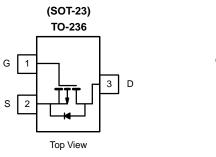
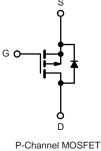


## P-Channel 30 V (D-S) MOSFET

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

- Notebook Adaptor Switch

• 100 % Rg Tested

• For Mobile Computing - Load Switch

- DC/DC Converter

**APPLICATIONS** 

#### RoHS COMPLIANT HALOGEN FREE

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V <sub>DS</sub>	- 30	
Gate-Source Voltage		V <sub>GS</sub>	± 20	V
	T <sub>C</sub> = 25 °C		- 5.6	
Continuous Drain Current (T. 150 °C)	T <sub>C</sub> = 70 °C		- 5.1	
Continuous Drain Current ( $T_J = 150 \ ^{\circ}C$ )	T <sub>A</sub> = 25 °C	I <sub>D</sub>	- 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	
Continous Source-Drain Diode Current	T <sub>C</sub> = 25 °C		- 2.1	
Continous Source-Drain Diode Current	T <sub>A</sub> = 25 °C	I <sub>S</sub>	- 1 <sup>b,c</sup>	
	T <sub>C</sub> = 25 °C		2.5	
Maximum Davias Diagingtian	T <sub>C</sub> = 70 °C		1.6	W
Maximum Power Dissipation	T <sub>A</sub> = 25 °C	P <sub>D</sub>	1.25 <sup>b,c</sup>	
	T <sub>A</sub> = 70 °C		0.8 <sup>b,c</sup>	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stq</sub>	- 55 to 150	°C

I HERMAL 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	0/10	

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.

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www.\	/Bsemi.com

Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 V, I_D = -250 \mu A$	- 30			V	
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	JI <sub>D</sub> = - 250 μA		- 19			
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	i <sub>D</sub> = - 250 μA		4		mV/°C	
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>	$V_{DS} = -30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			- 1	μA	
Zero Gate Voltage Drain Current		$V_{DS} = -30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 55 \text{ °C}$			- 5		
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			
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		Ω	
		V <sub>GS</sub> =- 4.5 V, I <sub>D</sub> = - 3.6 A		0.054			
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>		•		•	•		
Input Capacitance	C <sub>iss</sub>			1295		pF	
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = - 15 V, V <sub>GS</sub> = 0 V, f = 1 MHz		150			
Reverse Transfer Capacitance	C <sub>rss</sub>			130			
Total Gate Charge	Qg	$V_{DS} = -15 \text{ V}, \text{ V}_{GS} = -10 \text{ V}, \text{ I}_{D} = -5.4 \text{ A}$		24	36		
				11.4	17	nC	
Gate-Source Charge	Q <sub>gs</sub>	$V_{DS}$ = - 15 V, $V_{GS}$ = - 4.5 V, $I_{D}$ = - 5.4 A		3.4			
Gate-Drain Charge	Q <sub>gd</sub>			3.8			
Gate Resistance	Rg	f = 1 MHz	1.5	7.7	15.4	Ω	
Turn-On Delay Time	t <sub>d(on)</sub>			13	20		
		$t_r$ V <sub>DD</sub> = - 15 V, R <sub>L</sub> = 3.5 Ω		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>	1		6	12		
Turn-On Delay Time	t <sub>d(on)</sub>			28	42	ns	
Rise Time	t <sub>r</sub>	$V_{DD}$ = - 15 V, R <sub>L</sub> = 3.5 Ω		16	24	-	
Turn-Off Delay Time	t <sub>d(off)</sub>	$\text{I}_\text{D}\cong$ - 4.3 A, $\text{V}_\text{GEN}$ = - 4.5 V, $\text{R}_\text{g}$ = 1 $\Omega$		30	45		
Fall Time	t <sub>f</sub>			10	20		
Drain-Source Body Diode Characteristic	s						
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>C</sub> = 25 °C			- 2.1	٨	
Pulse Diode Forward Current (t = $100 \mu s$ )	I <sub>SM</sub>				- 80	A	
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	Q <sub>rr</sub>	L = 4.2 A dl/dt = 100 A/via T = 05.00		7	14	nC	
Reverse Recovery Fall Time	ta	- I <sub>F</sub> = - 4.3 A, dl/dt = 100 A/μs, T <sub>J</sub> = 25 °C		8			
Reverse Recovery Rise Time	t <sub>b</sub>	1 1		7		ns	

Notes:

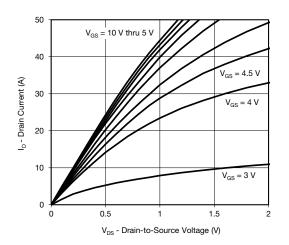
a. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.

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

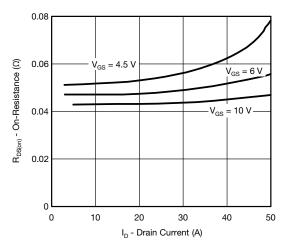
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



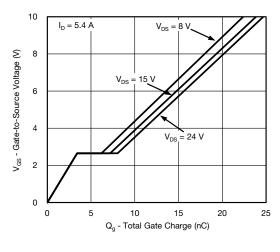




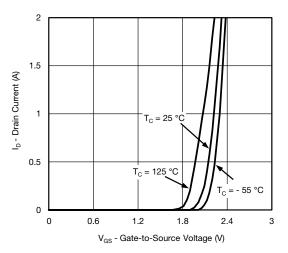
**Output Characteristics** 



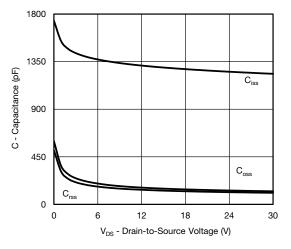
**On-Resistance vs. Drain Current** 



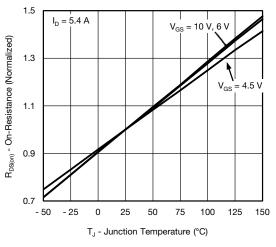
**Gate Charge** 



**Transfer Characteristics** 



Capacitance



**On-Resistance vs. Junction Temperature** 

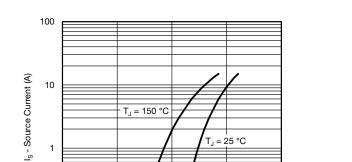
1

0.1

0.0

0.3





0.6

V<sub>SD</sub> - Source-to-Drain Voltage (V)

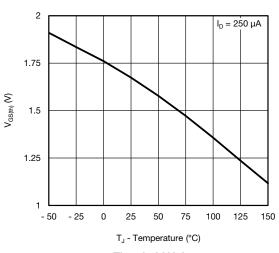
Source-Drain Diode Forward Voltage

#### TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

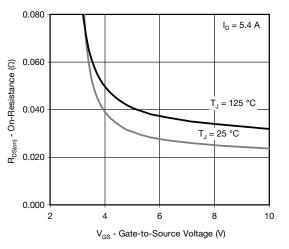
T<sub>J</sub> = 25 °C

0.9

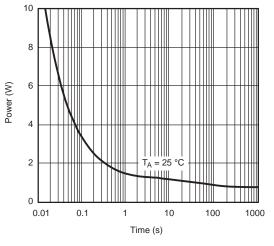
1.2



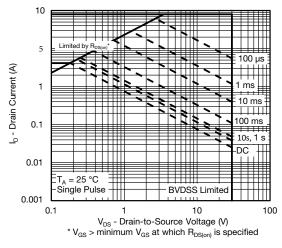
**Threshold Voltage** 



On-Resistance vs. Gate-to-Source Voltage



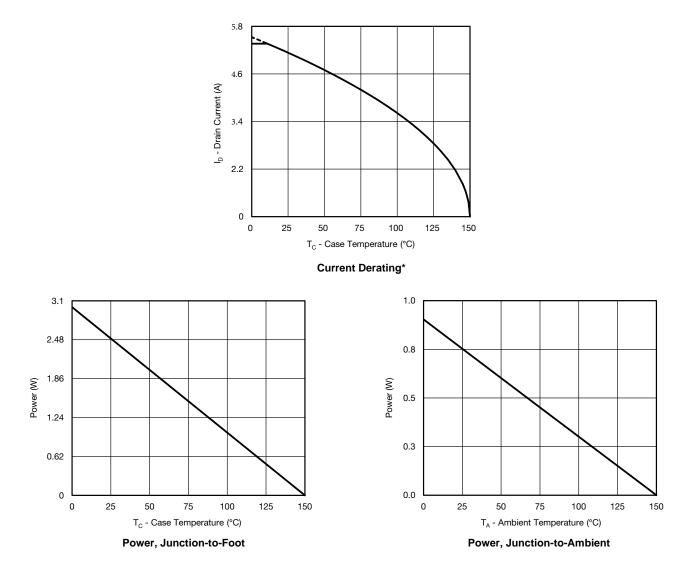
Single Pulse Power (Junction-to-Ambient)



Safe Operating Area, Junction-to-Ambient



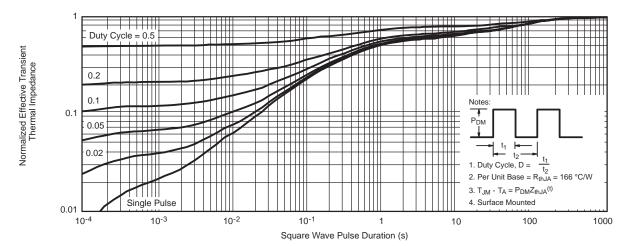
#### TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



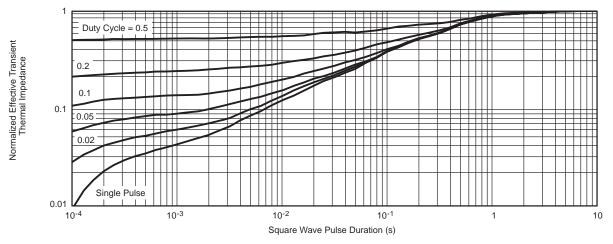
\* The power dissipation  $P_D$  is based on  $T_{J(max.)} = 150$  °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package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



### TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

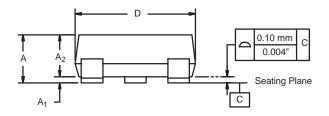


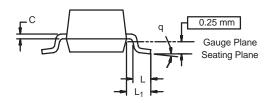
Normalized Thermal Transient Impedance, Junction-to-Foot



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



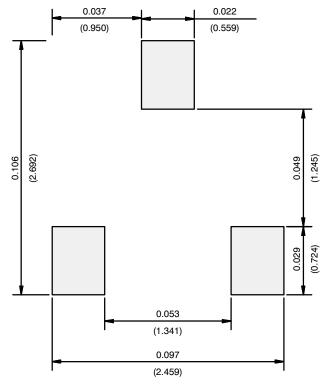




Dim	MILLIN	METERS	INCHES		
	Min	Max	Min	Max	
Α	0.89	1.12	0.035	0.044	
A <sub>1</sub>	0.01	0.10	0.0004	0.004	
A <sub>2</sub>	0.88	1.02	0.0346	0.040	
b	0.35	0.50	0.014	0.020	
C	0.085	0.18	0.003	0.007	
D	2.80	3.04	0.110	0.120	
E	2.10	2.64	0.083	0.104	
E <sub>1</sub>	1.20	1.40	0.047	0.055	
е	0.95 BSC		0.0374 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°	



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



Recommended Minimum Pads Dimensions in Inches/(mm)



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