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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

November 2015

FDMC4435BZ

P-Channel Power Trench® MOSFET

-30 V, -18 A, 20 mΩ

Features

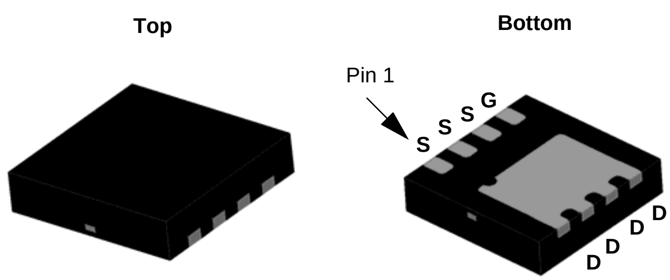
- Max $r_{DS(on)}$ = 20 mΩ at V_{GS} = -10 V, I_D = -8.5 A
- Max $r_{DS(on)}$ = 37 mΩ at V_{GS} = -4.5 V, I_D = -6.3 A
- Extended V_{GSS} range (-25 V) for battery applications
- High performance trench technology for extremely low $r_{DS(on)}$
- High power and current handling capability
- HBM ESD protection level >7 kV typical (Note 4)
- 100% UIL Tested
- Termination is Lead-free and RoHS Compliant

General Description

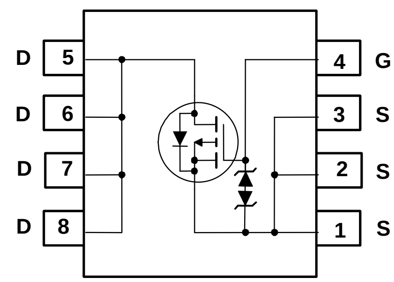
This P-Channel MOSFET is produced using Fairchild Semiconductor's advanced Power Trench® process that has been especially tailored to minimize the on-state resistance. This device is well suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

Applications

- High side in DC - DC Buck Converters
- Notebook battery power management
- Load switch in Notebook



MLP 3.3x3.3



MOSFET Maximum Ratings T_A = 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	T_C = 25 °C		-18	A
	-Continuous	T_A = 25 °C	(Note 1a)	-8.5	
	-Pulsed			-50	
E_{AS}	Single Pulse Avalanche Energy		(Note 3)	32	mJ
P_D	Power Dissipation	T_C = 25 °C		31	W
	Power Dissipation	T_A = 25 °C	(Note 1a)	2.3	
T_J, T_{STG}	Operating and Storage Junction Temperature Range			-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case		4	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	53	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDMC4435BZ	FDMC4435BZ	MLP 3.3X3.3	13 ”	12 mm	3000 units

Electrical Characteristics T_J = 25 °C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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		21		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24 V, V_{GS} = 0 V,			-1	μA
		V_{DS} = -24 V, V_{GS} = 0 V, T_J = 125 °C			-100	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±25 V, V_{DS} = 0 V			±10	μA

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$V_{GS(th)}$	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		-5		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = -10 V, I_D = -8.5 A		14	20	mΩ
		V_{GS} = -4.5 V, I_D = -6.3 A		21	37	
		V_{GS} = -10 V, I_D = -8.5 A, T_J = 125 °C		20	29	
g_{FS}	Forward Transconductance	V_{DD} = -5 V, I_D = -8.5 A		25		S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	V_{DS} = -15 V, V_{GS} = 0 V, f = 1 MHz		1535	2040	pF
C_{oss}	Output Capacitance			310	410	pF
C_{rss}	Reverse Transfer Capacitance			280	420	pF
R_g	Gate Resistance	f = 1 MHz		4		Ω

Switching Characteristics

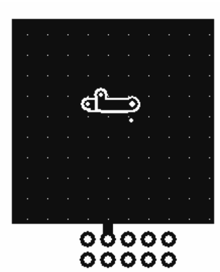
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -15 V, I_D = -8.5 A, V_{GS} = -10 V, R_{GEN} = 6 Ω		10	20	ns
t_r	Rise Time			9	18	ns
$t_{d(off)}$	Turn-Off Delay Time			35	56	ns
t_f	Fall Time			19	34	ns
Q_g	Total Gate Charge	V_{GS}=0V to -10V; V_{DD} = -15 V, I_D = -8.5 A		38	53	nC
Q_g	Total Gate Charge	V_{GS} = 0 V to -4.5 V; V_{DD} = -15 V, I_D = -8.5 A		20	28	nC
Q_{gs}	Gate to Source Charge	V_{DD} = -15 V, I_D = -8.5 A		4.3		nC
Q_{gd}	Gate to Drain "Miller" Charge			11		nC

Drain-Source Diode Characteristics

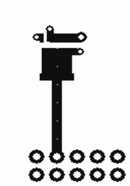
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = -8.5A (Note 2)		0.86	1.5	V
		V_{GS} = 0 V, I_S = -1.9 A (Note 2)		0.74	1.2	
t_{rr}	Reverse Recovery Time	I_F = -8.5 A, di/dt = 100 A/μs		26	40	ns
Q_{rr}	Reverse Recovery Charge			12	20	nC

NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 in^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. 53 °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. Starting T_J = 25°C; P-ch: L = 1mH, I_{AS} = -8A, V_{DD} = -27V, V_{GS} = -10V.
4. 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

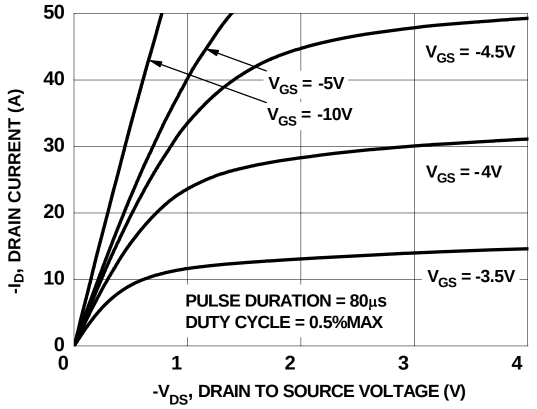


Figure 1. On-Region Characteristics

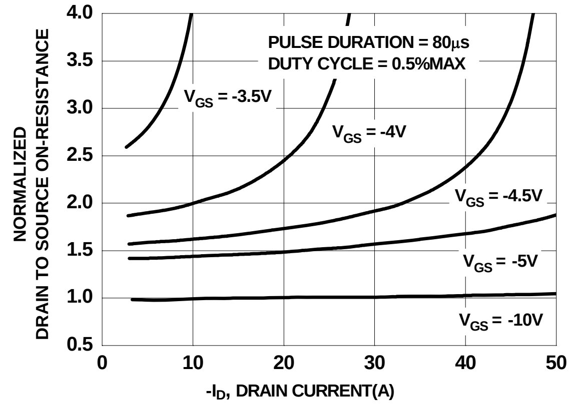


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

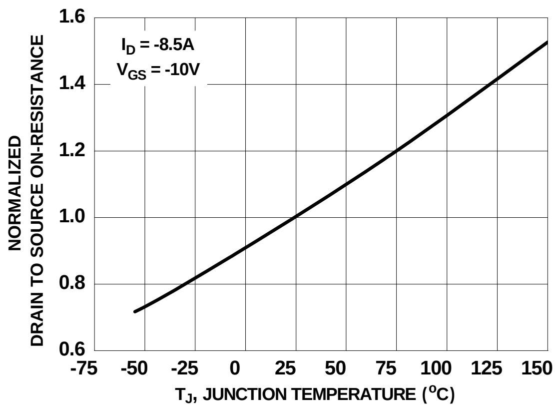


Figure 3. Normalized On-Resistance vs Junction Temperature

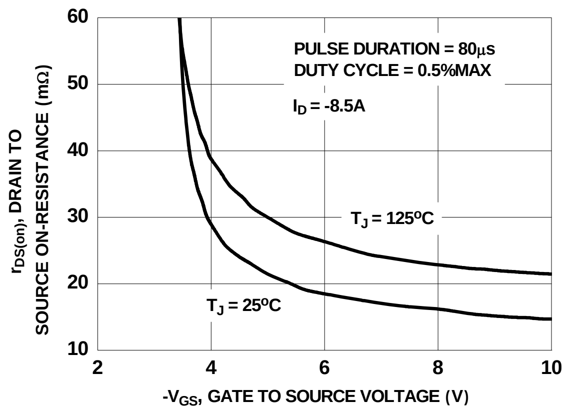


Figure 4. On-Resistance vs Gate to Source Voltage

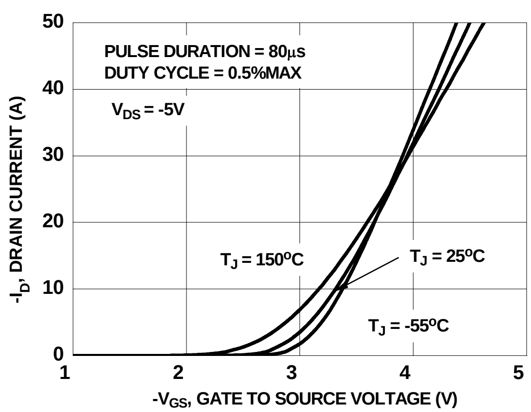


Figure 5. Transfer Characteristics

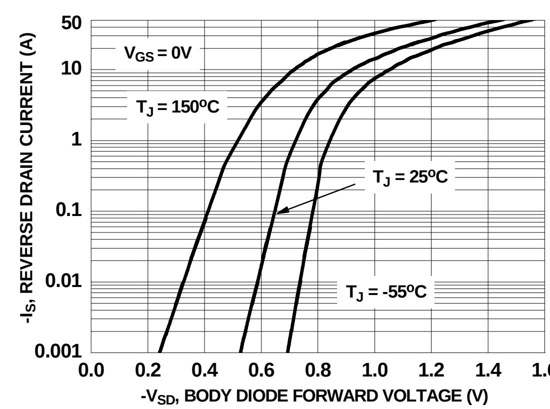


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25°C unless otherwise noted

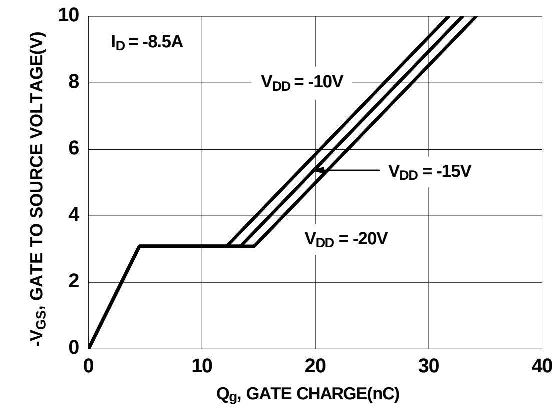


Figure 7. Gate Charge Characteristics

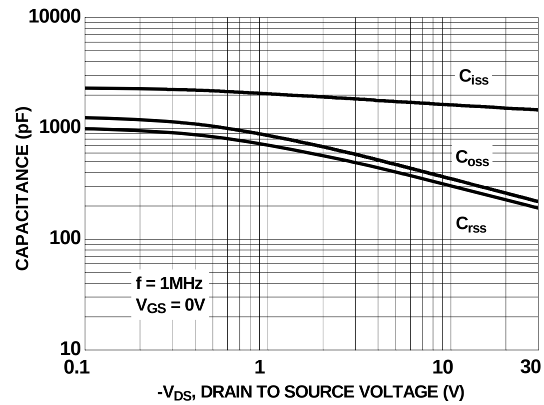


Figure 8. Capacitance vs Drain to Source Voltage

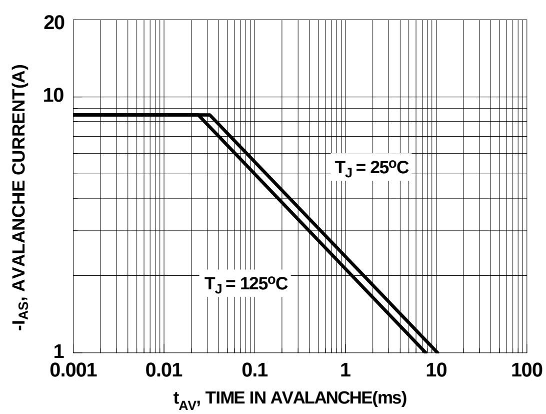


Figure 9. Unclamped Inductive Switching Capability

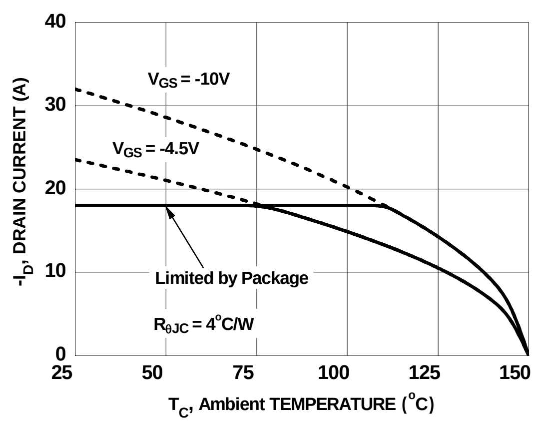


Figure 10. Maximum Continuous Drain Current vs Case Temperature

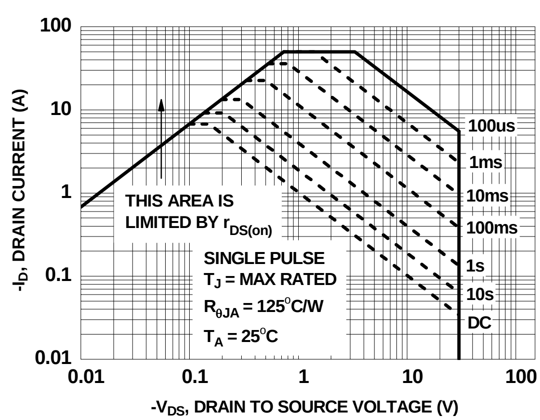


Figure 11. Forward Bias Safe Operating Area

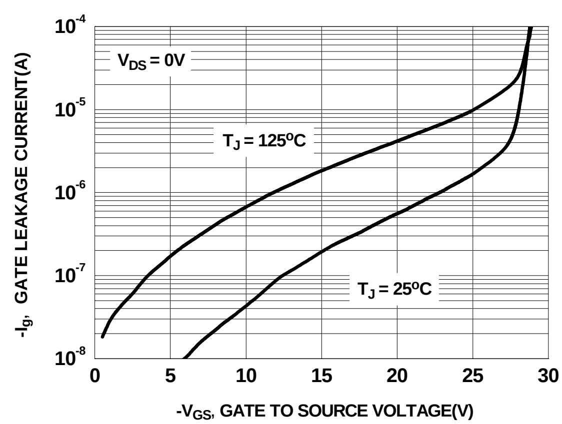


Figure 12. Igss vs Vgss

Typical Characteristics $T_J = 25°C$ unless otherwise noted

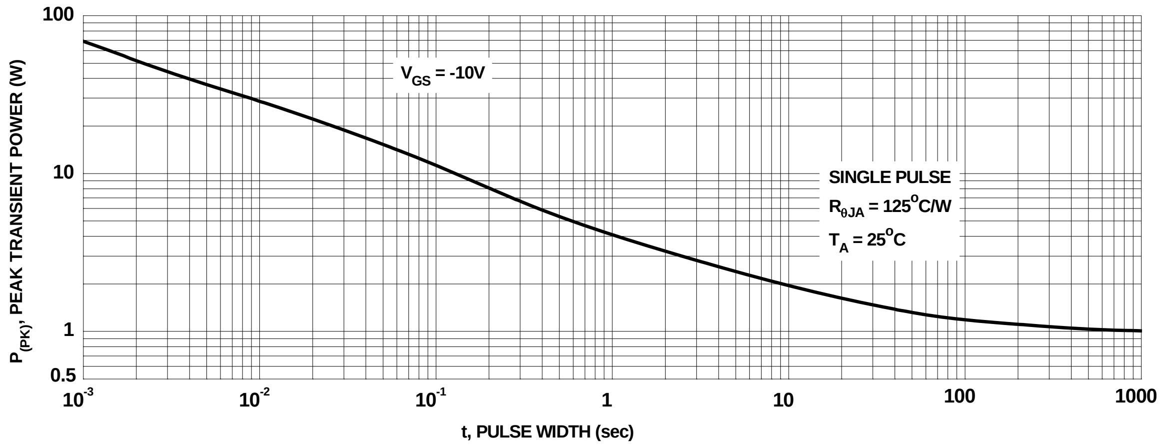


Figure 13. Single Pulse Maximum Power Dissipation

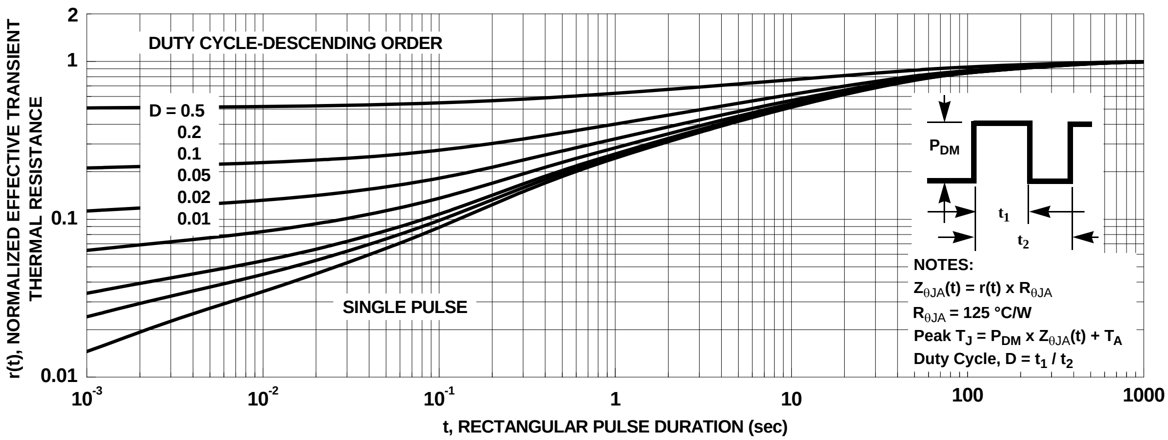
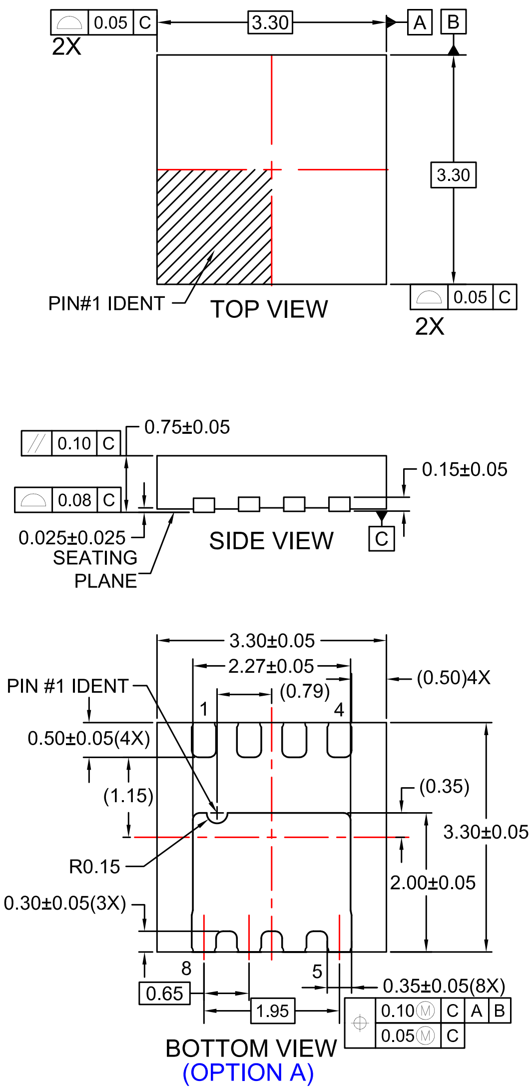
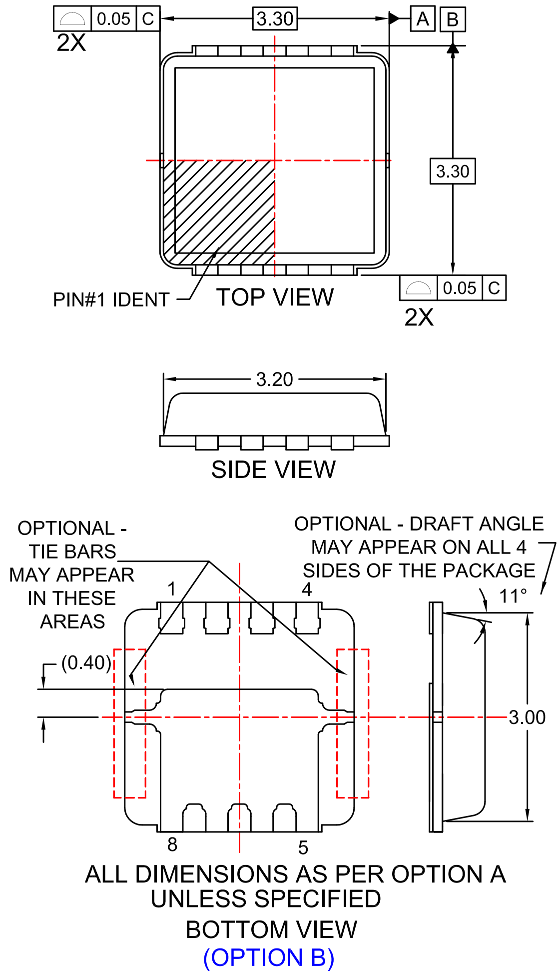
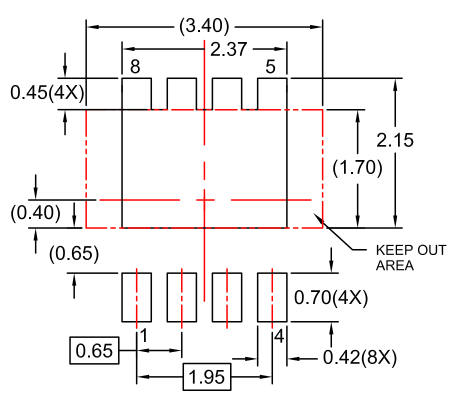


Figure 14. Transient Thermal Response Curve

Dimensional Outline and Pad Layout

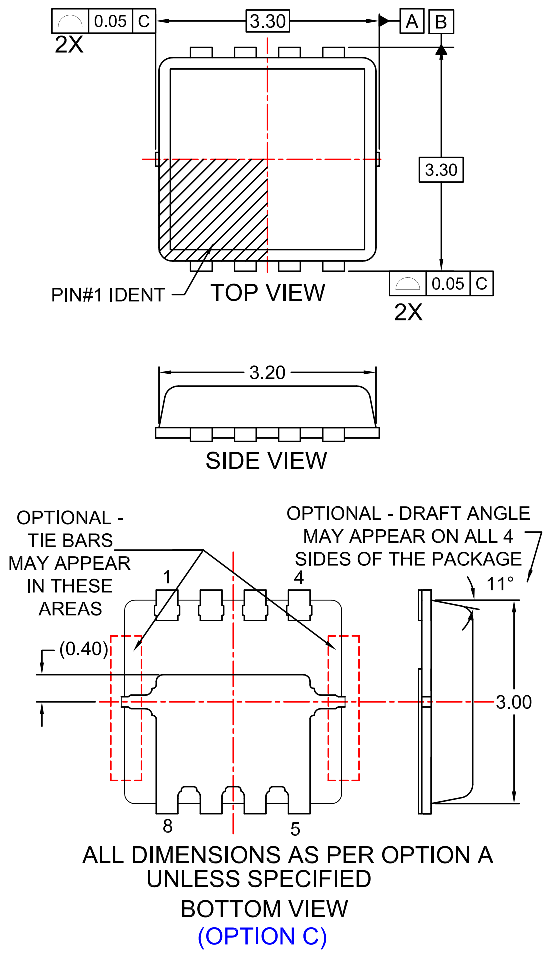






RECOMMENDED LAND PATTERN

Dimensional Outline and Pad Layout



NOTES:

A. PACKAGE DOES NOT FULLY CONFORM TO JEDEC REGISTRATION MO-240.
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009.
D. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN
E. DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. BURRS OR MOLD FLASH SHALL NOT EXCEED 0.10MM.
F. DRAWING FILENAME: MKT-MLP08Wrev3.
G. OPTION A - SAWN MLP, OPTIONS B & C - PUNCH MLP.

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Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I77

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OCEAN CHIPS
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- Поставка сложных, дефицитных, либо снятых с производства позиций;
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- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

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