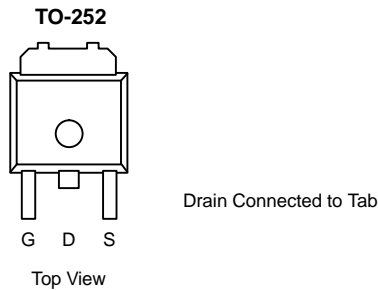
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-60	0.015 @ $V_{GS} = -10$ V	-50 <sup>d</sup>
	0.020 @ $V_{GS} = -4.5$ V	-50

### FEATURES

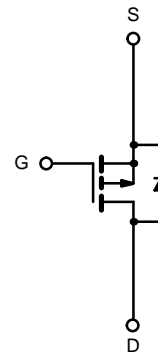
- TrenchFET® Power MOSFET
- 175°C Junction Temperature

### APPLICATIONS

- Automotive 12-V Boardnet



Ordering Information: SUD50P06-15L



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	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	-50 <sup>d</sup>
		$T_C = 125^\circ\text{C}$	-39
Pulsed Drain Current	$I_{DM}$	-80	A
Avalanche Current	$I_{AR}$	-50	
Repetitive Avalanche Energy <sup>a</sup>	$E_{AR}$	125	mJ
Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$	
		$T_A = 25^\circ\text{C}$	3 <sup>b, c</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
Junction-to-Ambient <sup>b</sup>	$R_{thJA}$	$t \leq 10$ sec	15	18
		Steady State	40	50
Junction-to-Case	$R_{thJC}$	0.82	1.1	$^\circ\text{C/W}$

Notes:

- Duty cycle  $\leq 1\%$ .
- When mounted on 1" square PCB (FR-4 material).
- See SOA curve for voltage derating.
- Package limited.

SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
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	-60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA	-1		-3	
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> = -48 V, V <sub>GS</sub> = 0 V			-1	μA
		V <sub>DS</sub> = -48 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			-50	
		V <sub>DS</sub> = -48 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			-150	
On-State Drain Current <sup>a</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>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -17 A		0.012	0.015	Ω
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -50 A, T <sub>J</sub> = 125 °C			0.025	
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -50 A, T <sub>J</sub> = 175 °C			0.030	
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -14 A			0.020	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -15 V, I <sub>D</sub> = -17 A		61		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		4950		pF
Output Capacitance	C <sub>oss</sub>			480		
Reverse Transfer Capacitance	C <sub>rss</sub>			405		
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		110	165	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			19		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			28		
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> = 6 Ω		15	23	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			70	105	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			175	260	
Fall Time <sup>c</sup>	t <sub>f</sub>			175	260	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)<sup>b</sup></b>						
Continuous Current	I <sub>s</sub>				-50	A
Pulsed Current	I <sub>SM</sub>				-80	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = -50 A, V <sub>GS</sub> = 0 V		1.0	1.6	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = -50 A, di/dt = 100 A/μs		45	70	ns

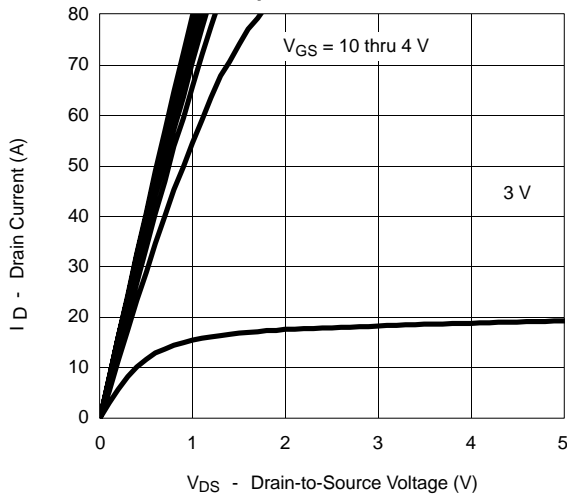
## Notes:

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

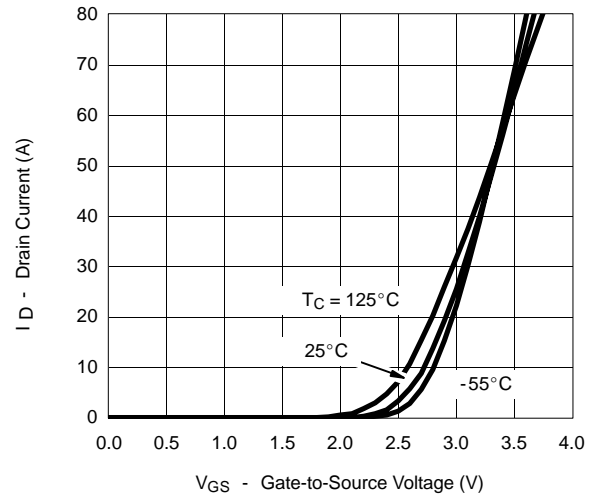


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

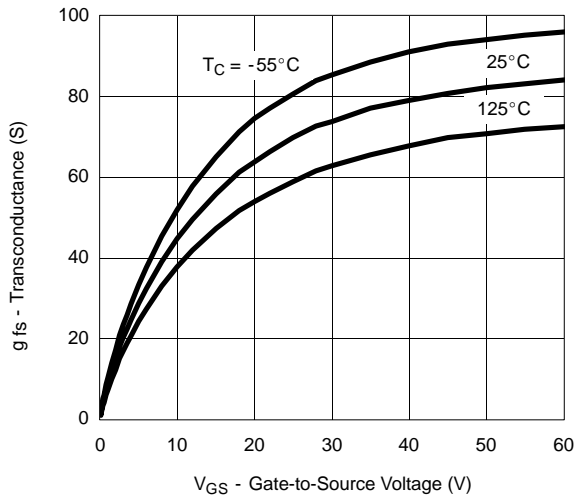
Output Characteristics



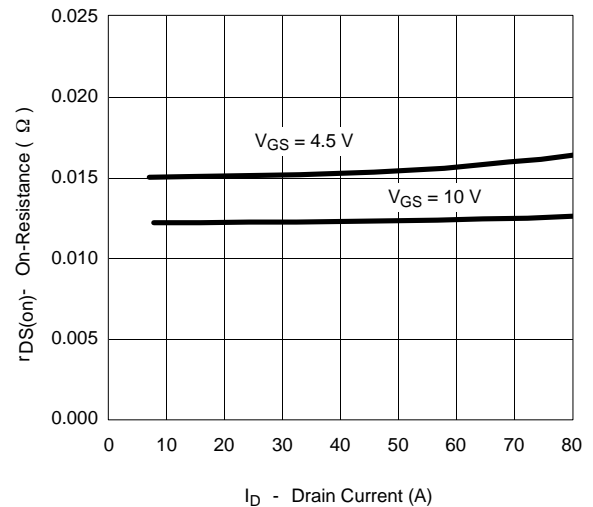
Transfer Characteristics



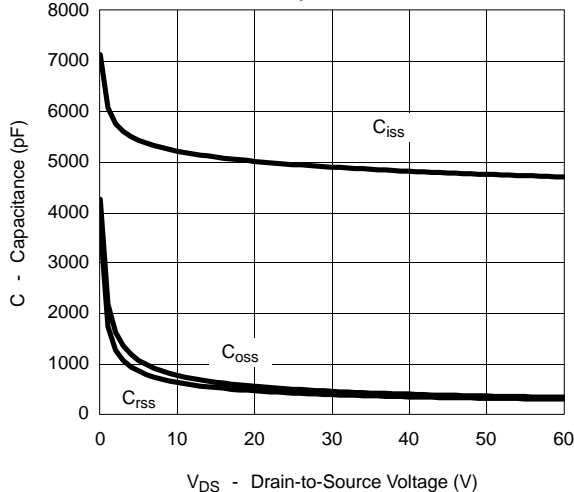
Transconductance



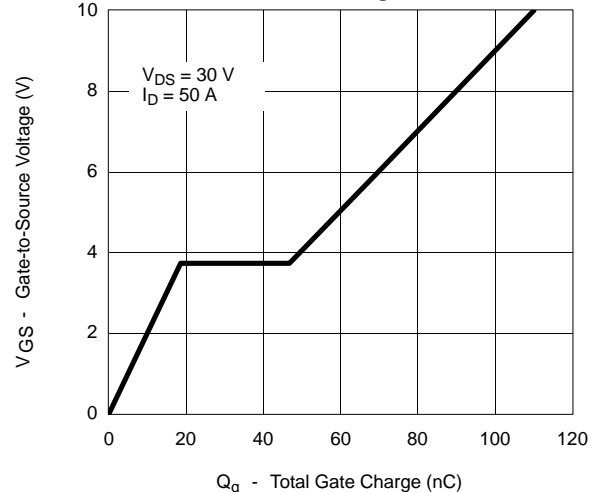
On-Resistance vs. Drain Current



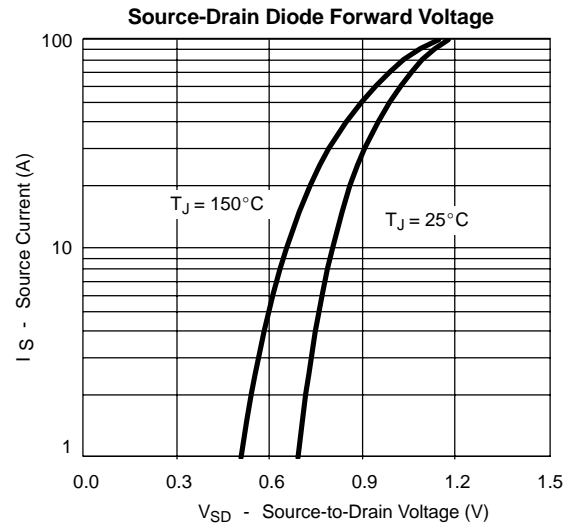
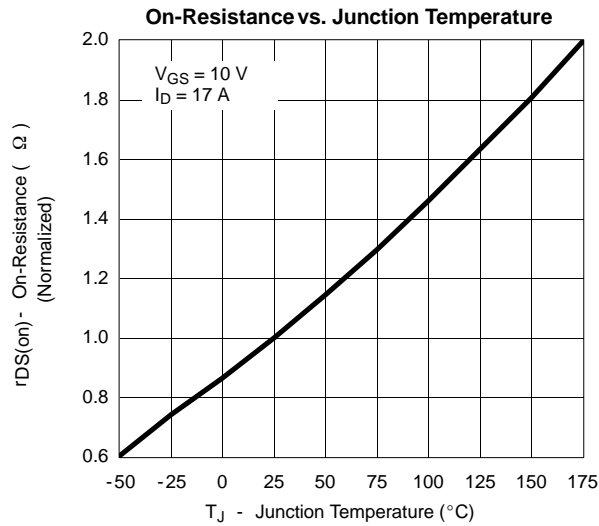
Capacitance



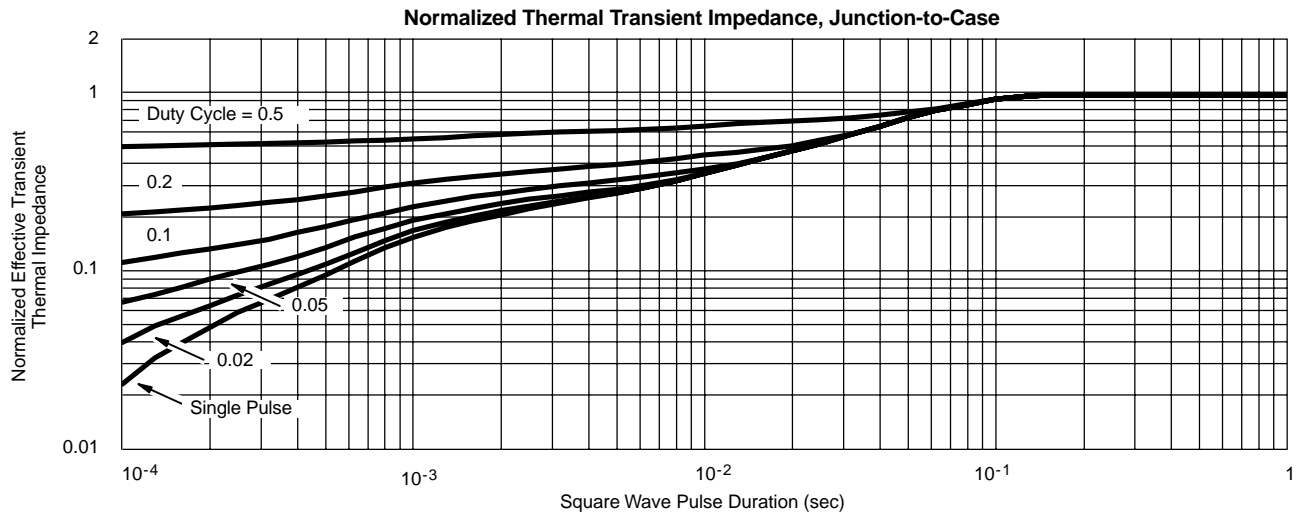
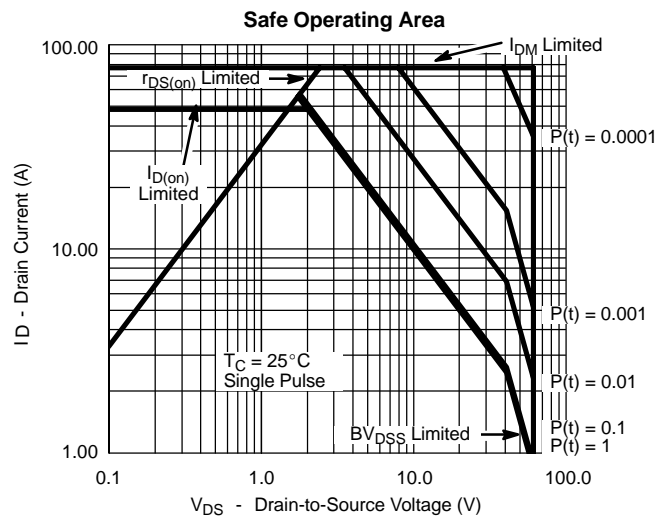
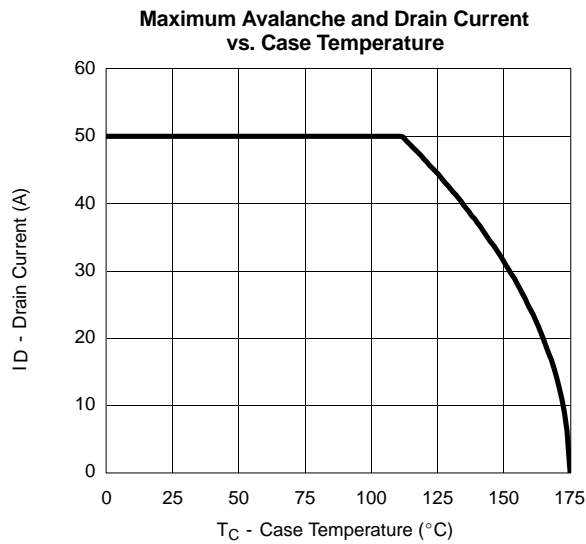
Gate Charge



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



### THERMAL RATINGS





## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.