FAIRCHILD SEMICONDUCTOR®

August 2009

FDMS6673BZ

P-Channel PowerTrench® MOSFET

-30 V, -28 A, 6.8 mΩ

Features

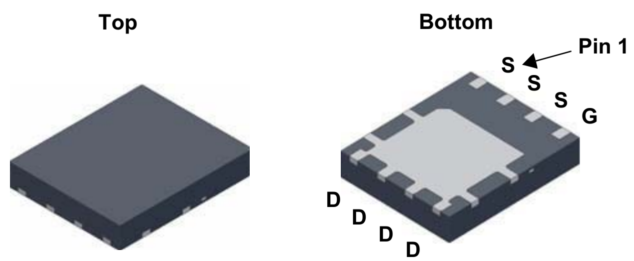
- Max $r_{DS(on)}$ = 6.8 mΩ at V_{GS} = -10 V, I_D = -15.2 A
- Max $r_{DS(on)}$ = 12.5 mΩ at V_{GS} = -4.5 V, I_D = -11.2 A
- Advanced Package and Silicon combination for low $r_{DS(on)}$
- HBM ESD protection level of 8 kV typical(note 3)
- MSL1 robust package design
- RoHS Compliant

General Description

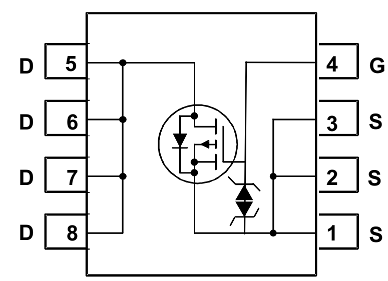
The FDMS6673BZ has been designed to minimize losses in load switch applications. Advancements in both silicon and package technologies have been combined to offer the lowest $r_{DS(on)}$ and ESD protection.

Applications

- Load Switch in Notebook and Server
- Notebook Battery Pack Power Management



Power 56



MOSFET Maximum Ratings T_C = 25 °C unless otherwise noted

Symbol	Parameter			Ratings	Units
V_{DS}	Drain to Source Voltage			-30	V
V_{GS}	Gate to Source Voltage			±25	V
I_D	Drain Current -Continuous (Package limited)	T_C = 25 °C		-28	A
	-Continuous (Silicon limited)	T_C = 25 °C		-90	
	-Continuous	T_A = 25 °C	(Note 1a)	-15.2	
	-Pulsed			-120	
P_D	Power Dissipation	T_C = 25 °C		73	W
	Power Dissipation	T_A = 25 °C	(Note 1a)	2.5	
T_J, T_{STG}	Operating and Storage Junction Temperature Range			-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case		1.7	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	50	

Package Marking and Ordering Information

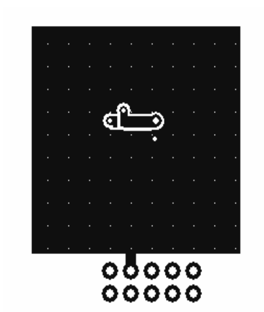
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDMS6673BZ	FDMS6673BZ	Power 56	13 ”	12 mm	3000 units

Electrical Characteristics T_J = 25 °C unless otherwise noted

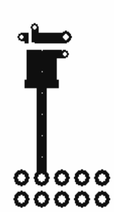
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = -250 μA, V_{GS} = 0 V	-30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = -250 μA, referenced to 25 °C		-18		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24 V, V_{GS} = 0 V			-1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±25 V, V_{DS} = 0 V			±10	μA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250 μA	-1.0	-1.8	-3.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = -250 μA, referenced to 25 °C		7		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = -10 V, I_D = -15.2 A		5.2	6.8	mΩ
		V_{GS} = -4.5 V, I_D = -11.2 A		7.8	12.5	
		V_{GS} = -10 V, I_D = -15.2 A, T_J = 125 °C		7.5	9.8	
g_{FS}	Forward Transconductance	V_{DS} = -5 V, I_D = -15.2 A		76		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -15 V, V_{GS} = 0 V, f = 1 MHz		4444	5915	pF
C_{oss}	Output Capacitance			781	1040	pF
C_{rss}	Reverse Transfer Capacitance			695	1045	pF
R_g	Gate Resistance			4.5		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -15 V, I_D = -15.2 A, V_{GS} = -10 V, R_{GEN} = 6 Ω		14	26	ns
t_r	Rise Time			28	45	ns
$t_{d(off)}$	Turn-Off Delay Time			97	156	ns
t_f	Fall Time			79	127	ns
Q_g	Total Gate Charge	V_{GS} = 0 V to -10 V; V_{DD} = -15 V, I_D = -15.2 A		93	130	nC
Q_g	Total Gate Charge	V_{GS} = 0 V to -5 V		52	73	nC
Q_{gs}	Gate to Source Charge			13		nC
Q_{gd}	Gate to Drain "Miller" Charge			26		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = -2.1 A (Note 2)		0.7	1.20	V
		V_{GS} = 0 V, I_S = -15.2 A (Note 2)		0.8	1.25	
t_{rr}	Reverse Recovery Time	I_F = -15.2 A, di/dt = 100 A/μs		33	53	ns
Q_{rr}	Reverse Recovery Charge			20	32	nC

Notes:

1: $R_{\theta JA}$ is determined with the device mounted on a 1in^2 pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a. 50 °C/W when mounted on a 1 in^2 pad of 2 oz copper.



b. 125 °C/W when mounted on a minimum pad of 2 oz copper.

2: Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0%.

3: The diode connected between the gate and source servers only as protection against ESD. No gate overvoltage rating is implied.

Typical Characteristics T_J = 25 °C unless otherwise noted

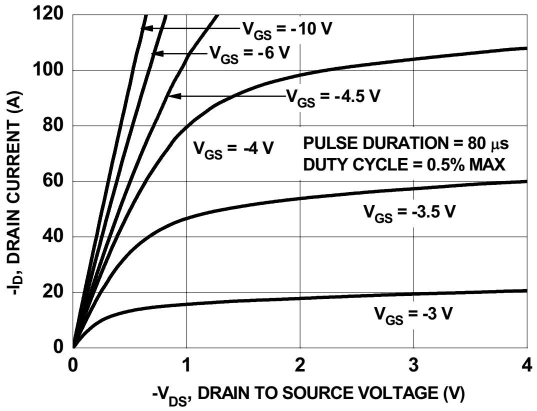


Figure 1. On Region Characteristics

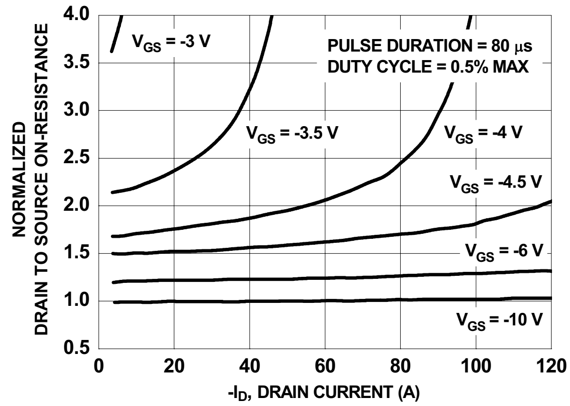


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

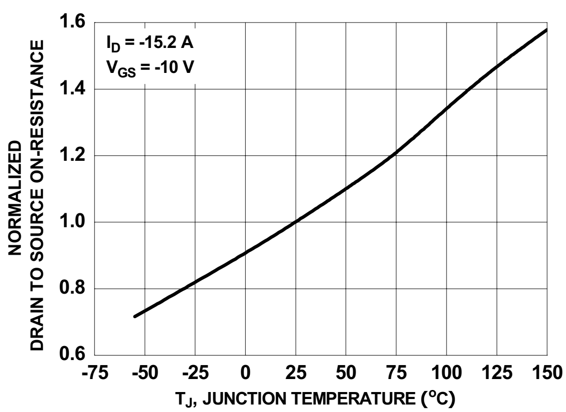


Figure 3. Normalized On Resistance vs Junction Temperature

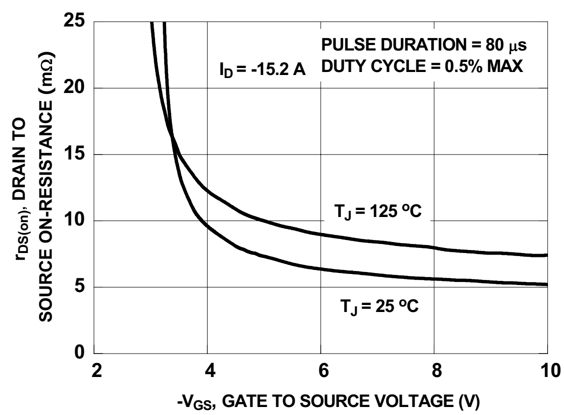


Figure 4. On-Resistance vs Gate to Source Voltage

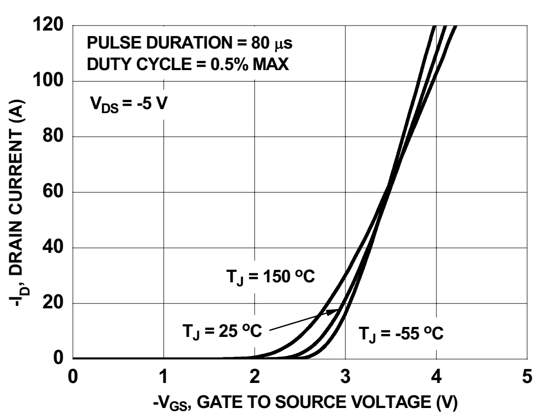


Figure 5. Transfer Characteristics

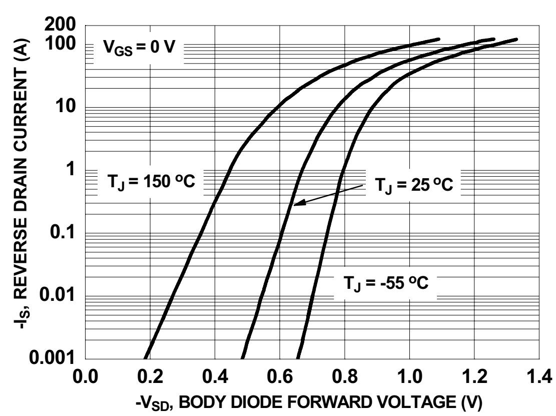


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25 °C unless otherwise noted

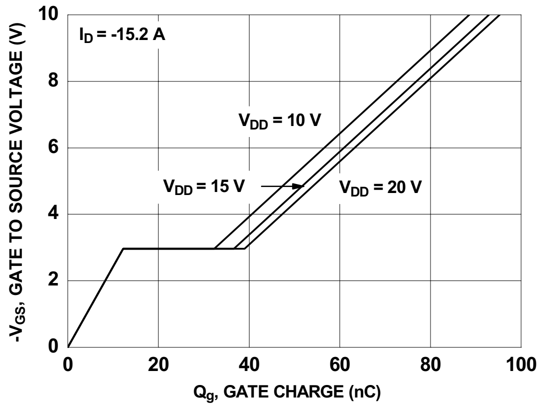


Figure 7. Gate Charge Characteristics

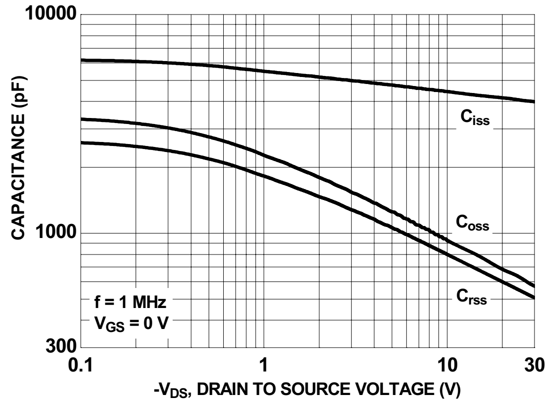


Figure 8. Capacitance vs Drain to Source Voltage

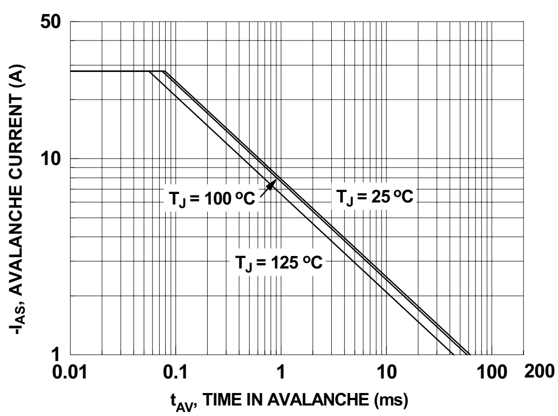


Figure 9. Unclamped Inductive Switching Capability

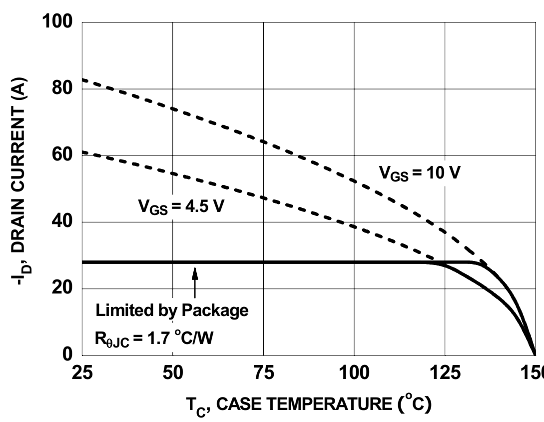


Figure 10. Maximum Continuous Drain Current vs Case Temperature

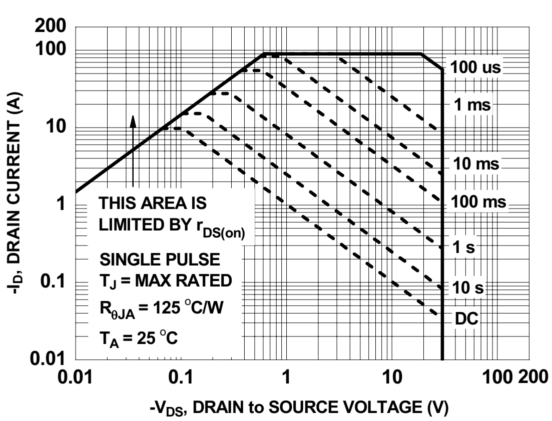


Figure 11. Forward Bias Safe Operating Area

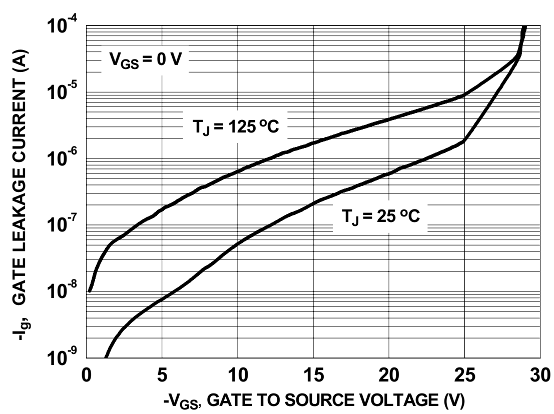


Figure 12. Igss vs Vgss

Typical Characteristics T_J = 25 °C unless otherwise noted

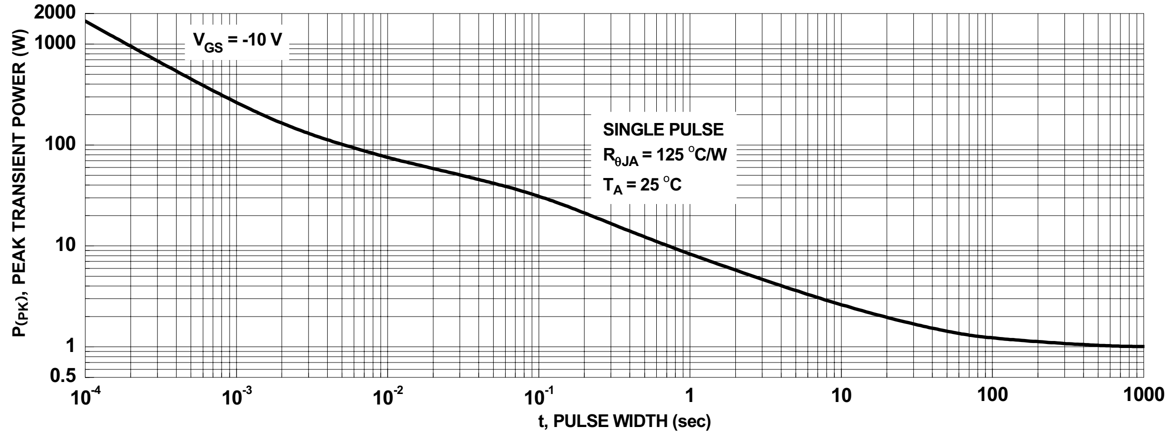


Figure 13. Single Pulse Maximum Power Dissipation

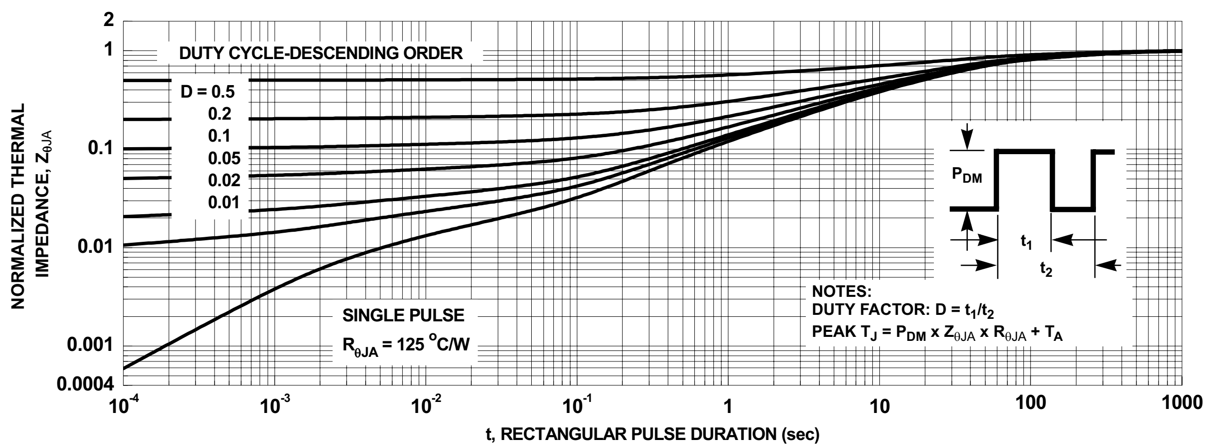
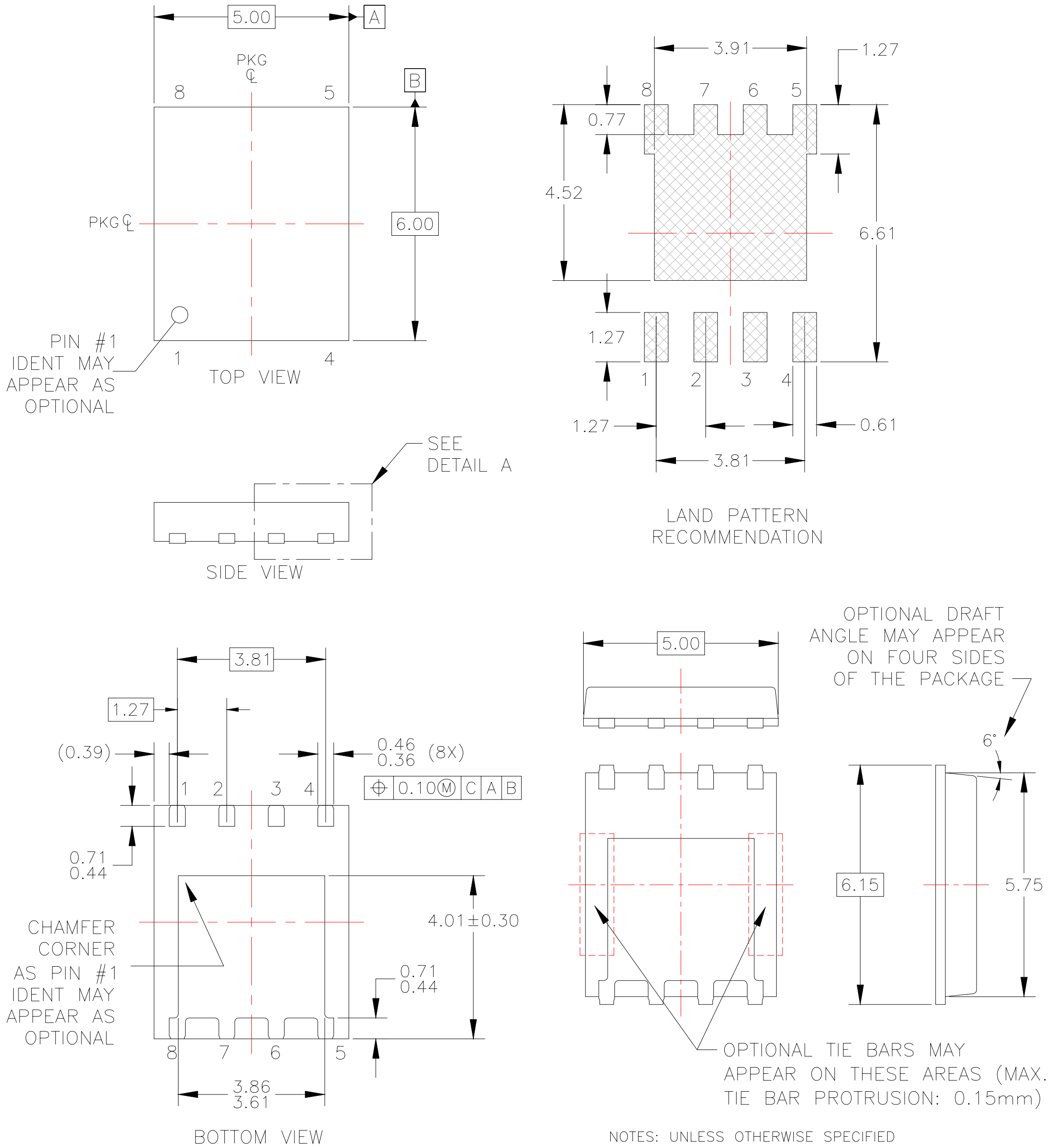
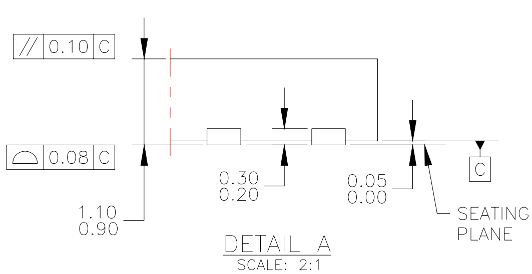


Figure 14. Junction-to-Ambient Transient Thermal Response Curve

Dimensional Outline and Pad Layout





NOTES: UNLESS OTHERWISE SPECIFIED

A) PACKAGE STANDARD REFERENCE: JEDEC MO-240, ISSUE A, VAR. AA, DATED OCTOBER 2002.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.
D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
E) DRAWING FILE NAME: PQFN08AREV4

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