Is Now Part of

ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at www.onsemi.com

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.

July 2015

FDMT800100DC

N-Channel Dual Cool^{TM} 88 PowerTrench$^®$ MOSFET
100 V, 162 A, 2.95 mΩ

Features

- Max $r_{DS(on)}$ = 2.95 mΩ at V_{GS} = 10 V, I_D = 24 A
- Max $r_{DS(on)}$ = 4.46 mΩ at V_{GS} = 6 V, I_D = 19 A
- Advanced Package and Silicon combination for low $r_{DS(on)}$ and high efficiency
- Next generation enhanced body diode technology, engineered for soft recovery
- Low profile 8x8mm MLP package
- MSL1 robust package design
- 100% UIL tested
- RoHS Compliant

General Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench$^®$ process. Advancements in both silicon and Dual Cool^{TM} package technologies have been combined to offer the lowest $r_{DS(on)}$ while maintaining excellent switching performance by extremely low Junction-to-Ambient thermal resistance.

Applications

- OringFET / Load Switching
- Synchronous Rectification
- DC-DC Conversion

Top **Dual Cool^{TM} 88** **Bottom**
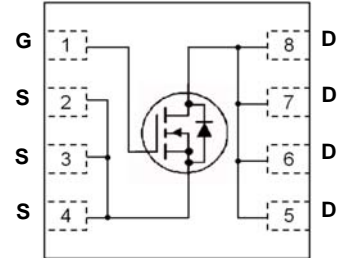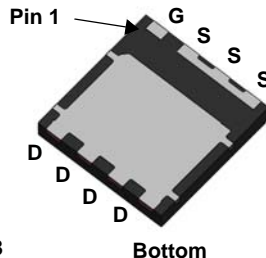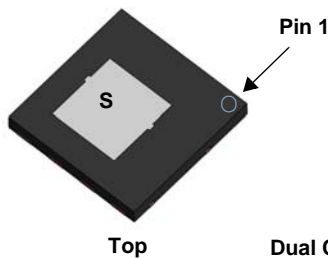
MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted

Symbol	Parameter			Ratings	Units
V_{DS}	Drain to Source Voltage			100	V
V_{GS}	Gate to Source Voltage			±20	V
I_D	Drain Current -Continuous	T_C = 25 °C	(Note 5)	162	A
	-Continuous	T_C = 100 °C	(Note 5)	102	
	-Continuous	T_A = 25 °C	(Note 1a)	24	
	-Pulsed		(Note 4)	989	
E_{AS}	Single Pulse Avalanche Energy		(Note 3)	1536	mJ
P_D	Power Dissipation	T_C = 25 °C		156	W
	Power Dissipation	T_A = 25 °C	(Note 1a)	3.2	
T_J, T_{STG}	Operating and Storage Junction Temperature Range			-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Top Source)	1.6	
$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Bottom Drain)	0.8	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	38	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1b)	81	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1i)	15	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1j)	21	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1k)	9	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
800100DC	FDMT800100DC	Dual Cool^{TM} 88	-	13.3 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	100			V
$\dfrac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 µA, referenced to 25 °C		66		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 80 V, V_{GS} = 0 V			1	µA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 µA	2.0	2.8	4.0	V
$\dfrac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 µA, referenced to 25 °C		-11		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 24 A		2.3	2.95	mΩ
		V_{GS} = 6 V, I_D = 19 A		3.5	4.46	
		V_{GS} = 10 V, I_D = 24 A, T_J = 125 °C		4.2	5.39	
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 24 A		66		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz		5595	7835	pF
C_{oss}	Output Capacitance			1160	1625	pF
C_{rss}	Reverse Transfer Capacitance			39	75	pF
R_g	Gate Resistance		0.1	1.4	3.5	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50 V, I_D = 24 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		29	47	ns
t_r	Rise Time			18	33	ns
$t_{d(off)}$	Turn-Off Delay Time			40	64	ns
t_f	Fall Time			10	20	ns
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to 10 V		79	111	nC
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to 6 V V_{DD} = 50 V, I_D = 24 A		50	70	nC
Q_{gs}	Gate to Source Charge			23		nC
Q_{gd}	Gate to Drain "Miller" Charge			16		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 2.9 A (Note 2)		0.7	1.1	V
		V_{GS} = 0 V, I_S = 24 A (Note 2)		0.8	1.2	
t_{rr}	Reverse Recovery Time	I_F = 24 A, di/dt = 100 A/µs		71	114	ns
Q_{rr}	Reverse Recovery Charge			94	151	nC

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Top Source)	1.6	
$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Bottom Drain)	0.8	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	38	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1b)	81	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1c)	26	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1d)	34	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1e)	14	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1f)	16	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1g)	26	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1h)	60	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1i)	15	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1j)	21	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1k)	9	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1l)	11	

NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a FR-4 board using a specified pad of 2 oz copper as shown below. $R_{\theta CA}$ is determined by the user's board design.
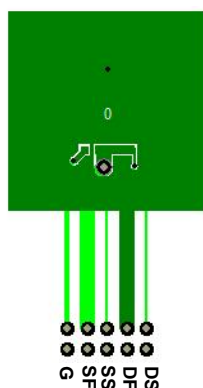
a. 38 °C/W when mounted on a 1 in^2 pad of 2 oz copper

b. 81 °C/W when mounted on a minimum pad of 2 oz copper

c. Still air, 20.9x10.4x12.7mm Aluminum Heat Sink, 1 in^2 pad of 2 oz copper

d. Still air, 20.9x10.4x12.7mm Aluminum Heat Sink, minimum pad of 2 oz copper

e. Still air, 45.2x41.4x11.7mm Aavid Thermalloy Part # 10-L41B-11 Heat Sink, 1 in^2 pad of 2 oz copper

f. Still air, 45.2x41.4x11.7mm Aavid Thermalloy Part # 10-L41B-11 Heat Sink, minimum pad of 2 oz copper

g. 200FPM Airflow, No Heat Sink,1 in^2 pad of 2 oz copper

h. 200FPM Airflow, No Heat Sink, minimum pad of 2 oz copper

i. 200FPM Airflow, 20.9x10.4x12.7mm Aluminum Heat Sink, 1 in^2 pad of 2 oz copper

j. 200FPM Airflow, 20.9x10.4x12.7mm Aluminum Heat Sink, minimum pad of 2 oz copper

k. 200FPM Airflow, 45.2x41.4x11.7mm Aavid Thermalloy Part # 10-L41B-11 Heat Sink, 1 in^2 pad of 2 oz copper

l. 200FPM Airflow, 45.2x41.4x11.7mm Aavid Thermalloy Part # 10-L41B-11 Heat Sink, minimum pad of 2 oz copper

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

3. E_{AS} of 1536 mJ is based on starting T_J = 25 °C; N-ch: L = 3 mH, I_{AS} = 32 A, V_{DD} = 100 V, V_{GS} =10 V. 100% test at L = 0.1 mH, I_{AS} = 101 A.

4. Pulsed Id please refer to Fig 11 SOA graph for more details.

5. Computed continuous current limited to Max Junction Temperature only, actual continuous current will be limited by thermal & electro-mechanical application board design.

Typical Characteristics T_J = 25 °C unless otherwise noted
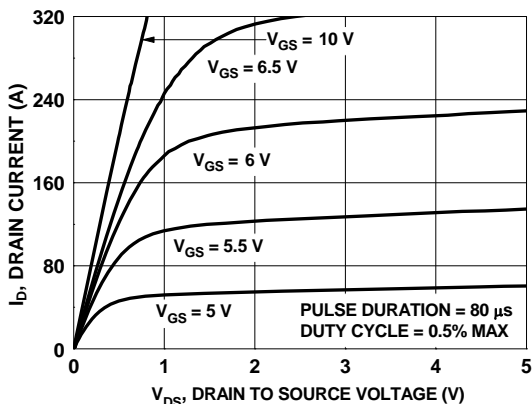

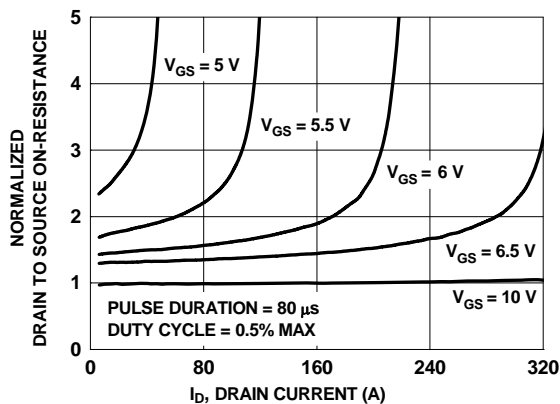**Figure 1. On-Region Characteristics**

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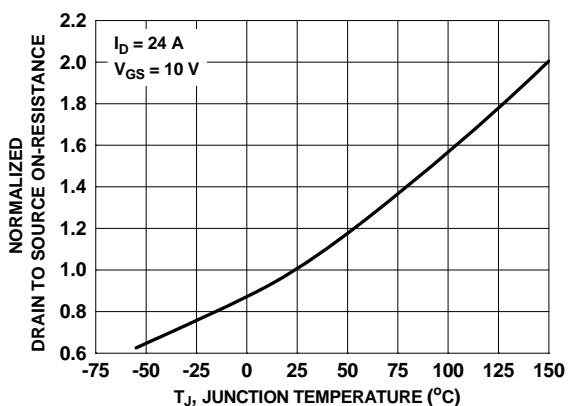

Figure 3. Normalized On-Resistance vs Junction Temperature
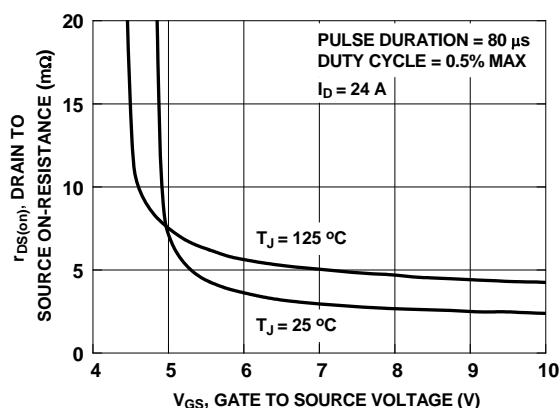
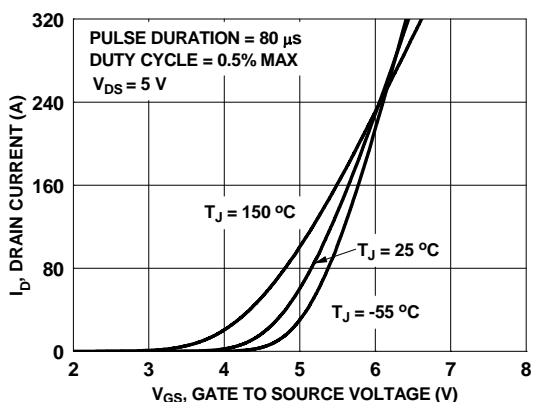

Figure 4. On-Resistance vs Gate to Source Voltage

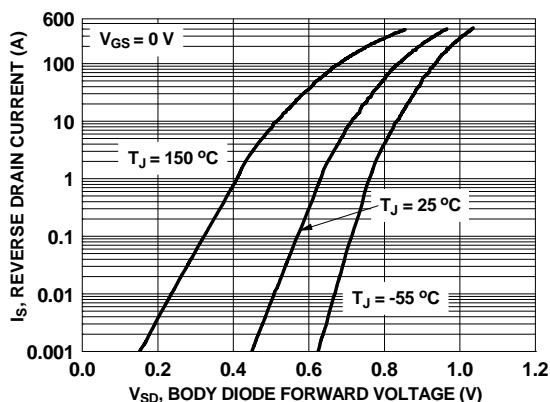**Figure 5. Transfer Characteristics**

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

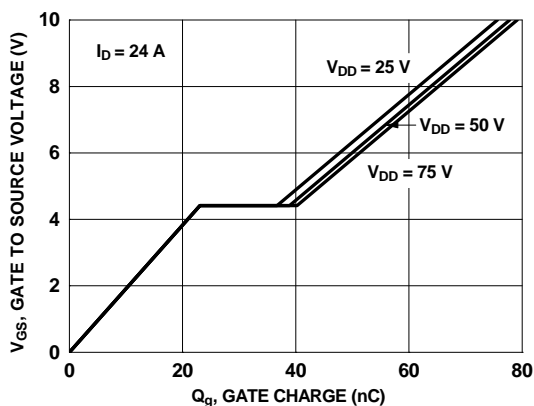## Typical Characteristics T_J = 25 °C unless otherwise noted

Figure 7. Gate Charge Characteristics
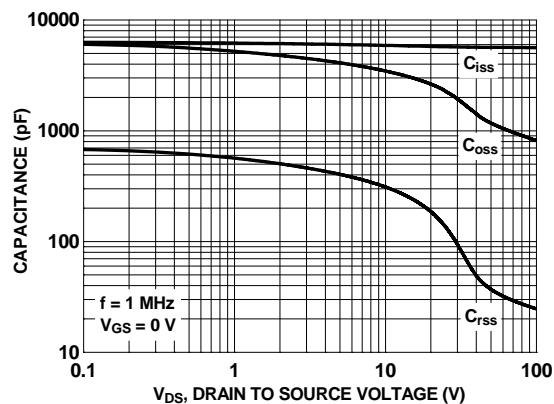
Figure 8. Capacitance vs Drain to Source Voltage
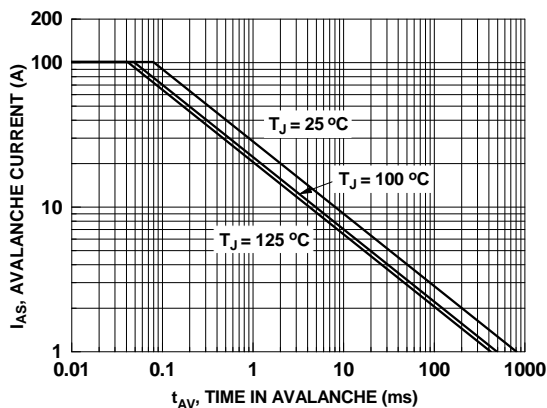
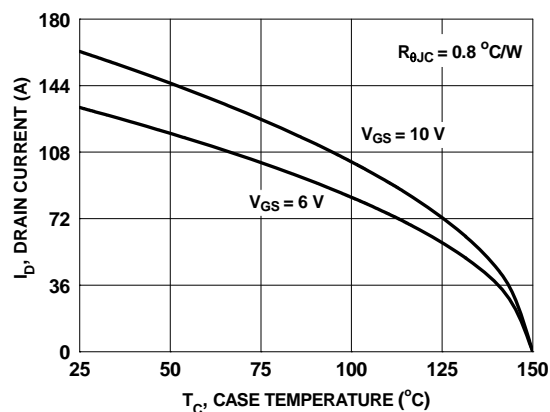**Figure 9. Unclamped Inductive Switching Capability**

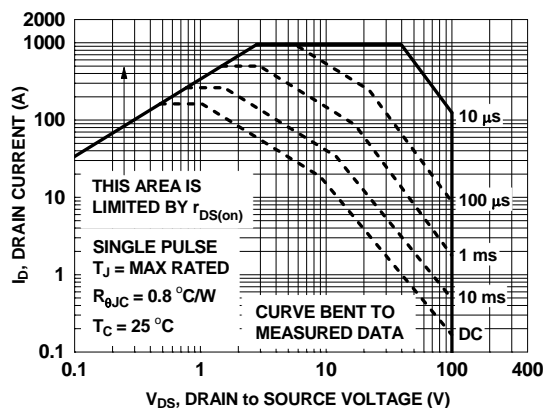**Figure 10. Maximum Continuous Drain Current vs Case Temperature**
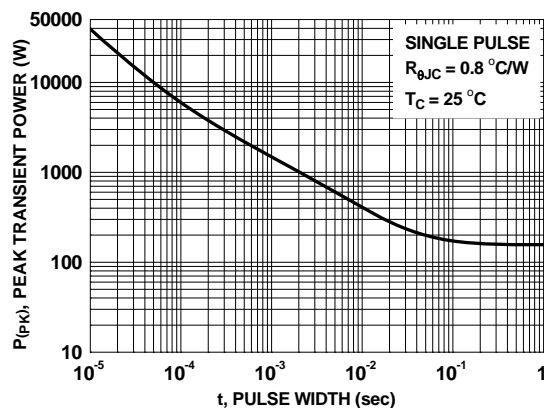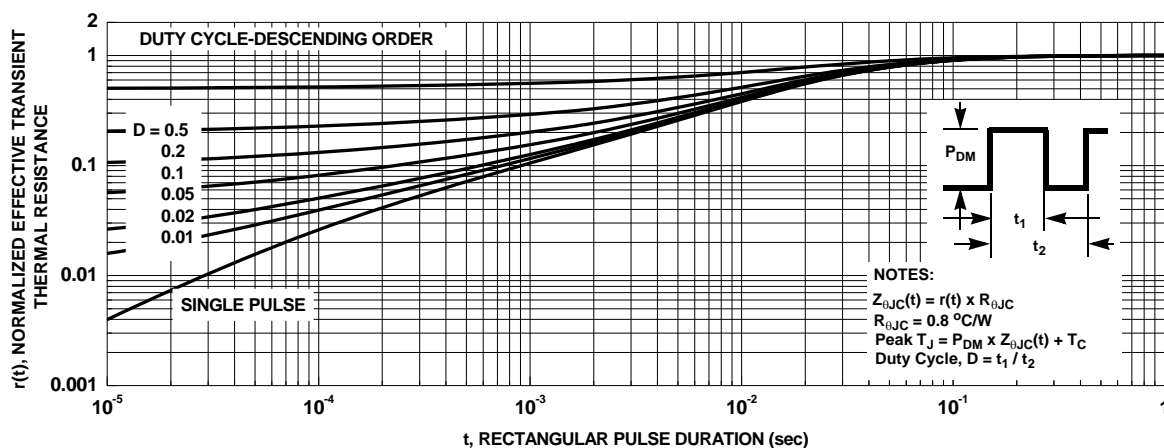

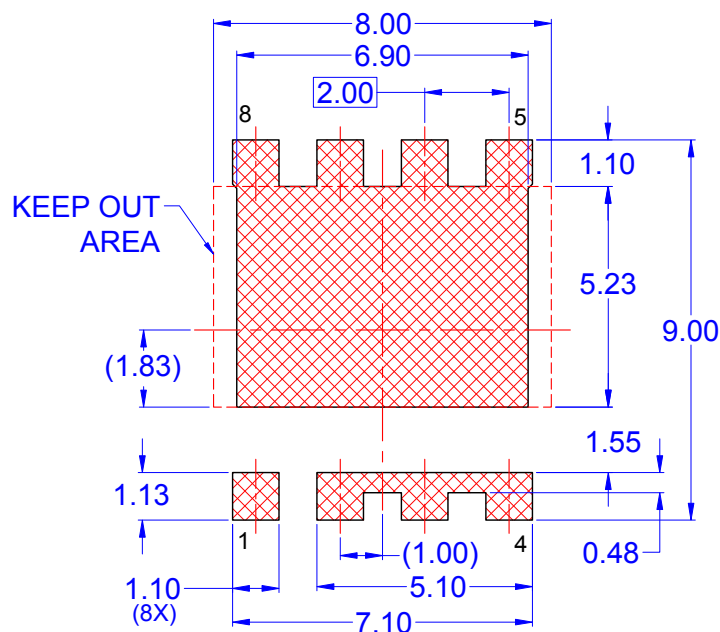**Figure 11. Forward Bias Safe Operating Area**

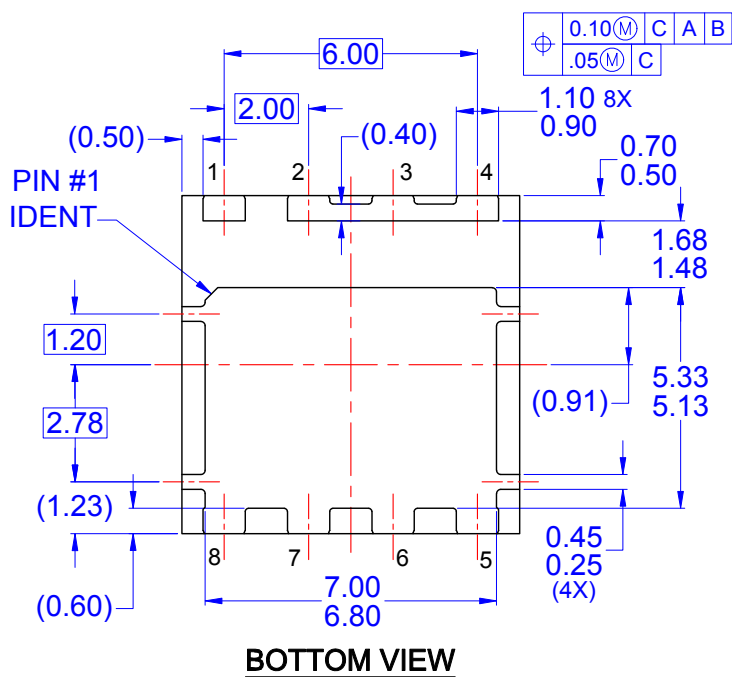**Figure 12. Single Pulse Maximum Power Dissipation**

Typical Characteristics T_J = 25 °C unless otherwise noted

Figure 13. Junction-to-Case Transient Thermal Response Curve

In figure:

DUTY CYCLE-DESCENDING ORDER

r(t), NORMALIZED EFFECTIVE TRANSIENT THERMAL RESISTANCE

D = 0.5
0.2
0.1
0.05
0.02
0.01

SINGLE PULSE

t, RECTANGULAR PULSE DURATION (sec)

NOTES:
$Z_{\theta JC}(t) = r(t) \times R_{\theta JC}$
$R_{\theta JC} = 0.8\ ^oC/W$
Peak $T_J = P_{DM} \times Z_{\theta JC}(t) + T_C$
Duty Cycle, $D = t_1 / t_2$

P_{DM}, t_1, t_2

TOP VIEW

(2X)
⌒ | 0.05 | C

8.00±0.10   A   B

8   5

8.00±0.10

4.24
3.94

PKG ℄

(2.41)

1   4

PKG ℄

⌒ | 0.05 | C
(2X)

4.03
3.68

(1.56)

FRONT VIEW

SEE DETAIL A
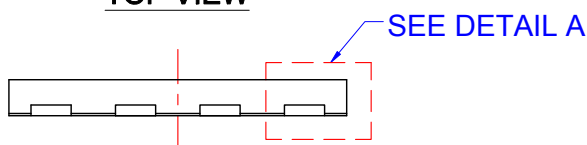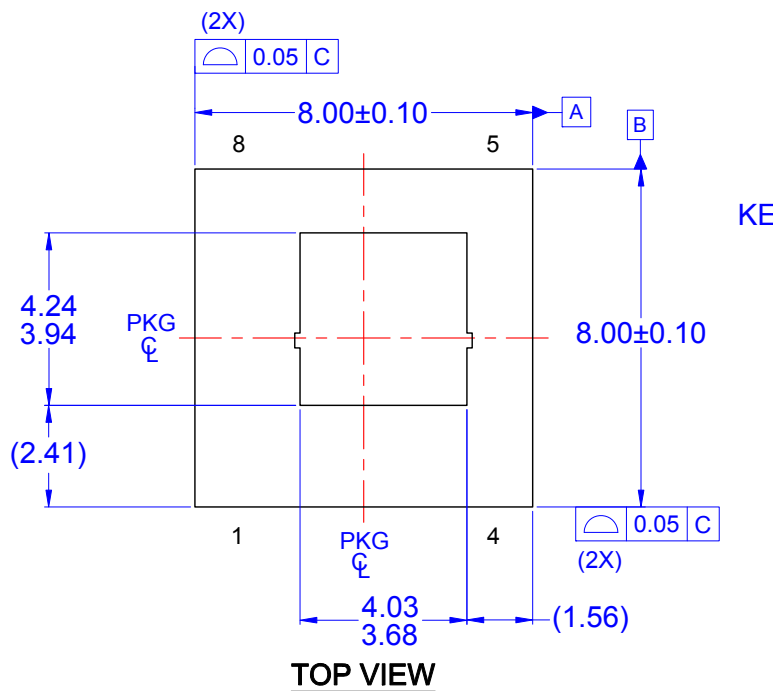
LAND PATTERN RECOMMENDATION

8.00
6.90
2.00

8   5

KEEP OUT AREA

1.10

5.23

9.00

(1.83)

1.13

1.55

1   4

1.10
(8X)

(1.00)

5.10

0.48

7.10

DETAIL A
SCALE: 2X

0.30
0.20

0.95
0.75

0.05
0.00

C

SEATING PLANE

BOTTOM VIEW

⊕ | 0.10Ⓜ | C | A | B
   | .05Ⓜ | C

6.00

2.00

1.10 8X
0.90

(0.50)

PIN #1 IDENT

1   2   3   4

0.70
0.50

1.68
1.48

1.20

2.78

(0.91)

5.33
5.13

(1.23)

8   7   6   5

0.45
0.25
(4X)

7.00
6.80

(0.60)
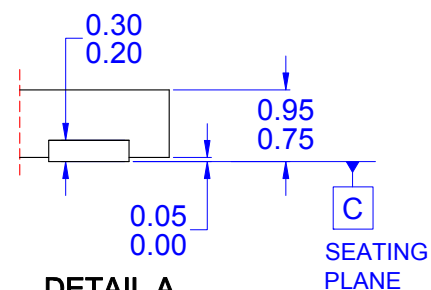
NOTES: UNLESS OTHERWISE SPECIFIED
 A) THIS PACKAGE IS NOT PRESENTLY REGISTERED
    WITH ANY STANDARDS COMMITTEE.
 B) DIMENSIONS ARE INCLUSIVE OF BURRS,
    MOLD FLASH, AND TIE BAR PROTRUSIONS.
 C) ALL DIMENSIONS ARE IN MILLIMETERS.
 D) DRAWING CONFORMS TO ASME Y14.5M-2009.
 E) IT IS RECOMMENDED TO HAVE NO TRACES OR
    VIAS WITHIN THE KEEP OUR AREA.
 F) DRAWING FILENAME: MKT-PQFN08RREV2

FAIRCHILD™

PUBLICATION ORDERING INFORMATION

© Semiconductor Components Industries, LLC

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[ON Semiconductor]():

[FDMT800100DC]()

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- 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.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».

«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.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А