

BSH114,215-VB Datasheet

N-Channel 100 V (D-S) MOSFET

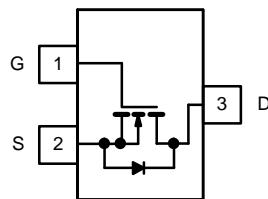
MOSFET PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
100	0.240 at V _{GS} = 10 V	2.0	2.9 nC
	0.250 at V _{GS} = 6 V	1.8	
	0.260 at V _{GS} = 4.5 V	1.7	

FEATURES

- Trench Power MOSFET
- 100 % R_g Tested
- 100 % U_{IS} Tested
- Material categorization:



RoHS
COMPLIANT
HALOGEN
FREE



APPLICATIONS

- DC/DC Converters
- Load Switch
- LED Backlighting in LCD TVs

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	100		
Gate-Source Voltage	V _{GS}	± 20	V	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	I _D	2	A
	T _C = 70 °C		1.8	
	T _A = 25 °C		1.6 ^{b, c}	
	T _A = 70 °C		1.3 ^{b, c}	
Pulsed Drain Current (t = 300 μs)	I _{DM}	7		
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	2.1	A
	T _A = 25 °C		1.0 ^{b, c}	
Single Pulse Avalanche Current	I _{AS}	5		
Single Pulse Avalanche Energy	E _{AS}	1.25	mJ	
Maximum Power Dissipation	T _C = 25 °C	P _D	2.5	W
	T _C = 70 °C		1.6	
	T _A = 25 °C		1.25 ^{b, c}	
	T _A = 70 °C		0.8 ^{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}	75	100	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	40	50	

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 166 °C/W.

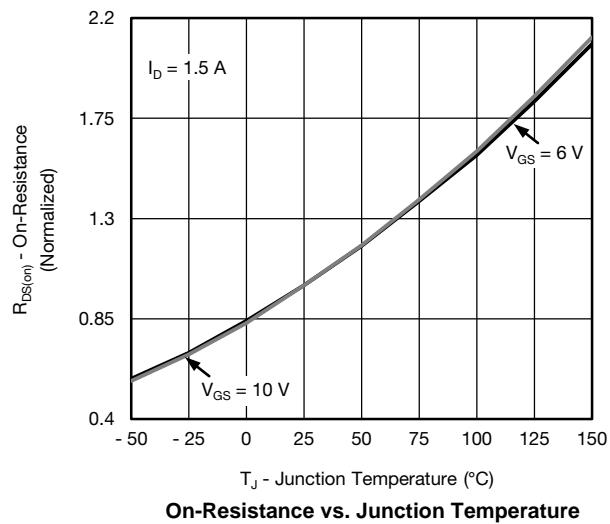
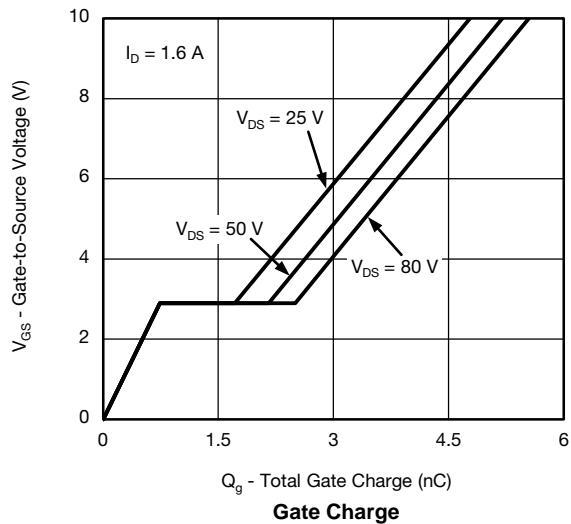
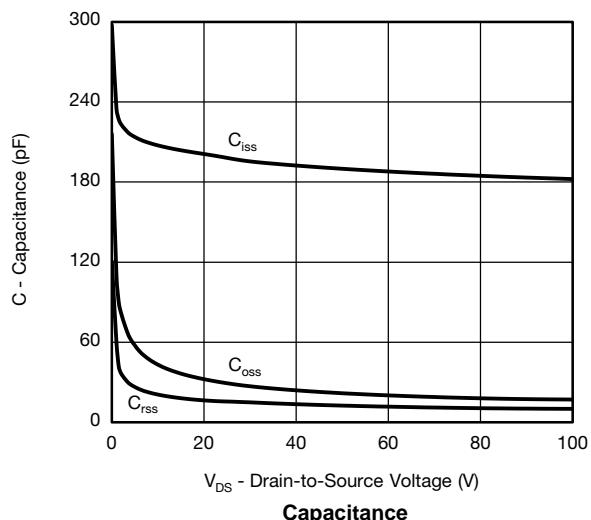
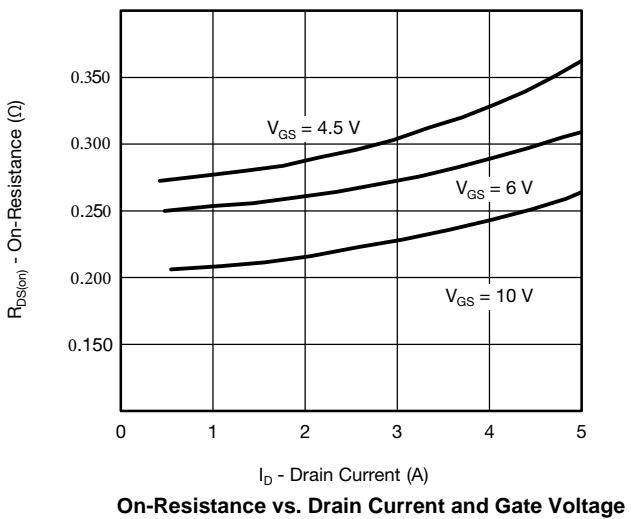
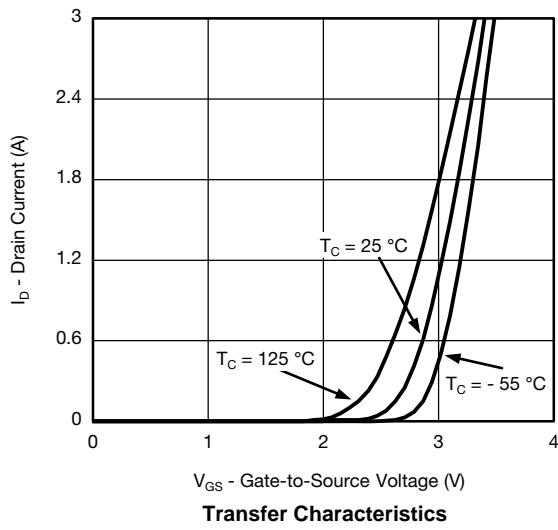
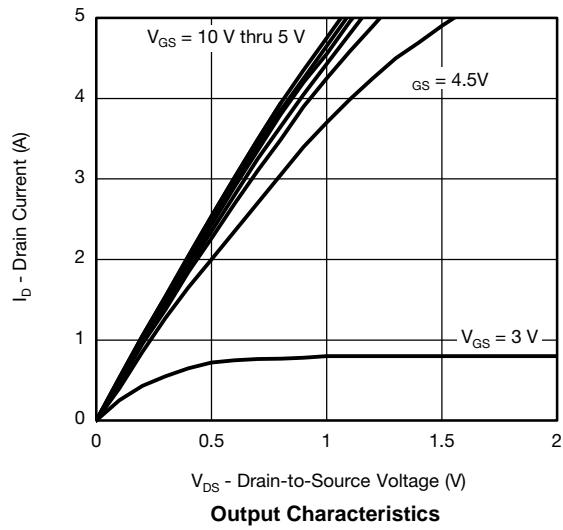
MOSFET SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)

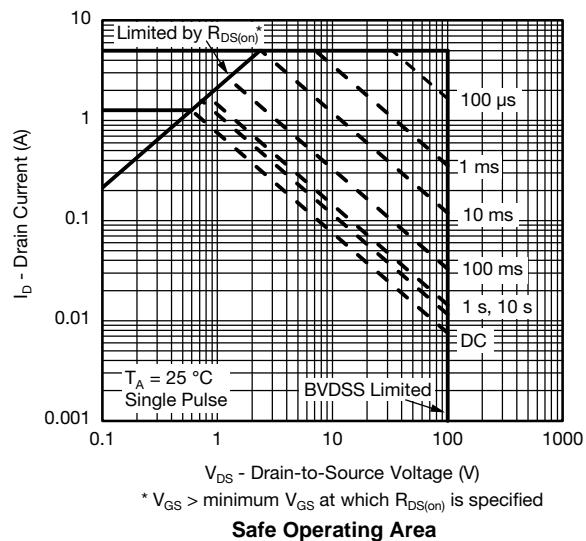
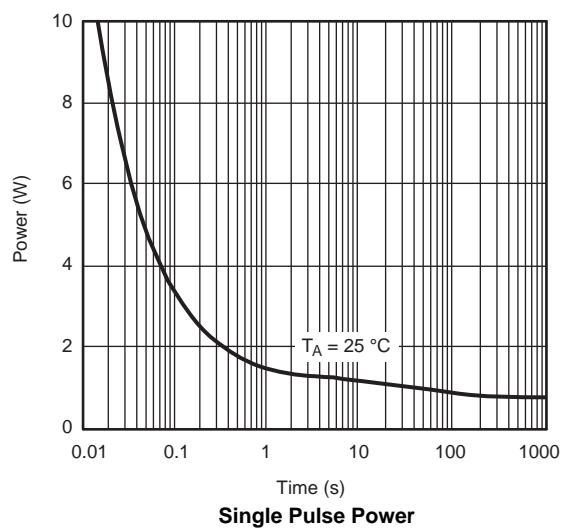
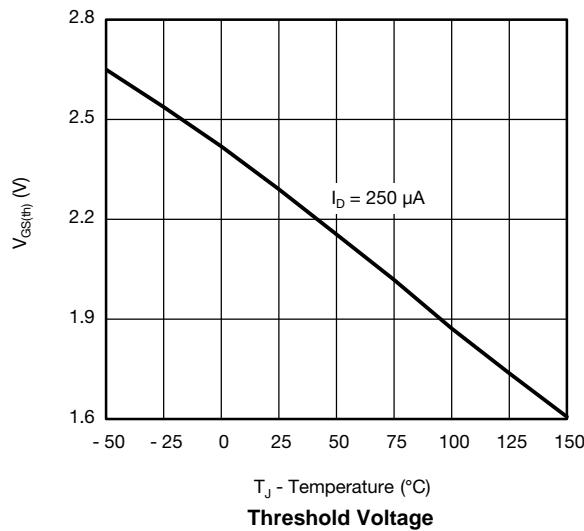
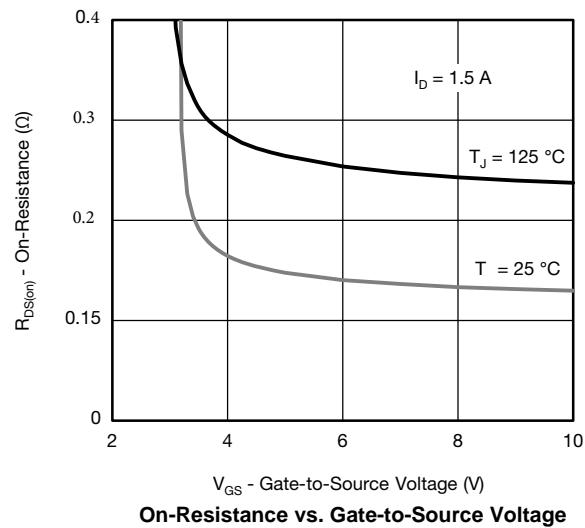
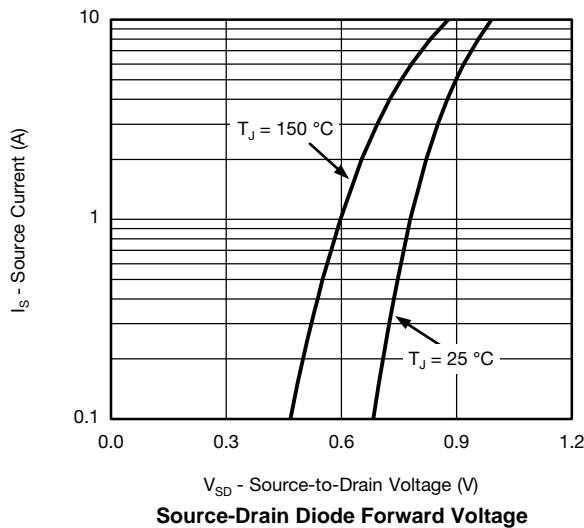
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	100			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu\text{A}$		105		mV/°C
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			- 5.2		
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	1.2		2.8	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}	$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}$		- 1		μA
		$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$		- 10		
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}, V_{GS} = 4.5 \text{ V}$	5			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}, I_D = 1.5 \text{ A}$		0.240		Ω
		$V_{GS} = 6 \text{ V}, I_D = 1 \text{ A}$		0.250		
		$V_{GS} = 4.5 \text{ V}, I_D = 0.5 \text{ A}$		0.260		
Forward Transconductance ^a	g_{fs}	$V_{DS} = 20 \text{ V}, I_D = 1.5 \text{ A}$		2.0		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 50 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		190		pF
Output Capacitance	C_{oss}			22		
Reverse Transfer Capacitance	C_{rss}			13		
Total Gate Charge	Q_g	$V_{DS} = 50 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 1.6 \text{ A}$		5.2	10.4	nC
				2.9	5.8	
Gate-Source Charge	Q_{gs}	$V_{DS} = 50 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 1.6 \text{ A}$		0.75		
Gate-Drain Charge	Q_{gd}			1.4		
Gate Resistance	R_g	$f = 1 \text{ MHz}$	0.3	1.4	2.8	Ω
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 50 \text{ V}, R_L = 39 \Omega$ $I_D = 1.3 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$		30	45	ns
Rise Time	t_r			26	39	
Turn-Off Delay Time	$t_{d(\text{off})}$			17	26	
Fall Time	t_f			12	20	
Turn-On Delay Time	$t_{d(\text{on})}$			6	12	
Rise Time	t_r	$V_{DD} = 50 \text{ V}, R_L = 39 \Omega$ $I_D = 1.3 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$		10	20	ns
Turn-Off Delay Time	$t_{d(\text{off})}$			10	20	
Fall Time	t_f			6	12	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			- 2.1	A
Pulse Diode Forward Current ^a	I_{SM}				- 20	
Body Diode Voltage	V_{SD}	$I_S = 1.3 \text{ A}$		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 1.3 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}, T_J = 25^\circ\text{C}$		22	33	ns
Body Diode Reverse Recovery Charge	Q_{rr}			21	32	nC
Reverse Recovery Fall Time	t_a			16		ns
Reverse Recovery Rise Time	t_b			6		

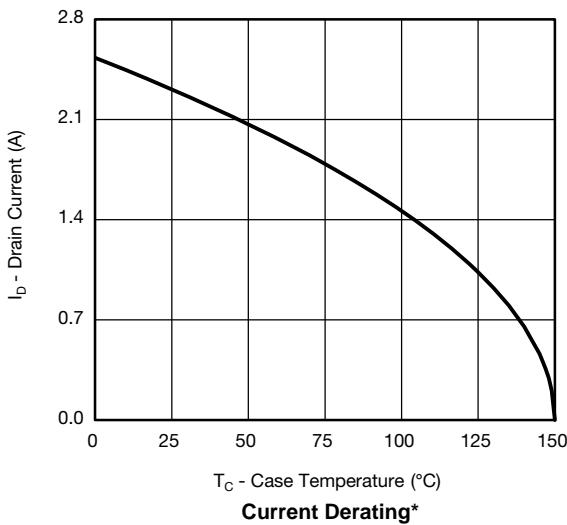
Notes:

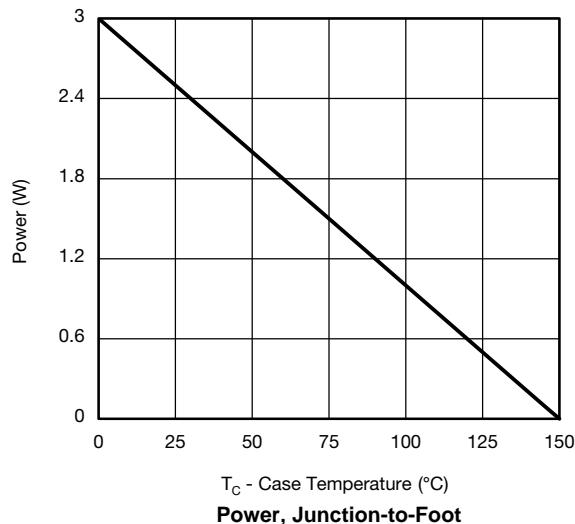
a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

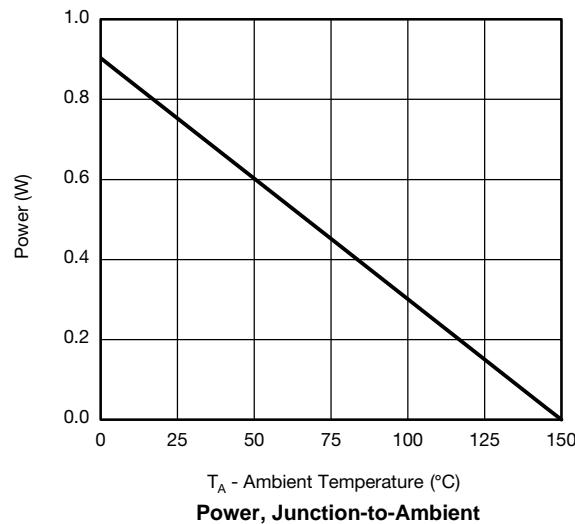
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


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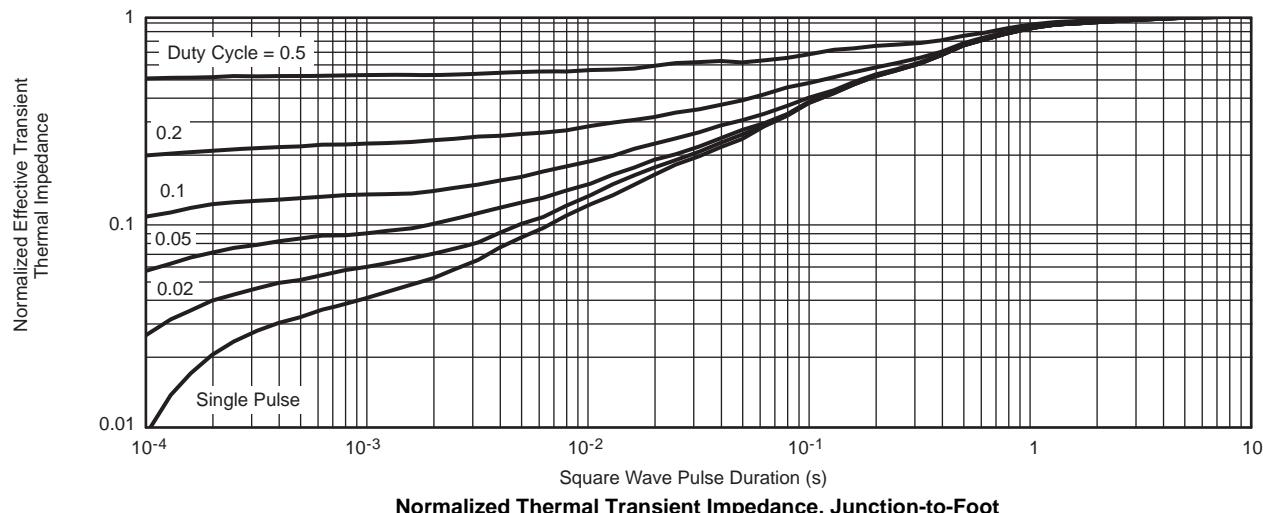
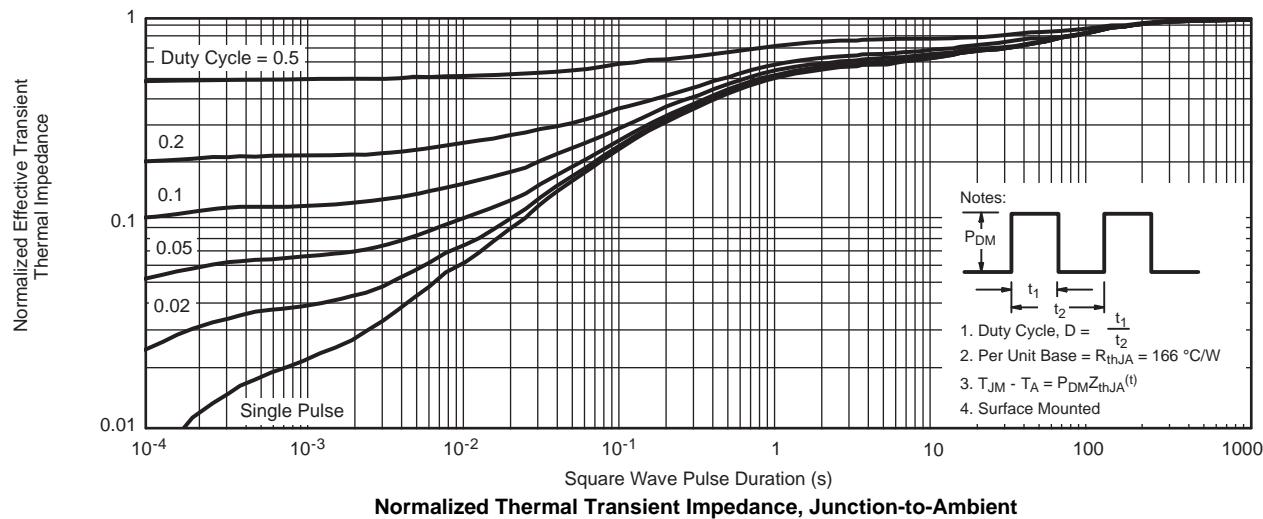
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

 T_C - Case Temperature (°C)

Current Derating*

 T_C - Case Temperature (°C)

Power, Junction-to-Foot

 T_A - Ambient Temperature (°C)

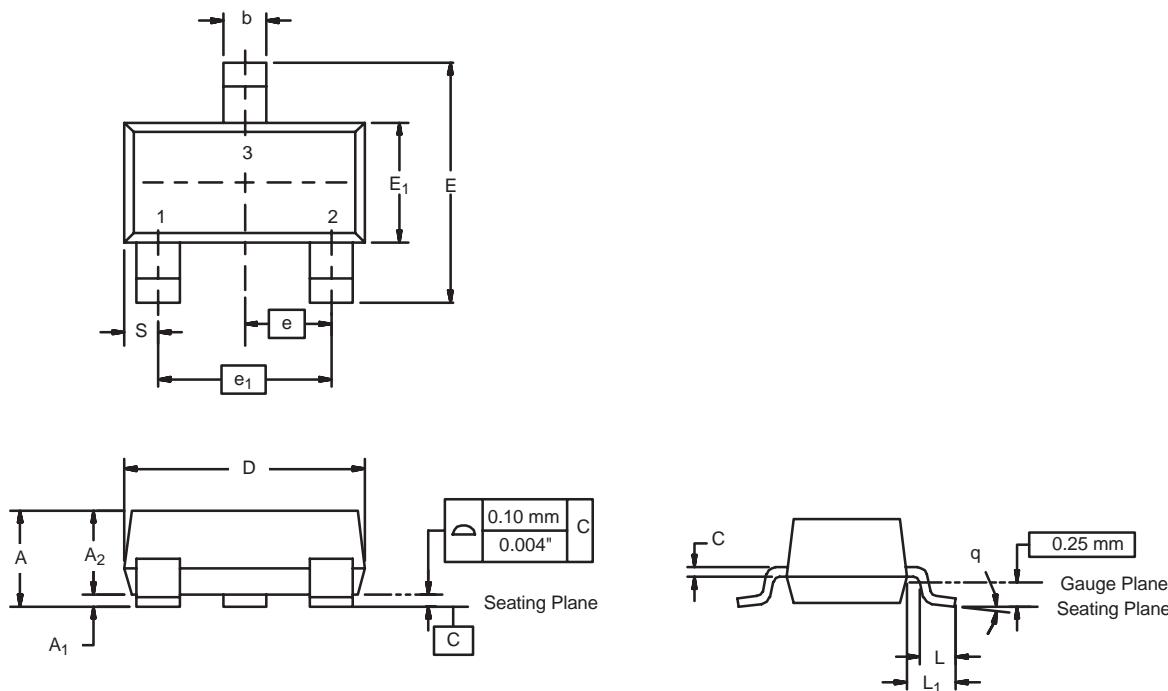
Power, Junction-to-Ambient

* 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)

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
 - Normalized Transient Thermal Impedance Junction-to-Foot (25 °C)

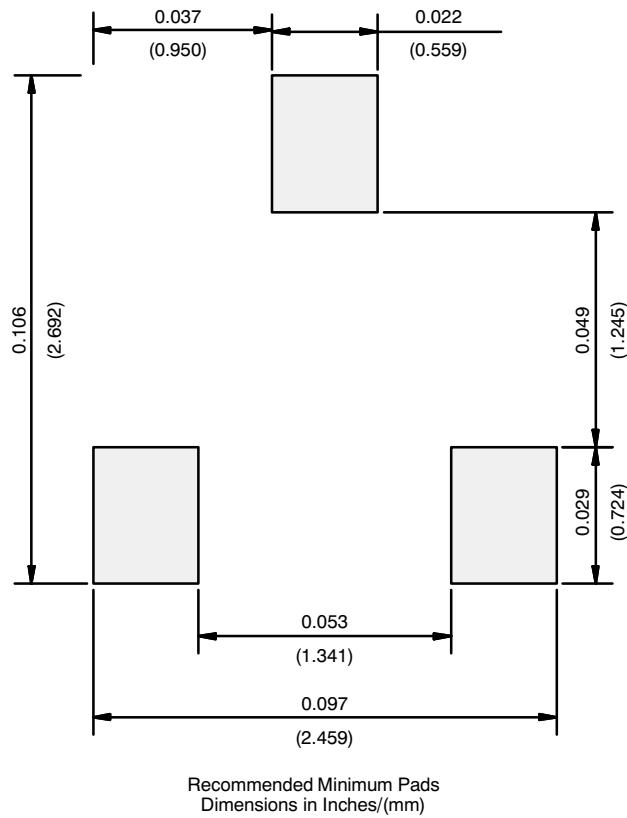
are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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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