

PMV20XNE215-VB Datasheet

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a	Q_g (Typ.)
30	0.030 at $V_{GS} = 10$ V	6.5	4.5 nC
	0.033 at $V_{GS} = 4.5$ V	6.0	

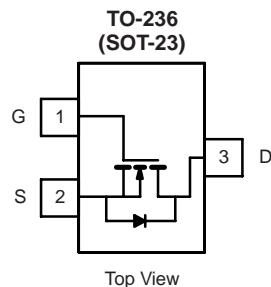
FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Trench Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC

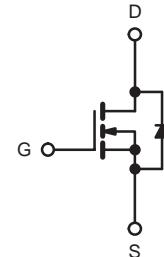


APPLICATIONS

- DC/DC Converter



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V_{DS}	30		
Gate-Source Voltage	V_{GS}	± 20	V	
Continuous Drain Current ($T_J = 150$ °C)	I_D	6.5 ^a	A	
		6.0		
		5.3		
		5.0		
Pulsed Drain Current	I_{DM}	25		
Continuous Source-Drain Diode Current	I_S	1.4	A	
		0.9 ^{b, c}		
Maximum Power Dissipation	P_D	1.7	W	
		1.1		
		1.1 ^{b, c}		
		0.7 ^{b, c}		
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150		
Soldering Recommendations (Peak Temperature) ^{d, e}		260	°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	R_{thJF}	60	75

Notes:

- Package limited
- Surface Mounted on 1" x 1" FR4 board.
- t = 5 s.
- Maximum under steady state conditions is 130 °C/W.

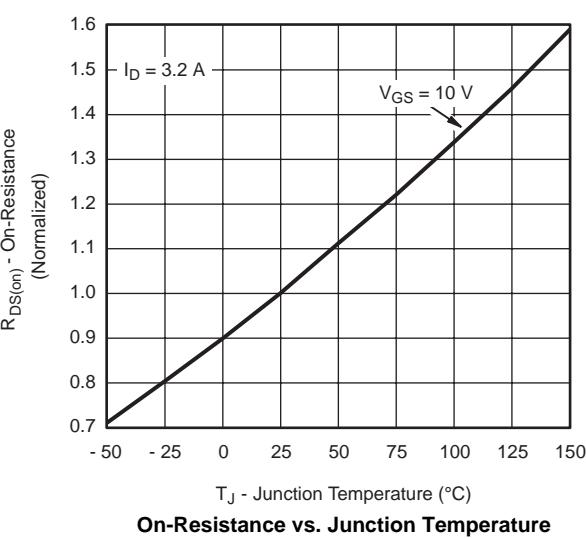
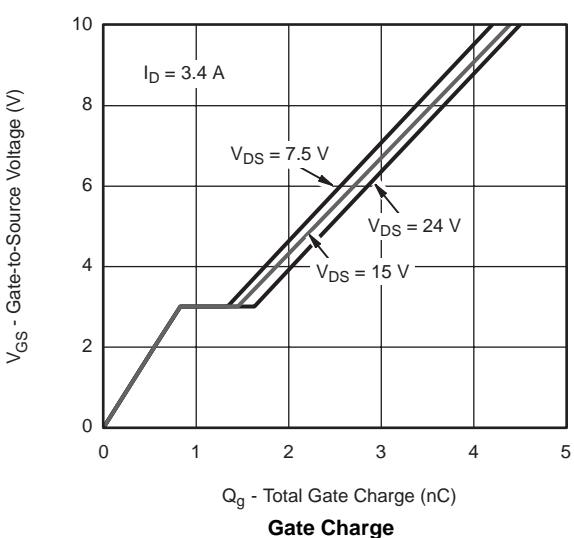
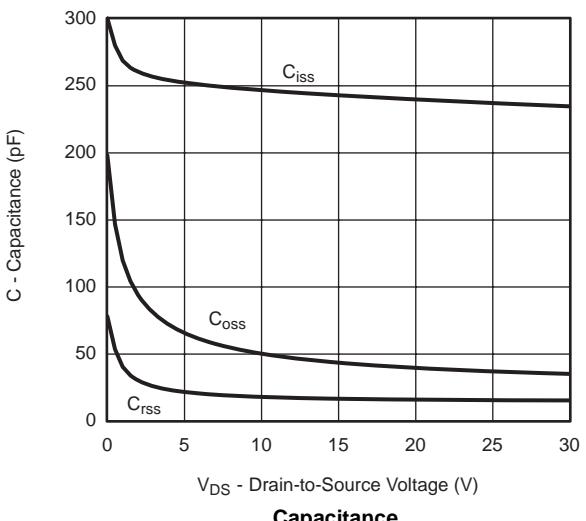
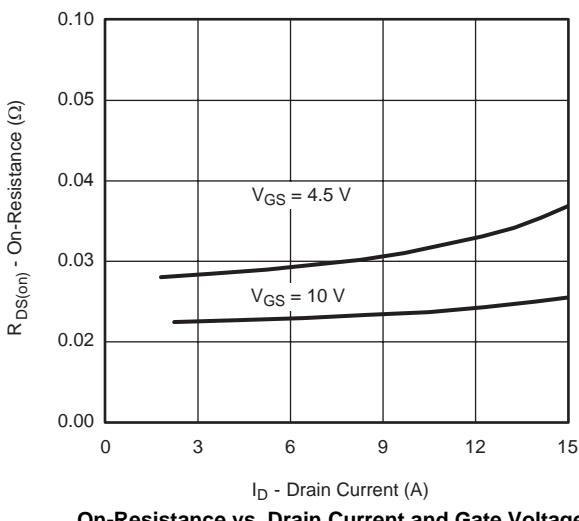
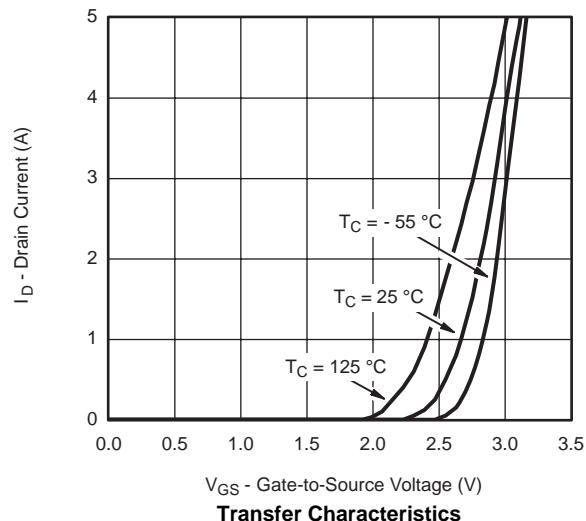
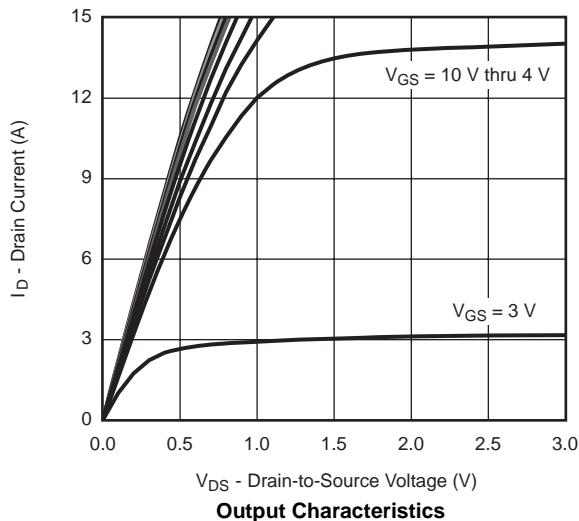
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

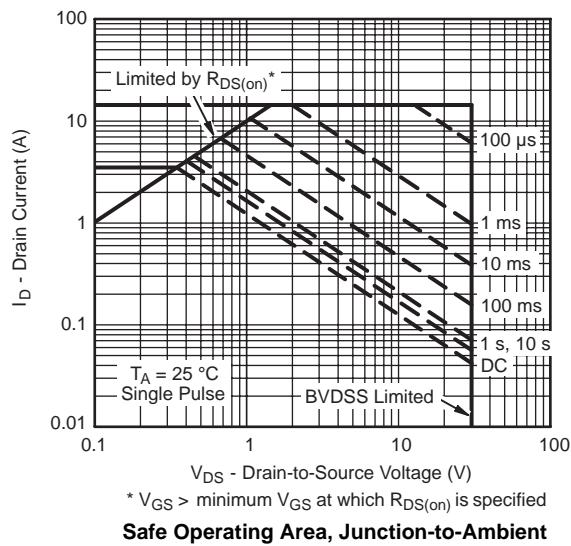
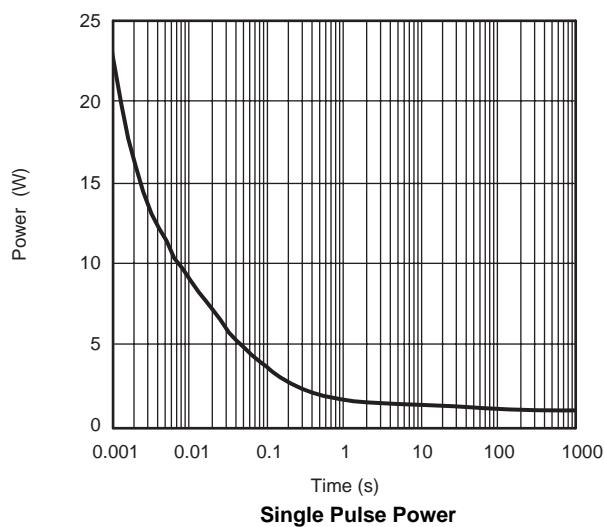
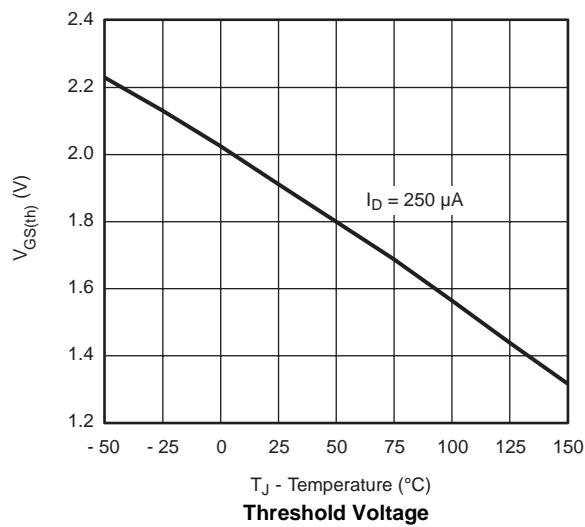
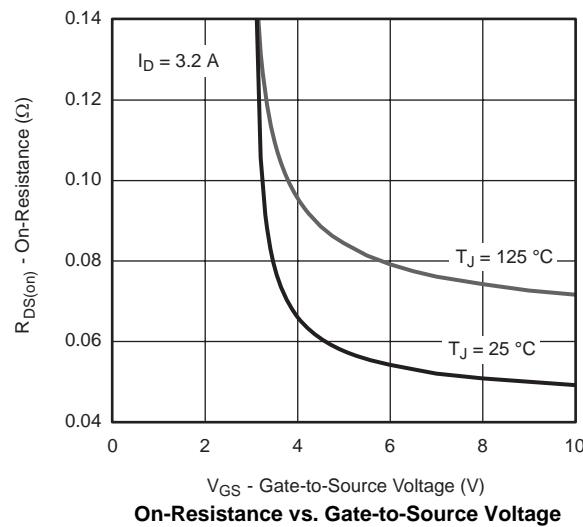
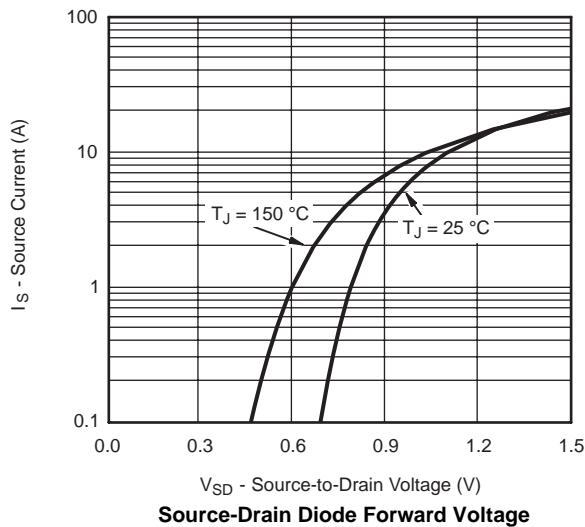
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	30			V	
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu\text{A}$		31		$\text{mV}/^\circ\text{C}$	
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			- 5			
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	0.7	1.1	2.0	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}	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$			1	μA	
		$V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 55^\circ\text{C}$			10		
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	10			A	
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 3.2 \text{ A}$		0.030		Ω	
		$V_{GS} = 4.5 \text{ V}$, $I_D = 2.8 \text{ A}$		0.033			
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 4.8 \text{ A}$		11		S	
Dynamic^b							
Input Capacitance	C_{iss}	$V_{DS} = 15 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$		335		pF	
Output Capacitance	C_{oss}			45			
Reverse Transfer Capacitance	C_{rss}			17			
Total Gate Charge	Q_g	$V_{DS} = 15 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 3.4 \text{ A}$		4.5	6.7	nC	
Gate-Source Charge	Q_{gs}			2.1	3.2		
Gate-Drain Charge	Q_{gd}	$V_{DS} = 15 \text{ V}$, $V_{GS} = 4.5 \text{ V}$, $I_D = 3.4 \text{ A}$		0.85			
Gate Resistance	R_g			0.65			
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 15 \text{ V}$, $R_L = 5.6 \Omega$ $I_D \geq 2.7 \text{ A}$, $V_{GEN} = 4.5 \text{ V}$, $R_g = 1 \Omega$		0.8	4.4	8.8	Ω
Rise Time	t_r				12	20	
Turn-Off Delay Time	$t_{d(\text{off})}$				50	75	
Fall Time	t_f				12	20	
Turn-On Delay Time	$t_{d(\text{on})}$				22	35	
Rise Time	t_r	$V_{DD} = 15 \text{ V}$, $R_L = 5.6 \Omega$ $I_D \geq 2.7 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 1 \Omega$			5	10	ns
Turn-Off Delay Time	$t_{d(\text{off})}$				12	20	
Fall Time	t_f				10	15	
					5	10	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			1.4	A	
Pulse Diode Forward Current	I_{SM}				15		
Body Diode Voltage	V_{SD}	$I_S = 2.7 \text{ A}$, $V_{GS} = 0 \text{ V}$		0.8	1.2	V	
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 2.7 \text{ A}$, $dl/dt = 100 \text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$		10	20	ns	
Body Diode Reverse Recovery Charge	Q_{rr}			5	10		
Reverse Recovery Fall Time	t_a			6		ns	
Reverse Recovery Rise Time	t_b			4			

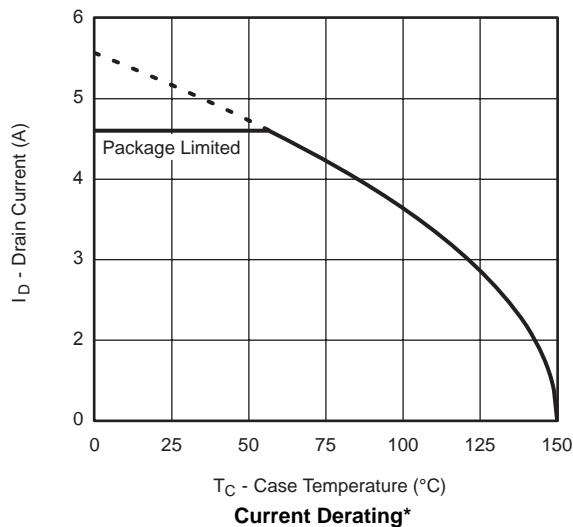
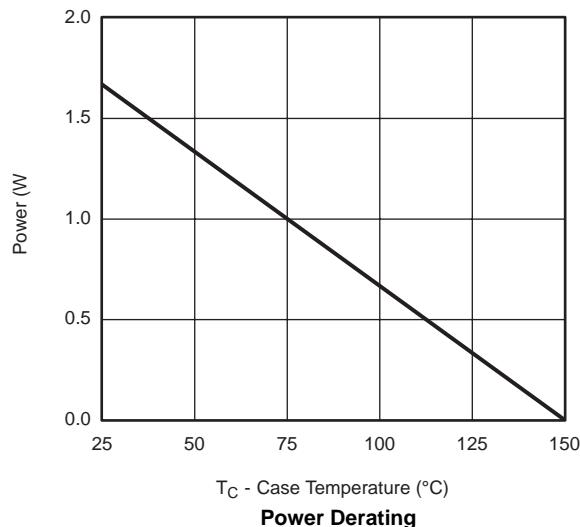
Notes:

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

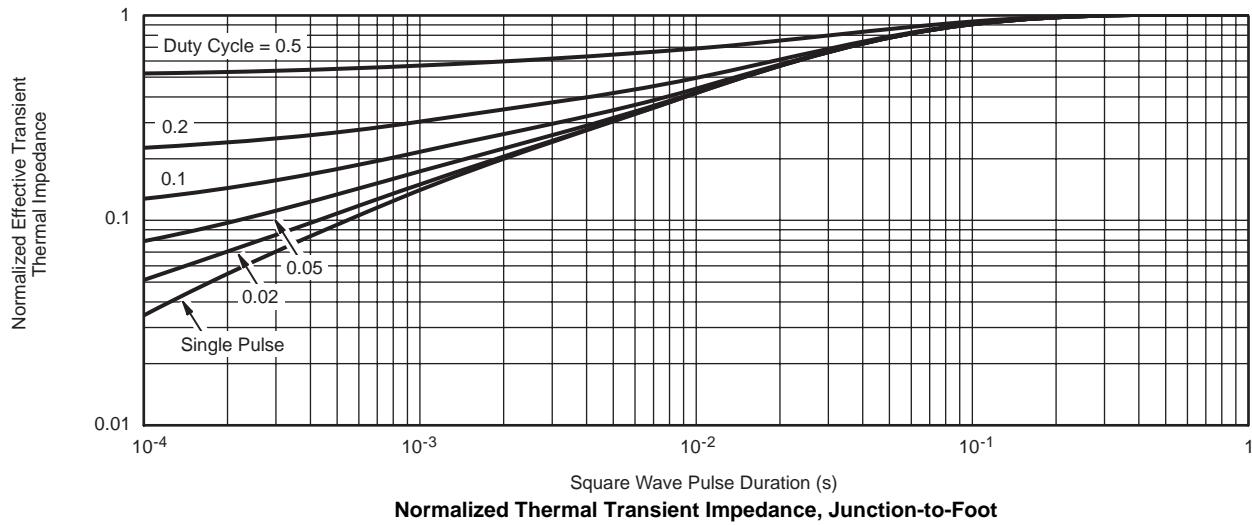
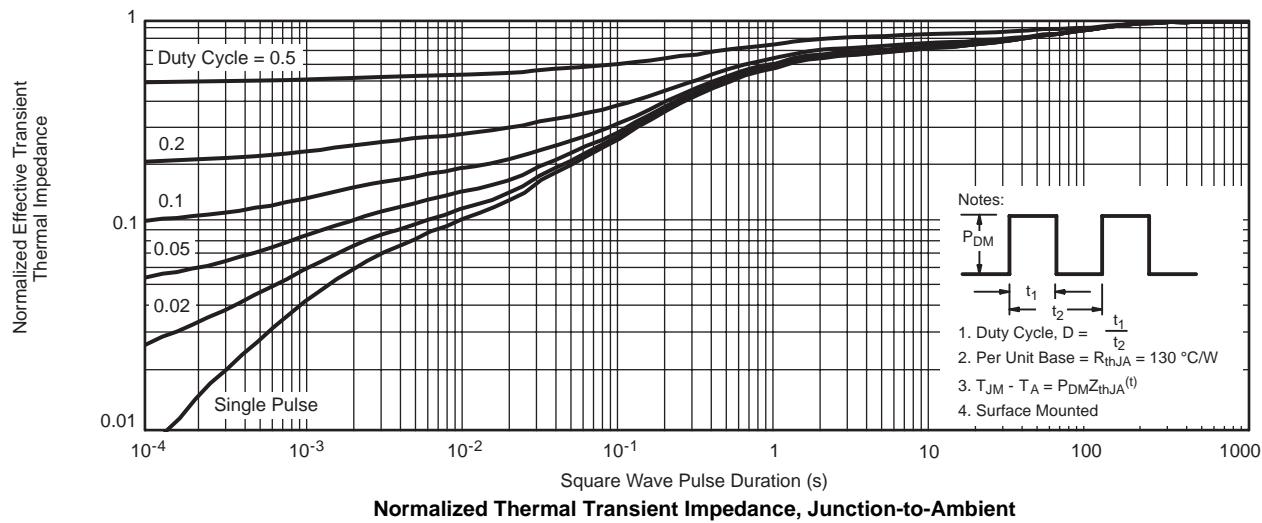
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


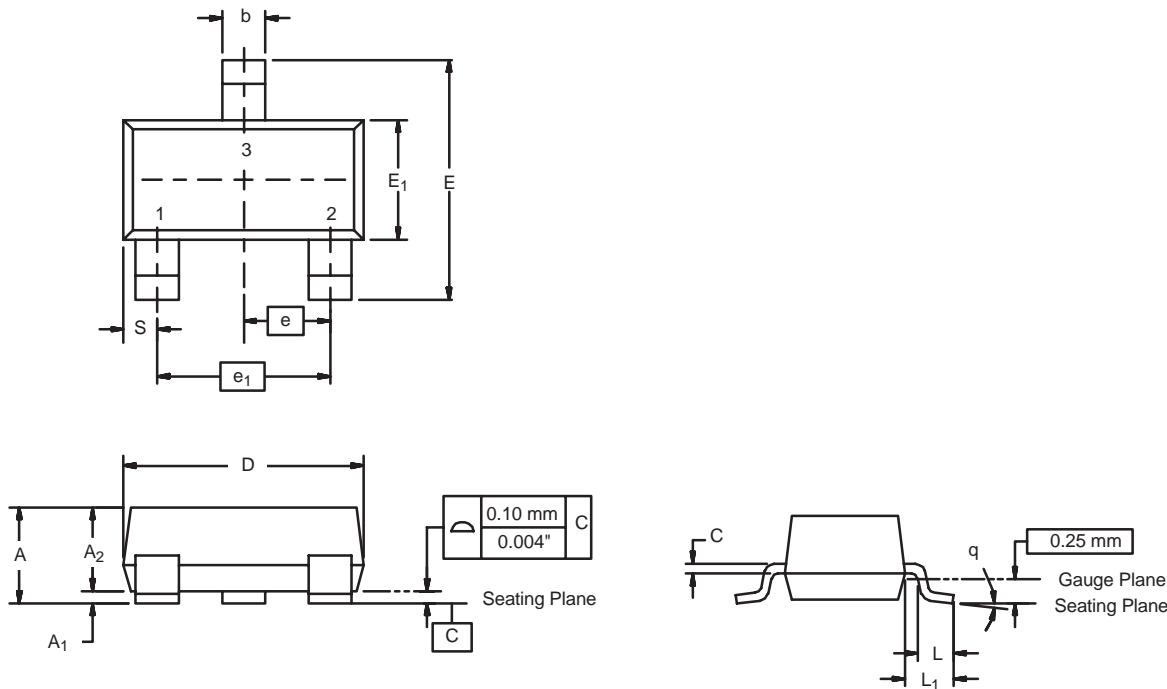
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**Current Derating*****Power Derating**

* 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


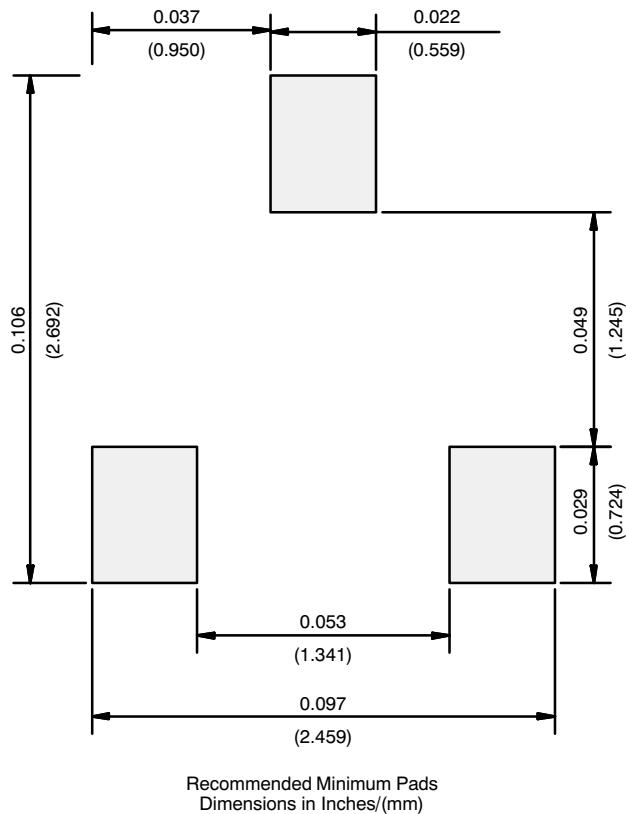
SOT-23 (TO-236): 3-LEAD



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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