

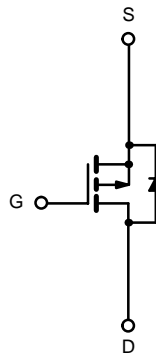
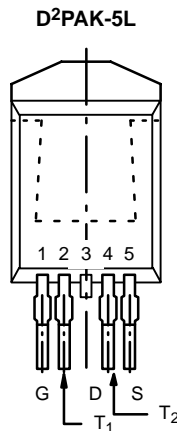


## P-Channel 55-V (D-S) MOSFET with Sensing Diode

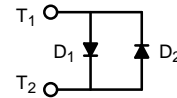
### PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-55	0.0135 @ $V_{GS} = -10$ V	-50 <sup>a</sup>
	0.019 @ $V_{GS} = -4.5$ V	-50 <sup>a</sup>

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



P-Channel MOSFET



### ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		$V_{DS}$	-55	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ ) <sup>d</sup>	$T_C = 25^\circ\text{C}$	$I_D$	-50 <sup>a</sup>	A
	$T_C = 100^\circ\text{C}$		-50 <sup>a</sup>	
Pulsed Drain Current		$I_{DM}$	-200	
Continuous Diode Current (Diode Conduction) <sup>d</sup>		$I_S$	-50 <sup>a</sup>	
Avalanche Current		$I_{AR}$	-50 <sup>a</sup>	
Repetitive Avalanche Energy <sup>b</sup>	$L = 0.1$ mH	$E_{AR}$	125	mJ
Maximum Power Dissipation <sup>a</sup>	$T_C = 25^\circ\text{C}$	$P_D$	200 <sup>c</sup>	W
	$T_A = 25^\circ\text{C}$		3.75 <sup>d</sup>	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$

### THERMAL RESISTANCE RATINGS

Parameter		Symbol	Limit	Unit
Junction-to-Ambient <sup>d</sup>	PCB Mount <sup>d</sup>	$R_{thJA}$	40	$^\circ\text{C/W}$
Junction-to-Case		$R_{thJC}$	0.75	

Notes

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

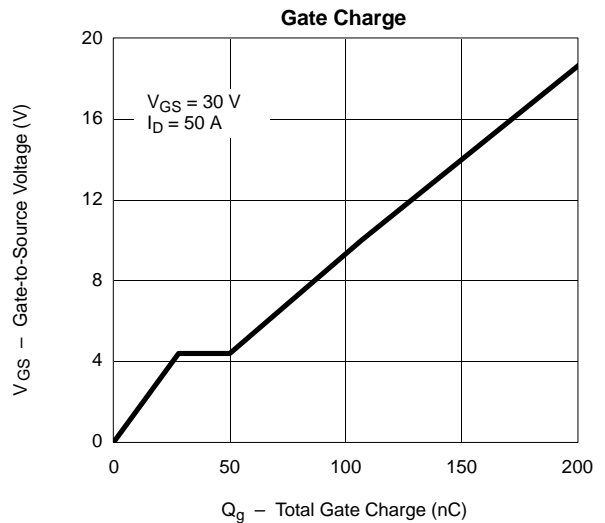
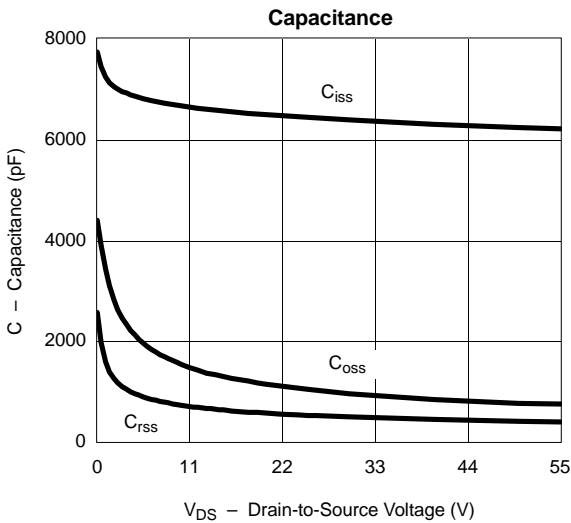
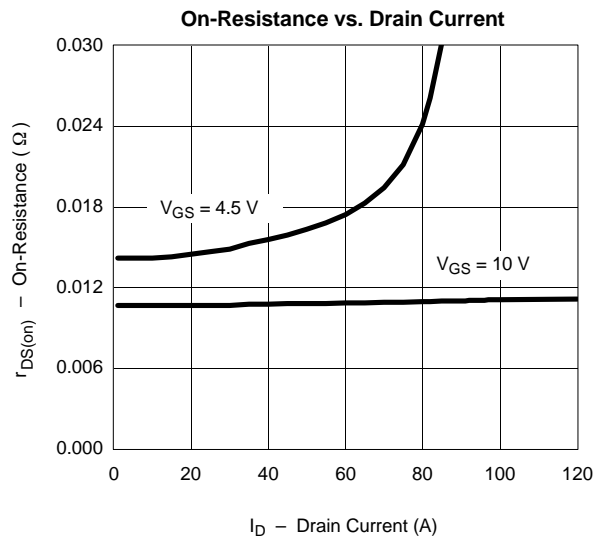
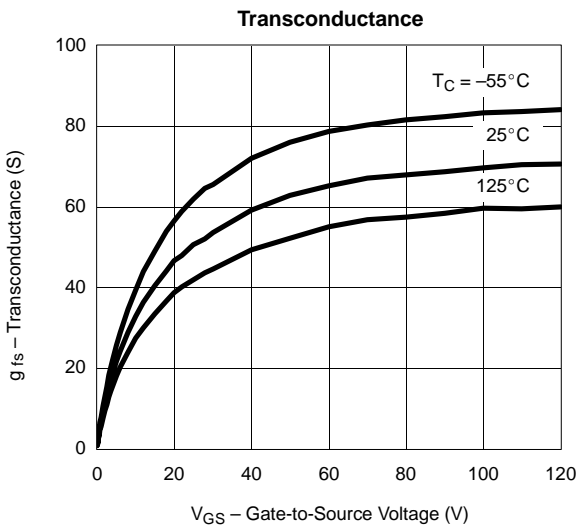
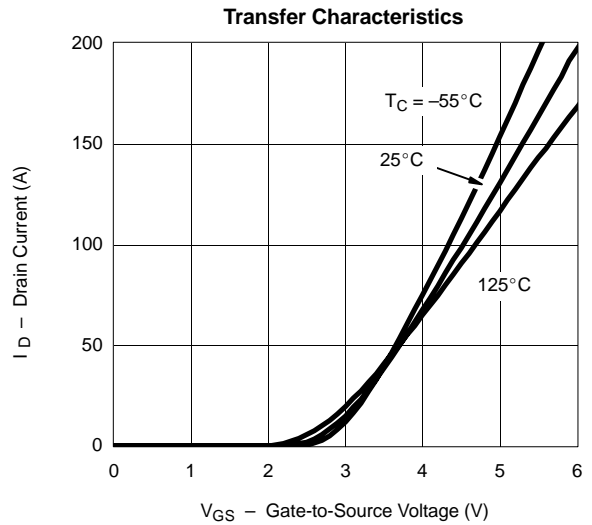
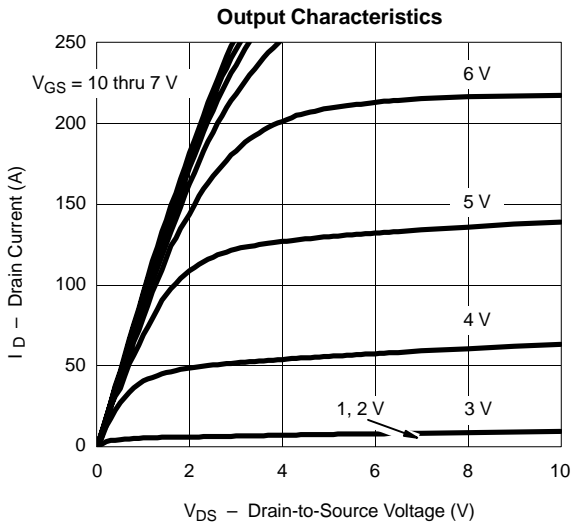
MOSFET SPECIFICATIONS (T <sub>J</sub> = 25° C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = -250 μA	-55			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = -250 μA	-1			
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> = -44 V, V <sub>GS</sub> = 0 V			-1	μA
		V <sub>DS</sub> = -44 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175° C			-250	
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		0.011	0.0135	Ω
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -30 A, T <sub>J</sub> = 125° C			0.021	
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -30 A, T <sub>J</sub> = 175° C			0.027	
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -20 A			0.019	
Sense Diode Forward Voltage	V <sub>FD</sub>	V <sub>DS</sub> = -25 V, I <sub>F</sub> = -250 μA	-770		-830	mV
Sense Diode Forward Voltage Increase	ΔV <sub>F</sub>	From I <sub>F</sub> = -125 μA to I <sub>F</sub> = -250 μA	-25		-55	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -25 V, I <sub>D</sub> = -30 A		50		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		6450	160	pF
Output Capacitance	C <sub>oss</sub>			1050		
Reversen Transfer Capacitance	C <sub>rss</sub>			520		
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		107		nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			28		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			22		
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		15	25	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			190	325	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			145	220	
Fall Time <sup>c</sup>	t <sub>f</sub>			265	450	
<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>				-200	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = -50 A, V <sub>GS</sub> = 0 V		-1.1	-1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = -50 A, di/dt = 100 A/μs		55	110	ns
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			-1.6	-2.0	A
Reverse Recovery Charge	Q <sub>rr</sub>				0.04	12

## Notes:

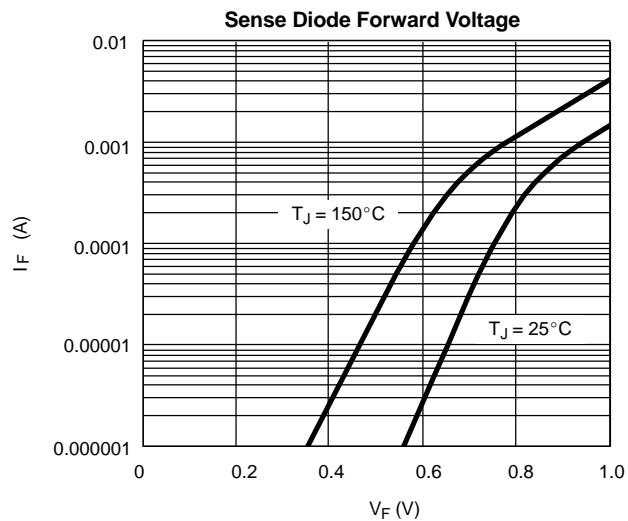
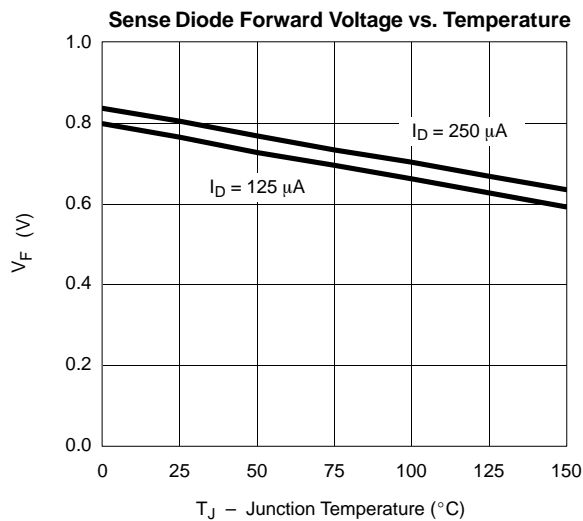
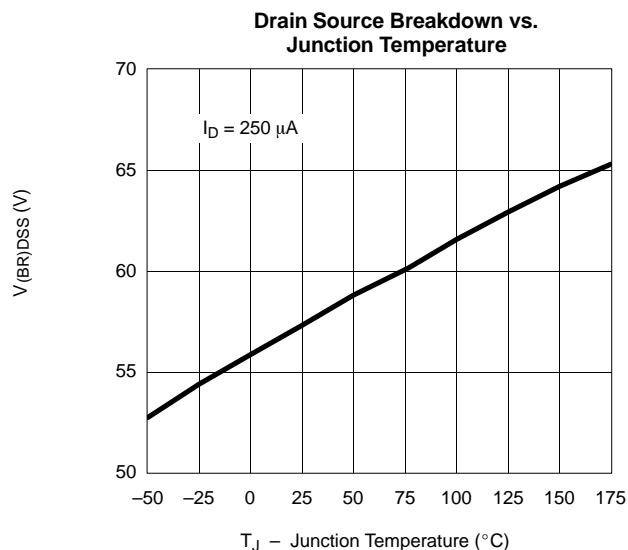
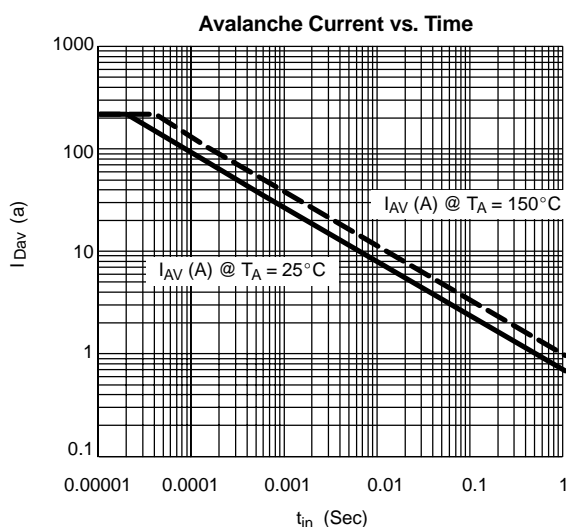
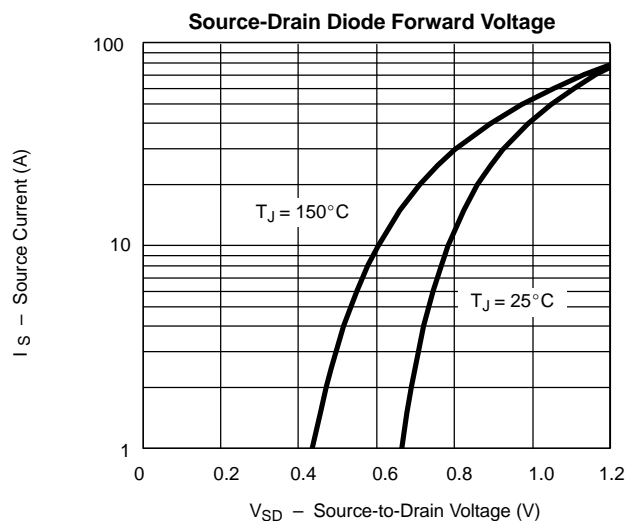
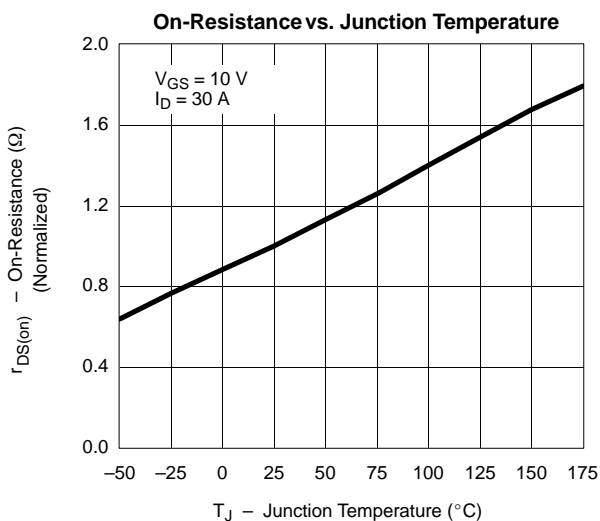
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.



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



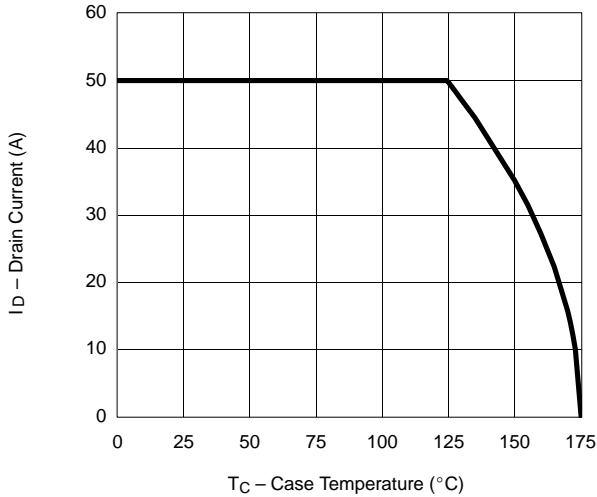
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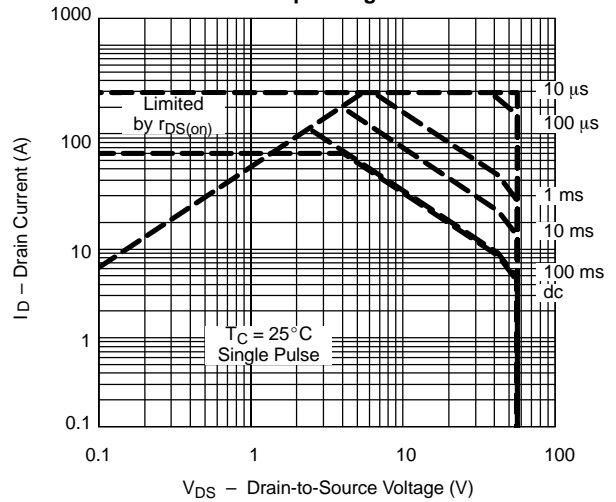


**THERMAL RATINGS**

**Maximum Avalanche and Drain Current vs. Case Temperature**



**Safe Operating Area**



**Normalized Thermal Transient Impedance, Junction-to-Case**

