



## P-Channel 60-V (D-S), 175°C MOSFET

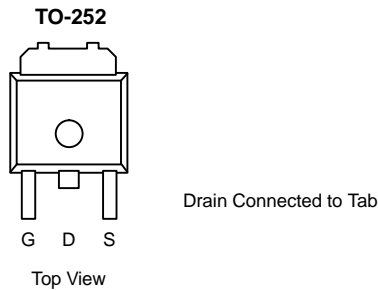
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
-60	0.015 @ V <sub>GS</sub> = -10 V	-50 <sup>d</sup>
	0.020 @ V <sub>GS</sub> = -4.5 V	-50

### FEATURES

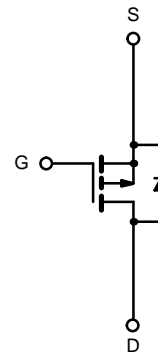
- TrenchFET® Power MOSFET
- 175°C Junction Temperature

### APPLICATIONS

- Automotive 12-V Boardnet



Ordering Information: SUD50P06-15L



ABSOLUTE MAXIMUM RATINGS (T <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)	I <sub>D</sub>	T <sub>C</sub> = 25°C	-50 <sup>d</sup>
		T <sub>C</sub> = 125°C	-39
Pulsed Drain Current	I <sub>DM</sub>	-80	A
Avalanche Current	I <sub>AR</sub>	-50	
Repetitive Avalanche Energy <sup>a</sup>	E <sub>AR</sub>	125	mJ
Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25°C	
		T <sub>A</sub> = 25°C	3 <sup>b, c</sup>
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>b</sup>	R <sub>thJA</sub>	t ≤ 10 sec	15	18
		Steady State	40	50
Junction-to-Case	R <sub>thJC</sub>	0.82	1.1	°C/W

Notes:

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

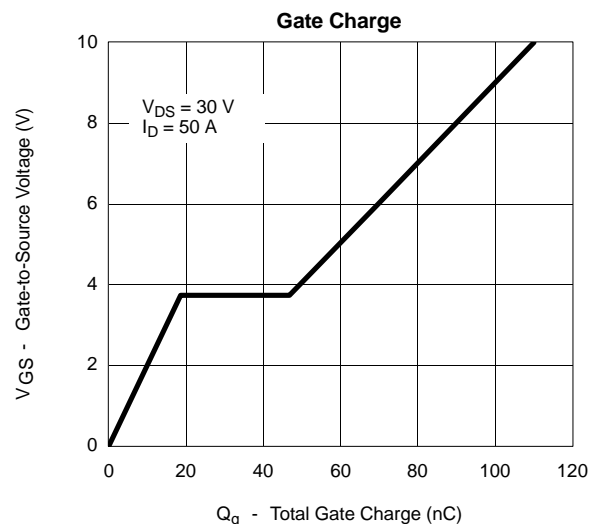
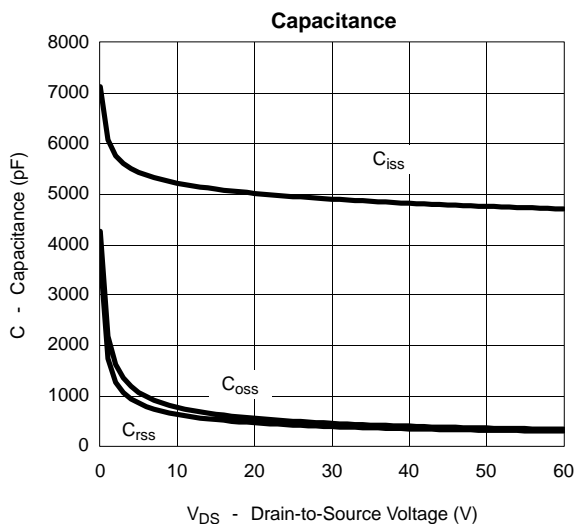
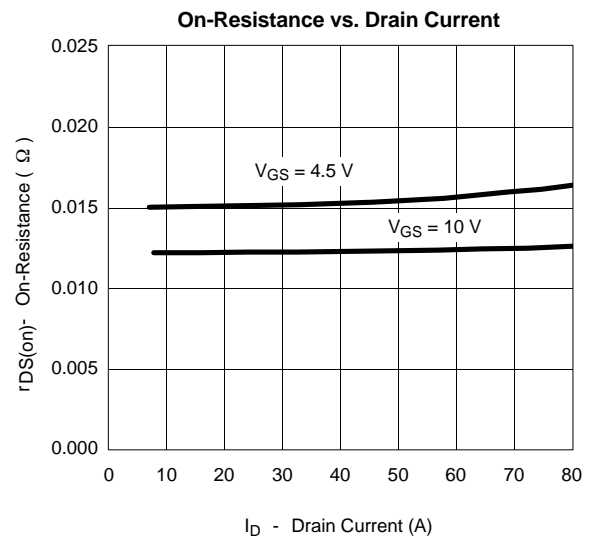
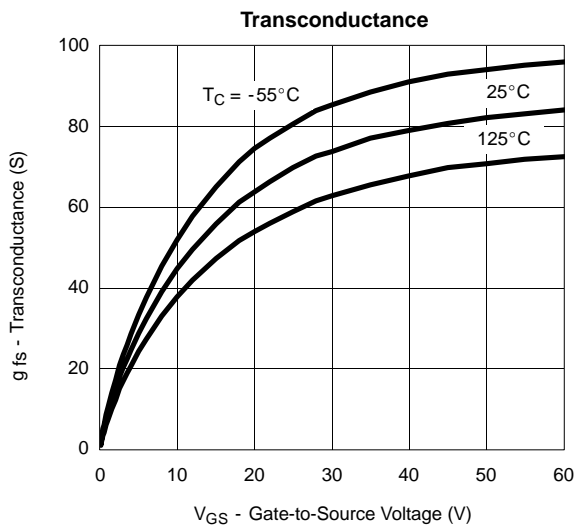
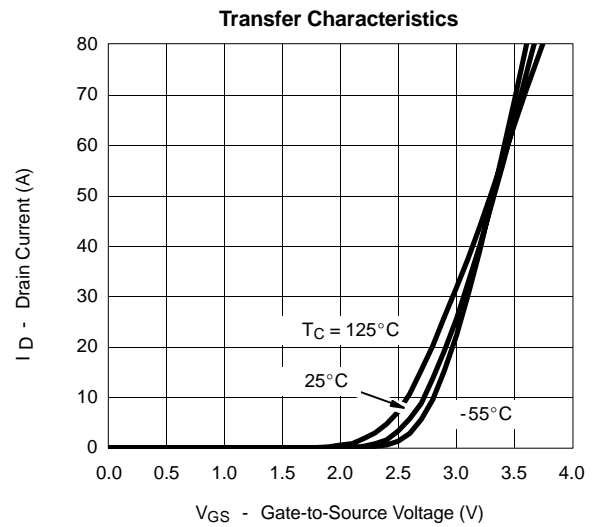
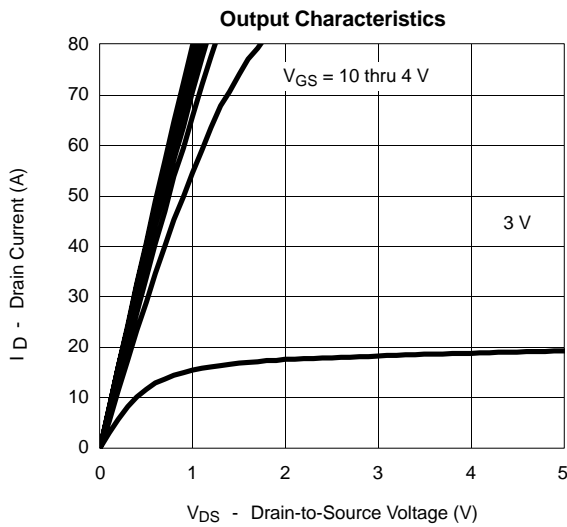
SPECIFICATIONS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	-1		-3	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -48\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -48\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			-50	
		$V_{DS} = -48\text{ V}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$			-150	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	-50			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -17\text{ A}$		0.012	0.015	$\Omega$
		$V_{GS} = -10\text{ V}, I_D = -50\text{ A}, T_J = 125^\circ\text{C}$			0.025	
		$V_{GS} = -10\text{ V}, I_D = -50\text{ A}, T_J = 175^\circ\text{C}$			0.030	
		$V_{GS} = -4.5\text{ V}, I_D = -14\text{ A}$			0.020	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -17\text{ A}$		61		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = -25\text{ V}, f = 1\text{ MHz}$		4950		pF
Output Capacitance	$C_{oss}$			480		
Reverse Transfer Capacitance	$C_{rss}$			405		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -50\text{ A}$		110	165	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			19		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			28		
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 0.6\ \Omega$ $I_D = -50\text{ A}, V_{GEN} = -10\text{ V}, R_G = 6\ \Omega$		15	23	ns
Rise Time <sup>c</sup>	$t_r$			70	105	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			175	260	
Fall Time <sup>c</sup>	$t_f$			175	260	
<b>Source-Drain Diode Ratings and Characteristics (<math>T_C = 25^\circ\text{C}</math>)<sup>b</sup></b>						
Continuous Current	$I_s$				-50	A
Pulsed Current	$I_{SM}$				-80	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = -50\text{ A}, V_{GS} = 0\text{ V}$		1.0	1.6	V
Reverse Recovery Time	$t_{rr}$	$I_F = -50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		45	70	ns

## Notes:

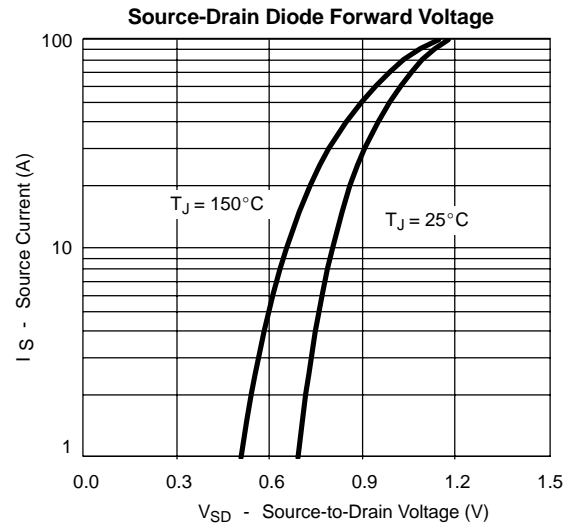
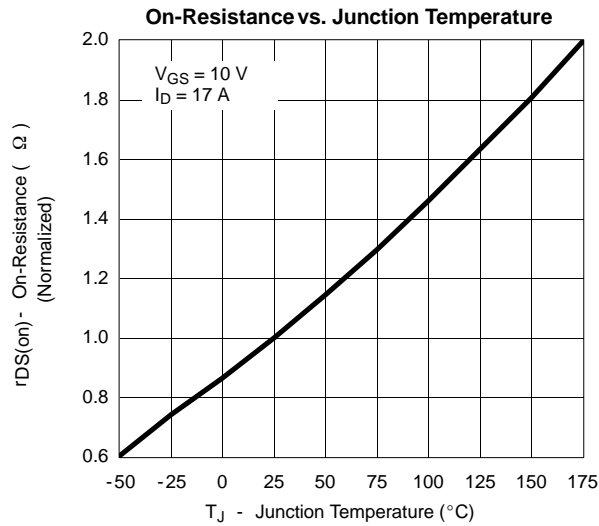
- Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.



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



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



### THERMAL RATINGS

