



## P-Channel 60-V (D-S), 175°C MOSFET

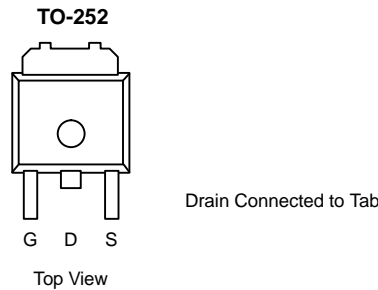
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-60	0.015 @ $V_{GS} = -10$ V	-50 <sup>d</sup>
	0.020 @ $V_{GS} = -4.5$ V	-50

### FEATURES

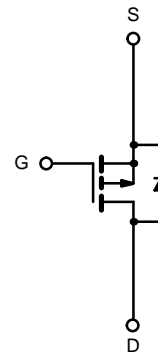
- TrenchFET® Power MOSFET
- 175°C Junction Temperature

### 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

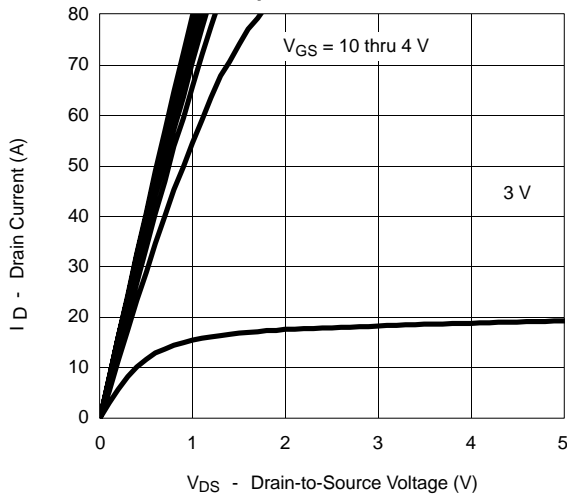
## Notes:

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

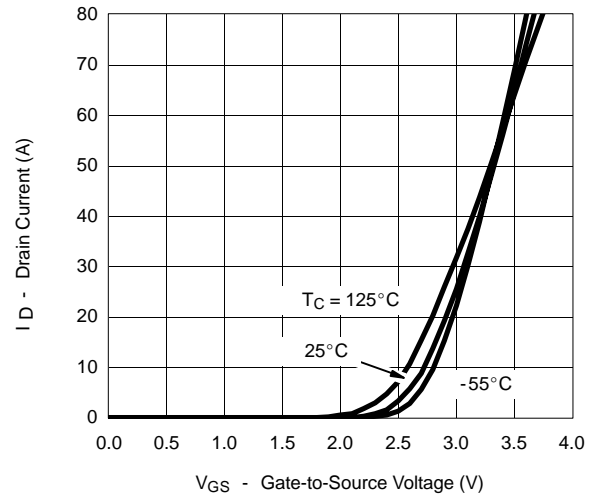


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

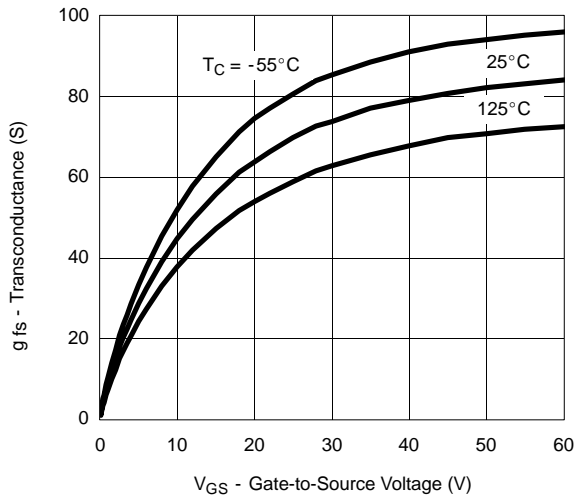
Output Characteristics



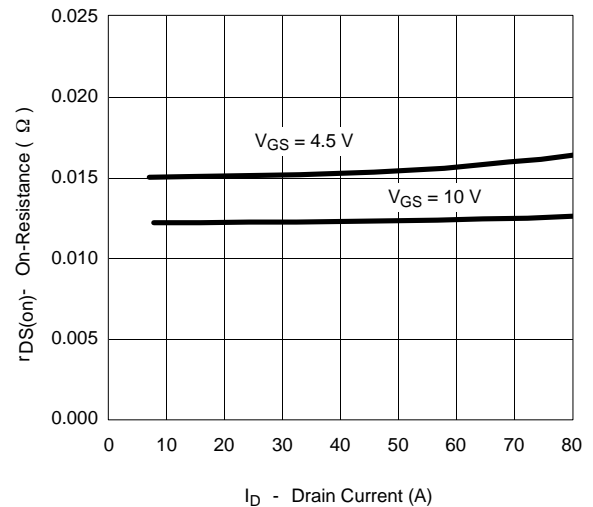
Transfer Characteristics



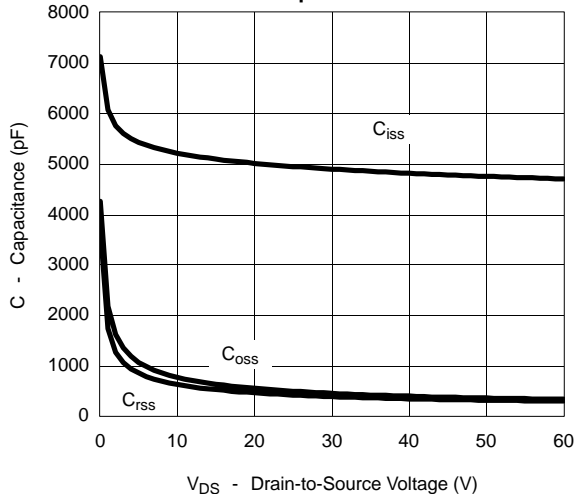
Transconductance



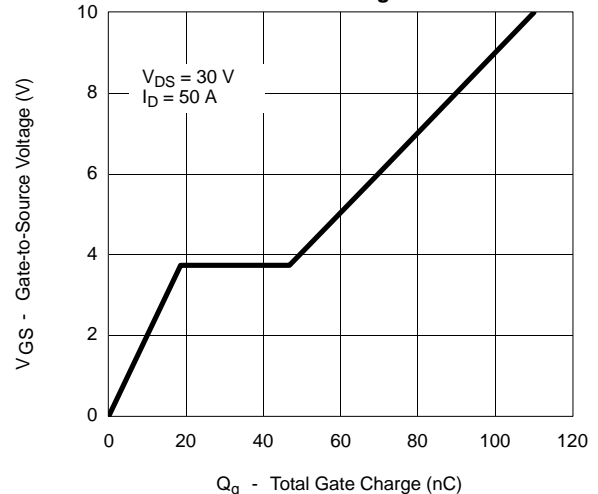
On-Resistance vs. Drain Current



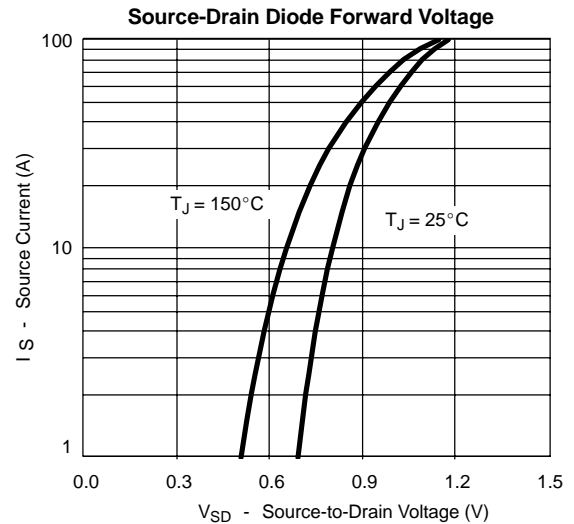
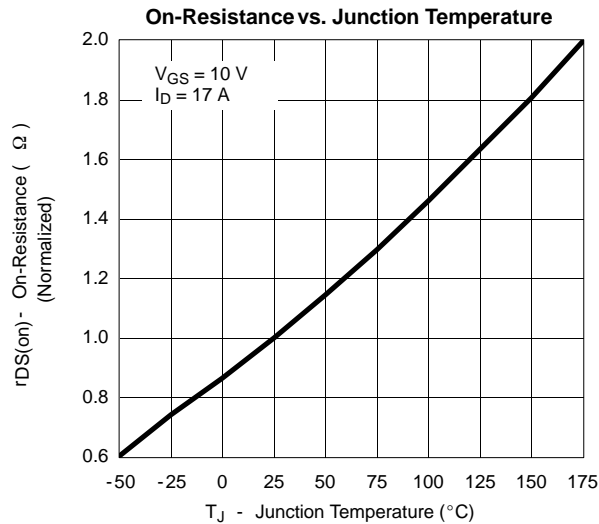
Capacitance



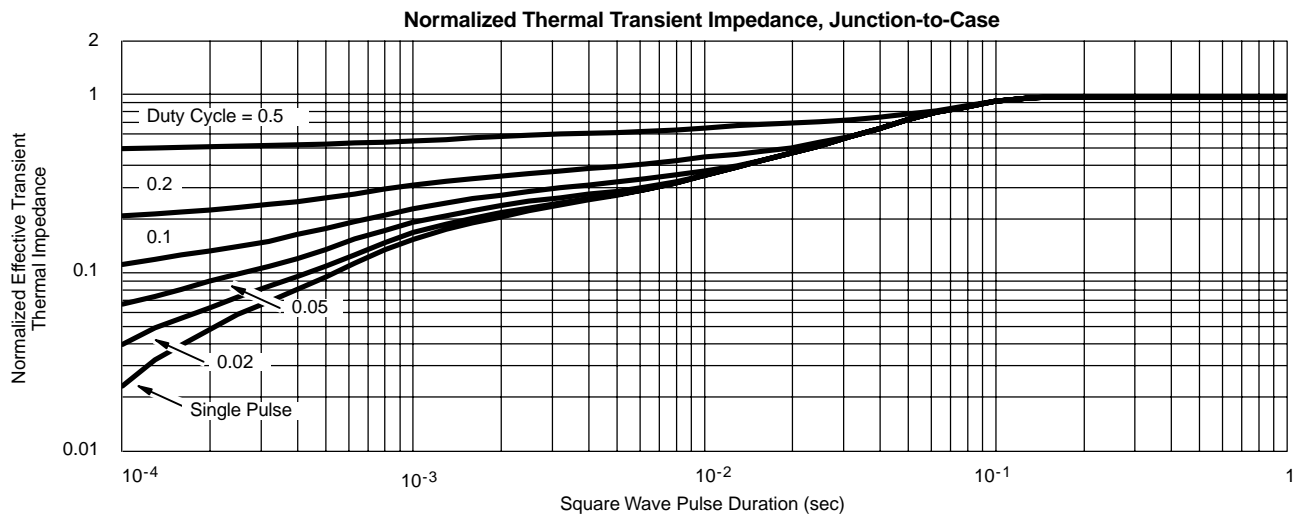
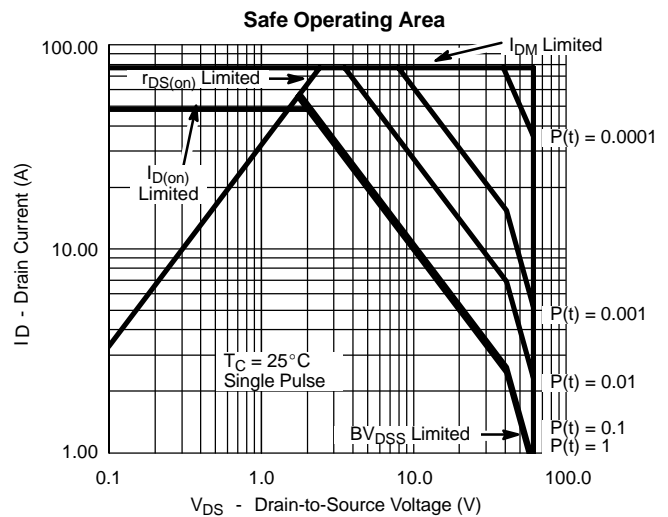
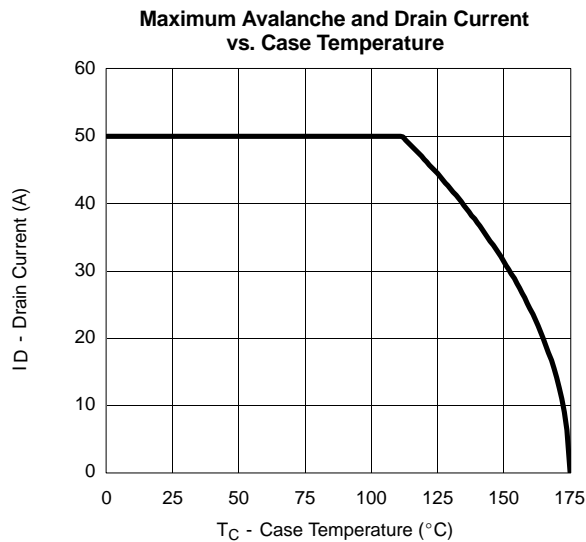
Gate Charge



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



### THERMAL RATINGS



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