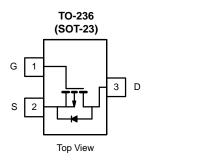
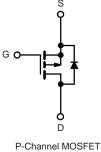


# P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY						
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω) Typ.	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)			
	0.046 at V <sub>GS</sub> = - 10 V	- 5.6				
- 30	0.049 at V <sub>GS</sub> = - 6 V	- 5	11.4 nC			
	0.054 at V <sub>GS</sub> = - 4.5 V	-4.5				





#### **FEATURES**

- TrenchFET<sup>®</sup> Power MOSFET
- 100 % R<sub>g</sub> Tested

#### **APPLICATIONS**

- For Mobile Computing
  - Load Switch - Notebook Adaptor Switch
  - DC/DC Converter



Parameter	<b>IGS</b> (T <sub>A</sub> = 25 °C	Symbol	Limit	Unit	
Parameter		-		Unit	
Drain-Source Voltage		V <sub>DS</sub>	- 30	V	
Gate-Source Voltage		V <sub>GS</sub>	± 20		
	T <sub>C</sub> = 25 °C		- 5.6		
Constitutions Desire Constants (T. 450.80)	T <sub>C</sub> = 70 °C		- 5.1		
Continuous Drain Current ( $T_J = 150 \ ^{\circ}C$ )	T <sub>A</sub> = 25 °C		- 5.4 <sup>b,c</sup>		
	T <sub>A</sub> = 70 °C		- 4.3 <sup>b,c</sup>	А	
Pulsed Drain Current (t = 100 µs)		I <sub>DM</sub>	- 18		
	T <sub>C</sub> = 25 °C		- 2.1		
Continous Source-Drain Diode Current	T <sub>A</sub> = 25 °C	Is –	- 1 <sup>b,c</sup>		
	T <sub>C</sub> = 25 °C		2.5		
Maximum Davias Disaination	T <sub>C</sub> = 70 °C		1.6		
Maximum Power Dissipation	T <sub>A</sub> = 25 °C	P <sub>D</sub>	1.25 <sup>b,c</sup>	W	
	T <sub>A</sub> = 70 °C		0.8 <sup>b,c</sup>		
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	

#### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit		
Maximum Junction-to-Ambient <sup>b,d</sup>	$t \le 5 s$	R <sub>thJA</sub>	75	100	°C/W	
Maximum Junction-to-Foot (Drain)	Steady State	R <sub>thJF</sub>	40	50	C/W	

Notes:

a. Based on T<sub>C</sub> = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under steady state conditions is 166 °C/W.

<b>B</b> <sup>®</sup> VBsemi
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Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static	-				1		
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = - 250 μA	- 30			V	
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$			- 19		mV/°C	
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I <sub>D</sub> = - 250 μA		4			
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}$ , $I_D = -250 \ \mu A$	- 0.5		- 2.0	V	
Gate-Source Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA	
	I <sub>DSS</sub>	V <sub>DS</sub> = - 30 V, V <sub>GS</sub> = 0 V			- 1	<u> </u>	
Zero Gate Voltage Drain Current		V <sub>DS</sub> = - 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			- 5	μA	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \le -5 V$ , $V_{GS} = -10 V$	- 2.5			Α	
		V <sub>GS</sub> =- 10 V, I <sub>D</sub> = - 4.4 A		0.046	0.055		
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =- 6 V, I <sub>D</sub> = - 4 A		0.049	0.058		
		V <sub>GS</sub> =- 4.5 V, I <sub>D</sub> = - 3.6 A		0.054	0.063		
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = - 15 V, I <sub>D</sub> = - 3.4 A		18		S	
Dynamic <sup>b</sup>				J	<u>I</u>	1	
Input Capacitance	C <sub>iss</sub>			1295			
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = 0 V, f = 1 MHz		150		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>			130			
i		V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 5.4 A		24	36	36	
Total Gate Charge	Qg			11.4	17	nC	
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 5.4 A		3.4			
Gate-Drain Charge	Q <sub>gd</sub>			3.8			
Gate Resistance	R <sub>g</sub>	f = 1 MHz	1.5	7.7	15.4	Ω	
Turn-On Delay Time	t <sub>d(on)</sub>			13	20		
Rise Time	tr	$V_{DD} = -15 \text{ V}, \text{ R}_{1} = 3.5 \Omega$		4	8	-	
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong$ - 4.3 A, $V_{GEN}$ = - 10 V, $R_g$ = 1 $\Omega$		38	57		
Fall Time	t <sub>f</sub>			6	12		
Turn-On Delay Time	t <sub>d(on)</sub>			28	42	ns	
Rise Time	t <sub>r</sub>	V <sub>DD</sub> = - 15 V, R <sub>I</sub> = 3.5 Ω		16	24	-	
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong$ - 4.3 A, $V_{GEN}$ = - 4.5 V, $R_g$ = 1 $\Omega$		30	45		
Fall Time	t <sub>f</sub>	· · · ·		10	20		
Drain-Source Body Diode Characteristic	S			1		1	
Continuous Source-Drain Diode Current	ا <sub>S</sub>	T <sub>C</sub> = 25 °C			- 2.1		
Pulse Diode Forward Current (t = 100 µs)	I <sub>SM</sub>				- 80	A 0	
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = - 4.3 A, V <sub>GS</sub> = 0 V		- 0.8	- 1.2	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>			15	23	ns	
Body Diode Reverse Recovery Charge	ly Diode Reverse Recovery Charge $Q_{rr}$ I <sub>F</sub> = - 4.3 A, dl/dt = -			7	14	nC	
Reverse Recovery Fall Time				8		1	
Reverse Recovery Rise Time	t <sub>b</sub>	1		7		ns	

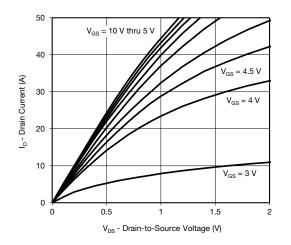
Notes:

a. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.

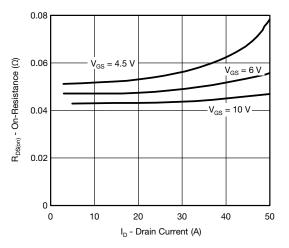
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

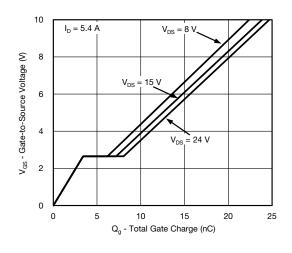




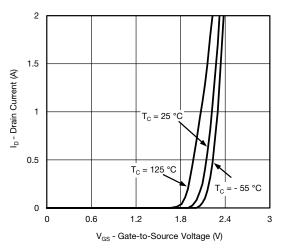




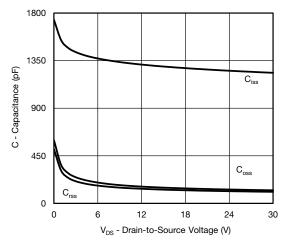
**On-Resistance vs. Drain Current** 



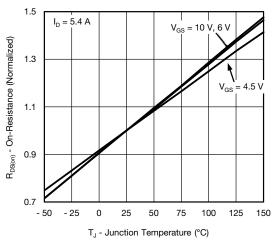
Gate Charge



**Transfer Characteristics** 

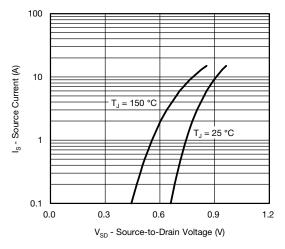


Capacitance

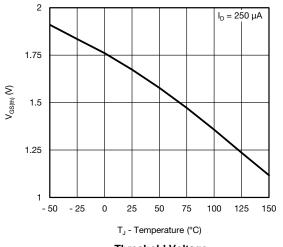


**On-Resistance vs. Junction Temperature** 

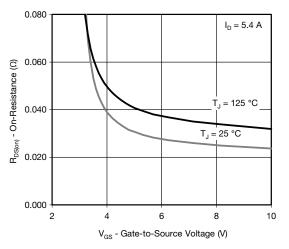




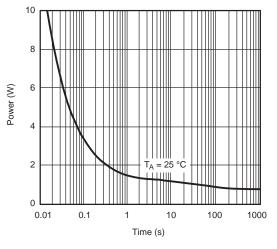
Source-Drain Diode Forward Voltage



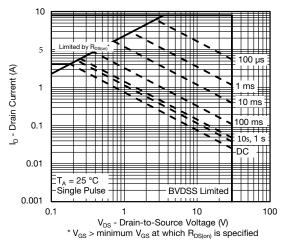
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage

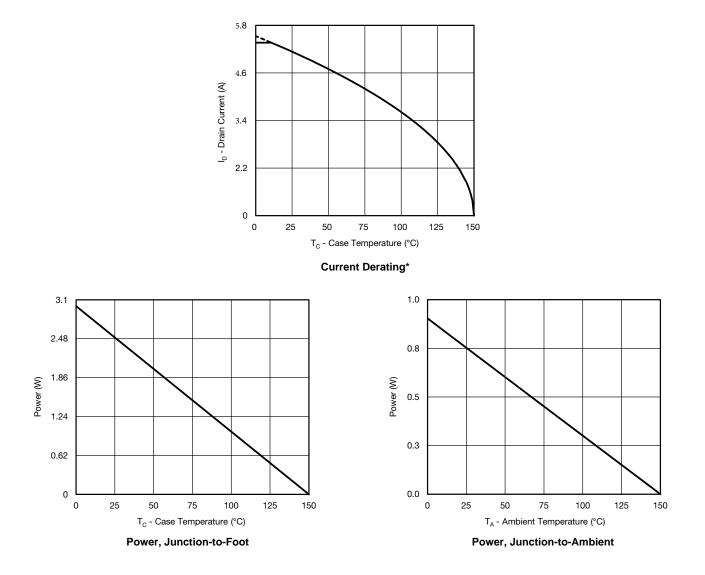


Single Pulse Power (Junction-to-Ambient)



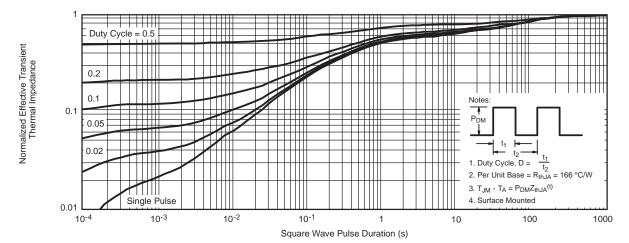
Safe Operating Area, Junction-to-Ambient





\* The power dissipation  $P_D$  is based on  $T_{J(max.)}$  = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.





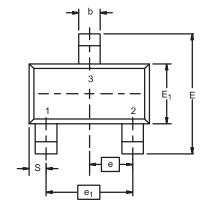
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot



## SOT-23 (TO-236): 3-LEAD



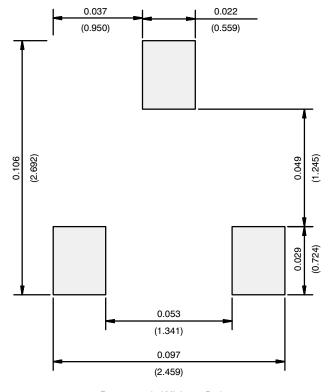




Dim	MILLI	METERS	INCHES		
	Min	Max	Min	Мах	
A	0.89	1.12	0.035	0.044	
A <sub>1</sub>	0.01	0.10	0.0004	0.004	
A <sub>2</sub>	0.88	1.02	0.0346	0.040	
b	0.35	0.50	0.014	0.020	
C	0.085	0.18	0.003	0.007	
D	2.80	3.04	0.110	0.120	
E	2.10	2.64	0.083	0.104	
E <sub>1</sub>	1.20	1.40	0.047	0.055	
е	0.95 BSC		0.0374 Ref		
e <sub>1</sub>	1.90 BSC		0.0748 Ref		
L	0.40	0.60	0.016	0.024	
L <sub>1</sub>	0.64 Ref		0.025 Ref		
S	0.50 Ref		0.020	Ref	
q	3°	8°	3°	8°	
ECN: S-03946-Rev. K, 09- DWG: 5479	Jul-01				



#### **RECOMMENDED MINIMUM PADS FOR SOT-23**



Recommended Minimum Pads Dimensions in Inches/(mm)



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