

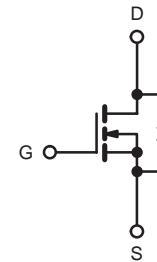
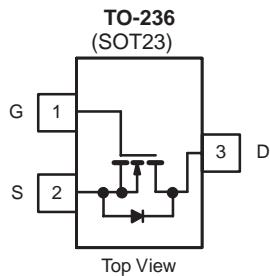
PMV164ENER-VB Datasheet

N-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
60	0.075 at V _{GS} = 10 V	4.0	2.1 nC
	0.086 at V _{GS} = 4.5 V	3.8	

FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- Trench Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested



APPLICATIONS

- Battery Switch
- DC/DC Converter

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	60		V
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C 4.0		
		T _C = 70 °C 3.4		
		T _A = 25 °C 3.1 ^{b, c}		
		T _A = 70 °C 2.5 ^{b, c}		
Pulsed Drain Current	I _{DM}	12		A
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C 1.39		
		T _A = 25 °C 0.91 ^{b, c}		
Avalanche Current	I _{AS}	6		
Single-Pulse Avalanche Energy	E _{AS}	1.8	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C 1.66		W
		T _C = 70 °C 1.06		
		T _A = 25 °C 1.09 ^{b, c}		
		T _A = 70 °C 0.7 ^{b, c}		
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	R _{thJA}	90	115	°C/W
Maximum Junction-to-Foot (Drain) Steady State		60	75	

Notes:

- a. Based on T_C = 25 °C.
- b. Surface Mounted on 1" x 1" FR4 board.
- c. t = 5 s.
- d. Maximum under Steady State conditions is 120 °C/W.

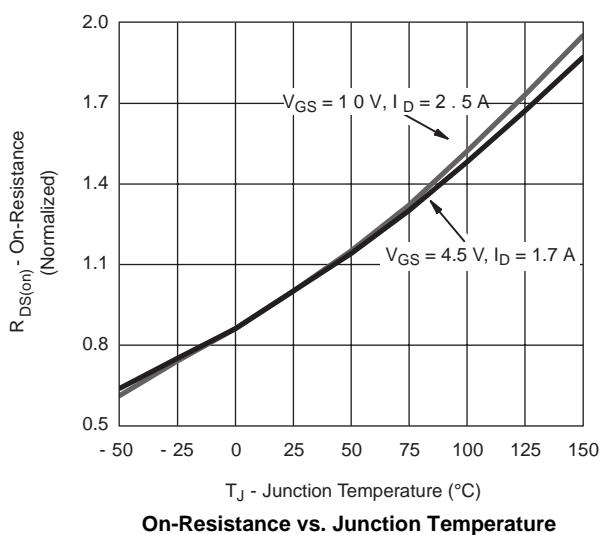
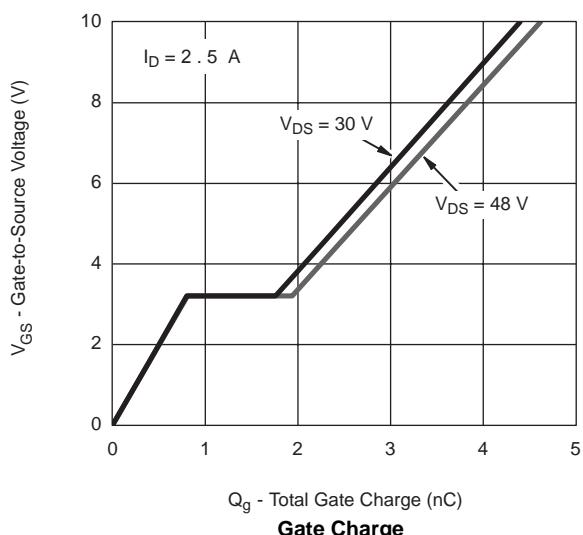
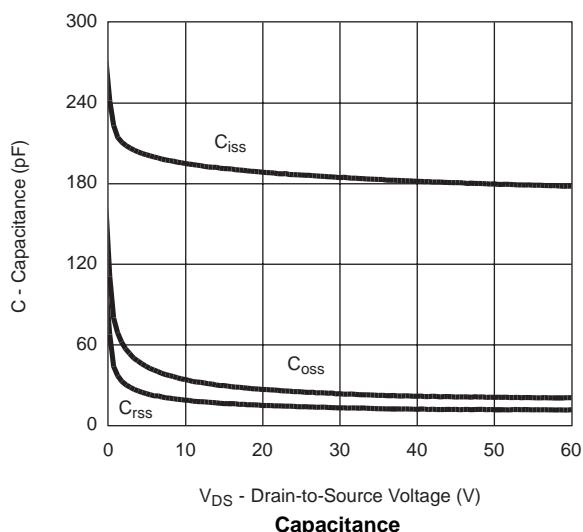
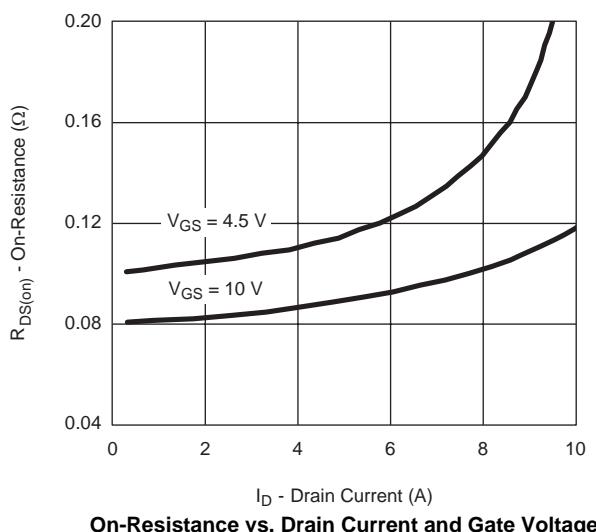
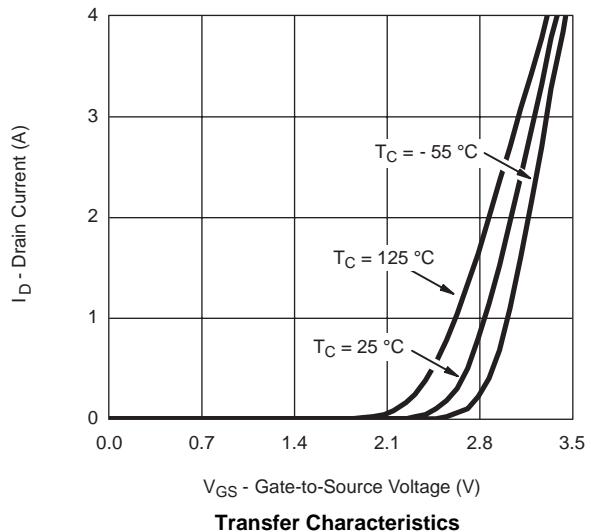
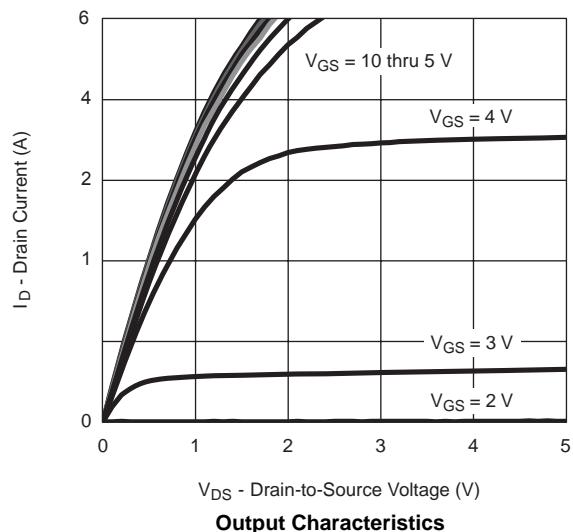
MOSFET SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

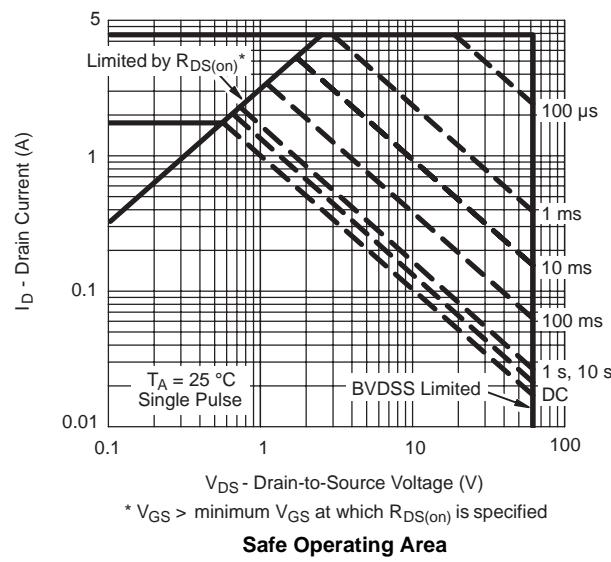
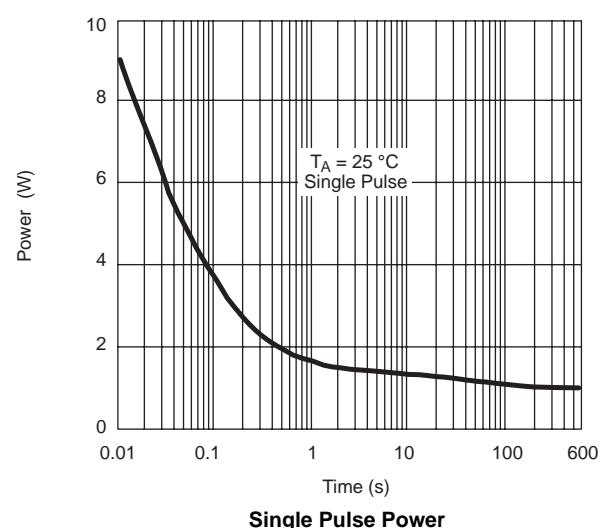
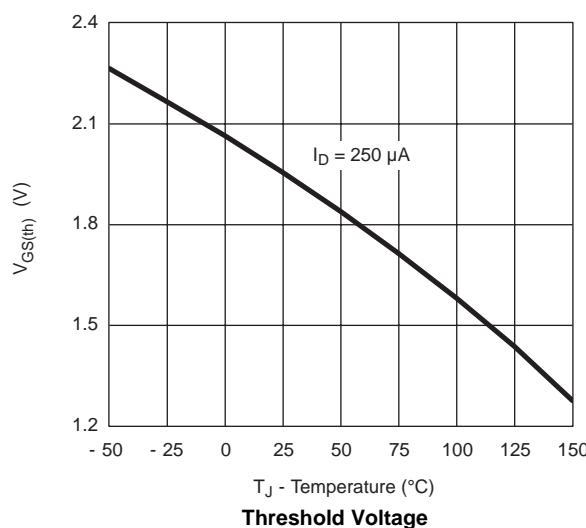
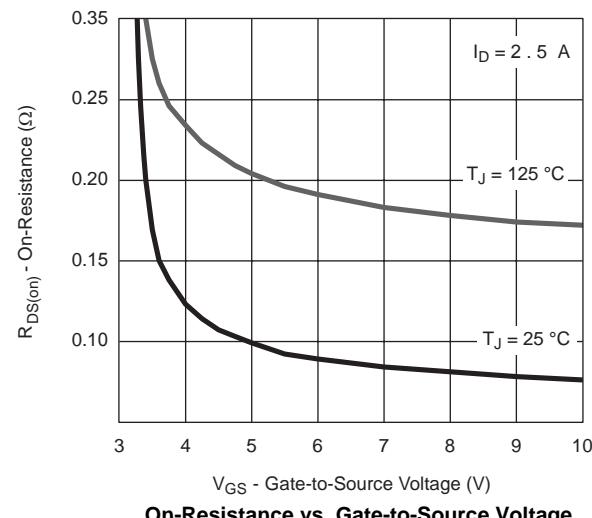
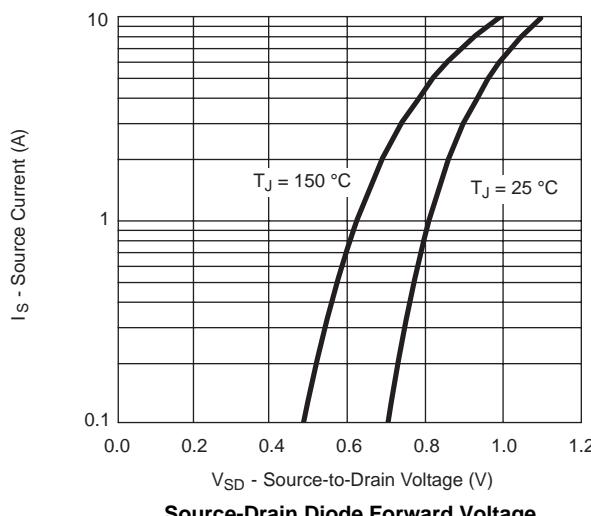
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	60			V	
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu\text{A}$		55		mV/°C	
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			-5			
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	1		3	V	
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$			1	μA	
		$V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 55^\circ\text{C}$			10		
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	8			A	
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 1.9 \text{ A}$		0.075		Ω	
		$V_{GS} = 4.5 \text{ V}$, $I_D = 1.7 \text{ A}$		0.086			
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 1.9 \text{ A}$		5		S	
Dynamic^b							
Input Capacitance	C_{iss}	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$		180		pF	
Output Capacitance	C_{oss}			22			
Reverse Transfer Capacitance	C_{rss}			13			
Total Gate Charge	Q_g	$V_{DS} = 30 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 1.9 \text{ A}$		4.2	6.1	nC	
Gate-Source Charge	Q_{gs}	$V_{DS} = 30 \text{ V}$, $V_{GS} = 4.5 \text{ V}$, $I_D = 1.9 \text{ A}$		2.1	3.2		
Gate-Drain Charge	Q_{gd}			0.7			
Gate Resistance	R_g			1			
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 30 \text{ V}$, $R_L = 20 \Omega$ $I_D \geq 1.5 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_G = 1 \Omega$		0.6	2.2	5.1	Ω
Rise Time	t_r				4	6	ns
Turn-Off Delay Time	$t_{d(\text{off})}$				10	15	
Fall Time	t_f				10	15	
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 30 \text{ V}$, $R_L = 20 \Omega$ $I_D = 1.5 \text{ A}$, $V_{GEN} = 4.5 \text{ V}$, $R_G = 1 \Omega$			7	10.5	ns
Rise Time	t_r				15	23	
Turn-Off Delay Time	$t_{d(\text{off})}$				16	24	
Fall Time	t_f				11	17	
Fall Time	t_f				11	17	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			2.19	A	
Pulse Diode Forward Current ^a	I_{SM}				7		
Body Diode Voltage	V_{SD}	$I_S = 1.5 \text{ A}$		0.8	1.2	V	
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 1.5 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$			15	23	ns
Body Diode Reverse Recovery Charge	Q_{rr}				10	15	nC
Reverse Recovery Fall Time	t_a				12		ns
Reverse Recovery Rise Time	t_b				3		

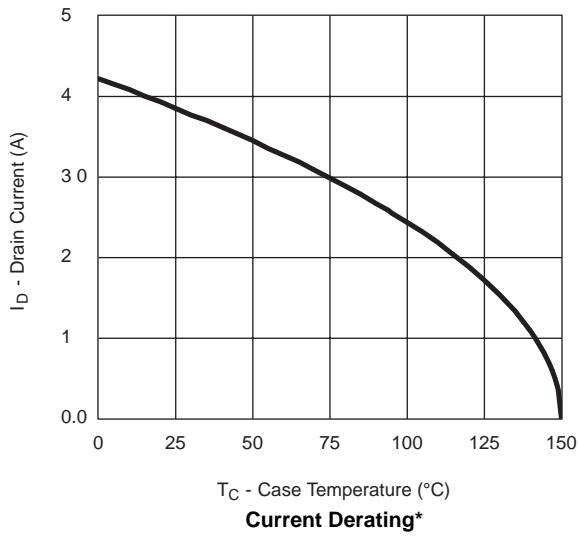
Notes:

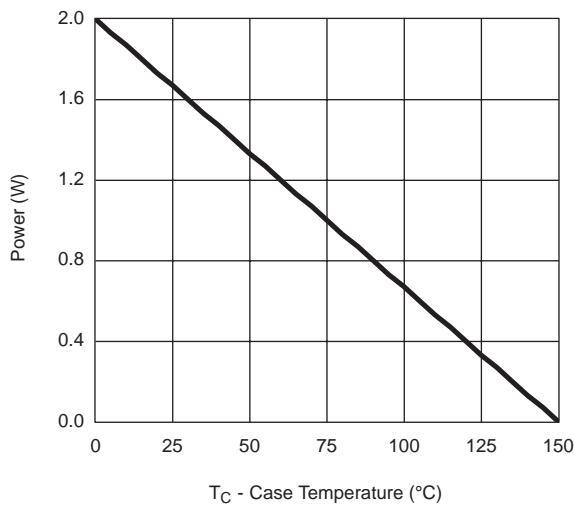
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

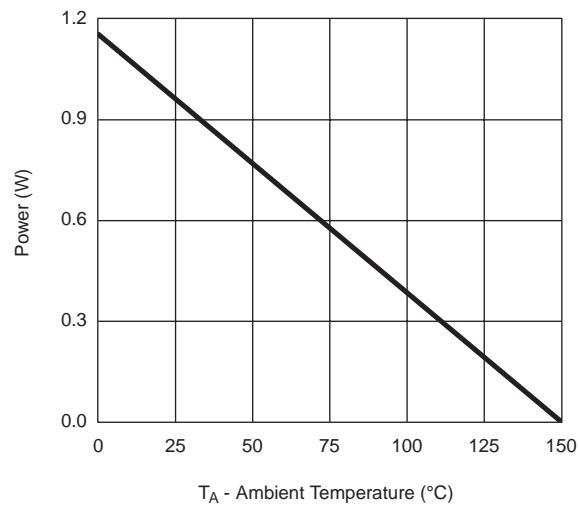
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


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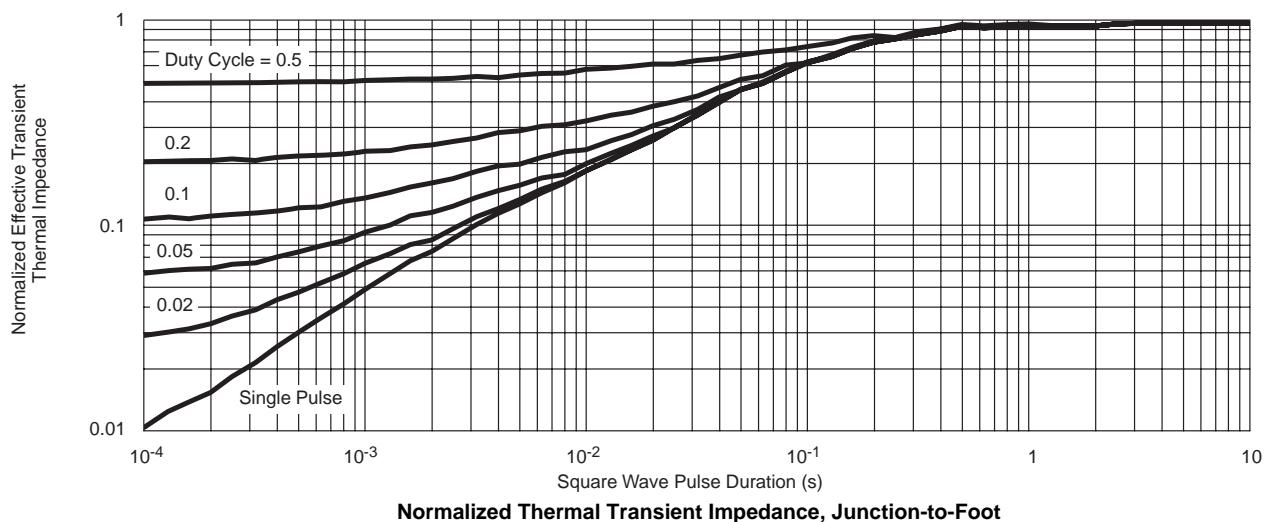
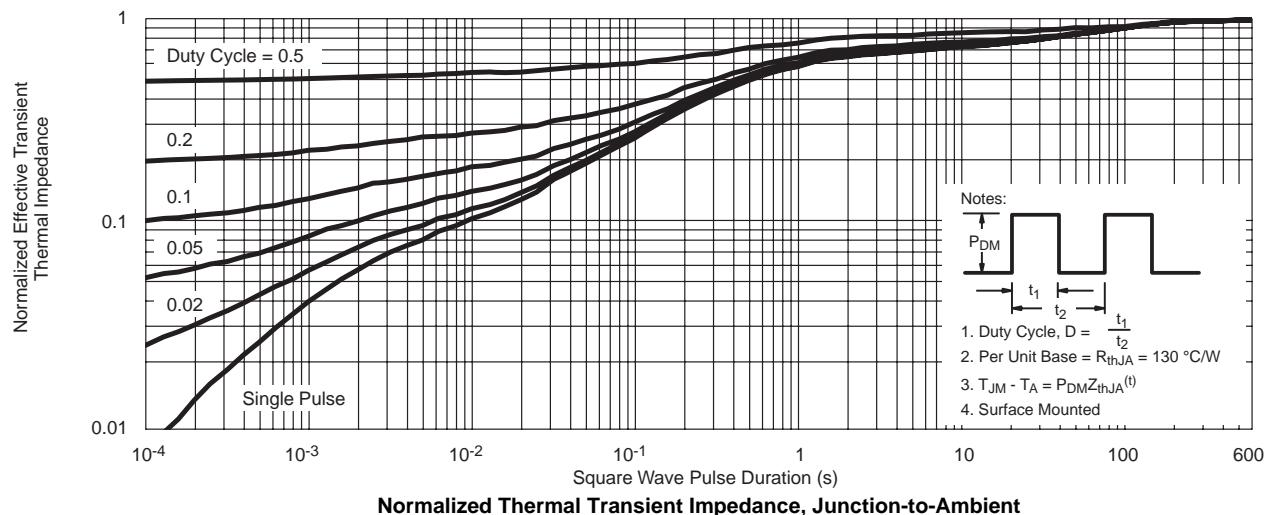
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

 T_C - Case Temperature (°C)

Current Derating*

 T_C - Case Temperature (°C)

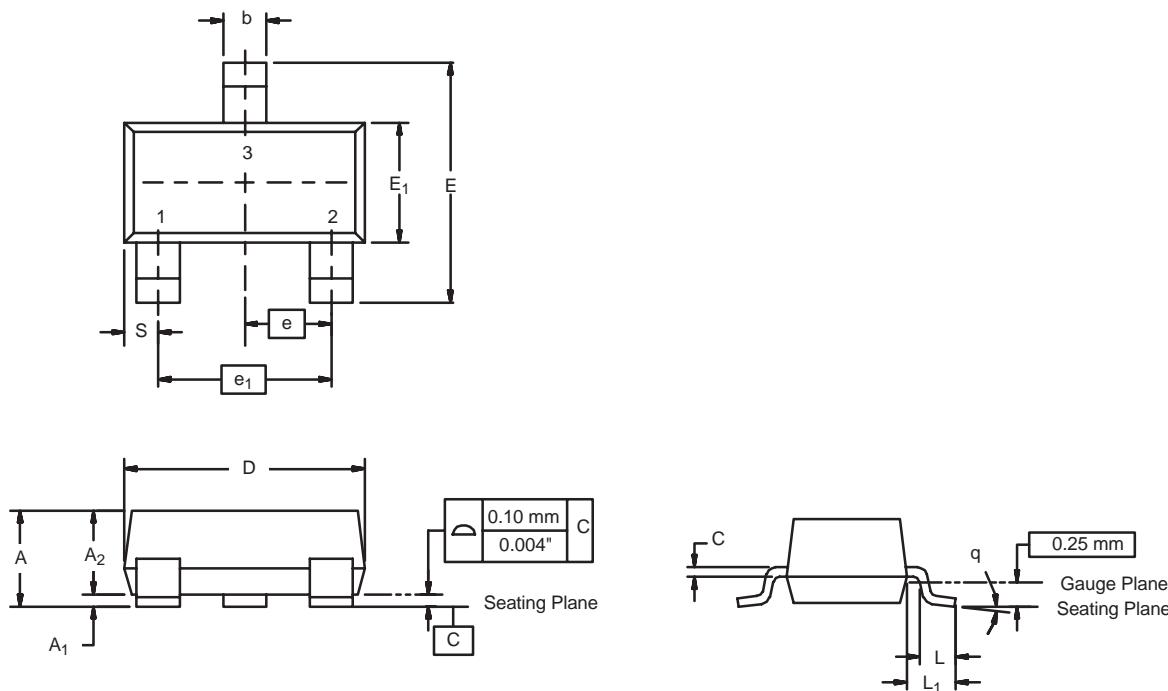
Power Derating, Junction-to-Case

 T_A - Ambient Temperature (°C)

Power Derating, 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.

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)


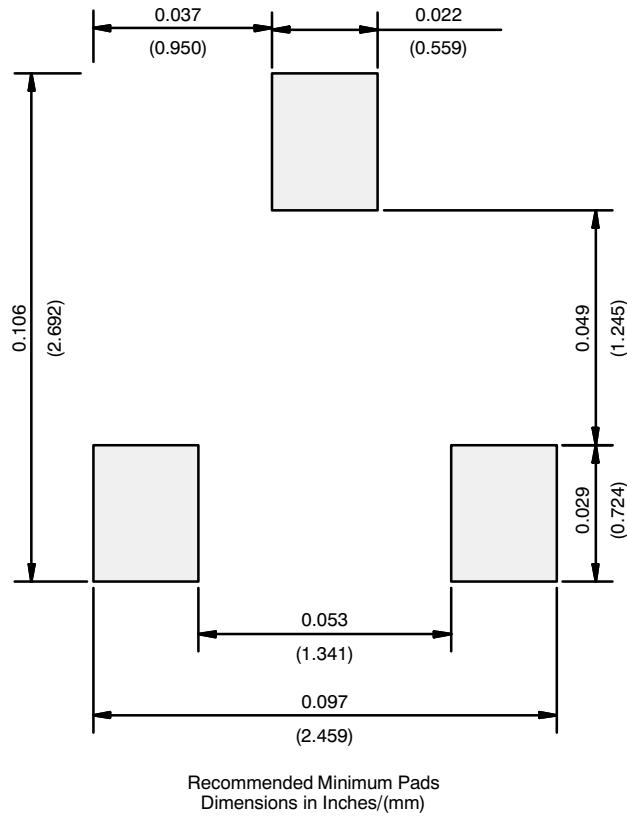
SOT-23 (TO-236): 3-LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A ₁	0.01	0.10	0.0004	0.004
A ₂	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 ₁	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e ₁	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L ₁	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°

ECN: S-03946-Rev. K, 09-Jul-01
 DWG: 5479

RECOMMENDED MINIMUM PADS FOR SOT-23



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