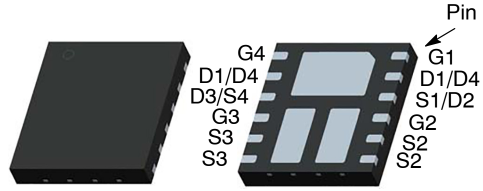
MOSFET – N-Channel, POWERTRENCH®, GreenBridge™ Series of High-Efficiency Bridge Rectifiers

100 V, 6 A, 110 mΩ

FDMQ8403

V_{DSS}	$R_{DS(ON)}$ MAX	I_D MAX
100 V	110 Ω @ 10 V	6 A



WDFN12 5 x 4.5, 0.8P
(MLP 4.5 x 5)
CASE 511CR

General Description

This quad MOSFET solution provides ten–fold improvement in power dissipation over diode bridge.

Features

- Max $r_{DS(on)}$ = 110 mΩ at V_{GS} = 10 V, I_D = 3 A
- Max $r_{DS(on)}$ = 175 mΩ at V_{GS} = 6 V, I_D = 2.4 A
- Substantial Efficiency Benefit in PD Solutions
- This Device is Pb–Free, Halid Free and is RoHS Compliant

Applications

- High–Efficiency Bridge Rectifiers

MARKING DIAGRAM

$Y&Z&2&K
FDMQ
8403

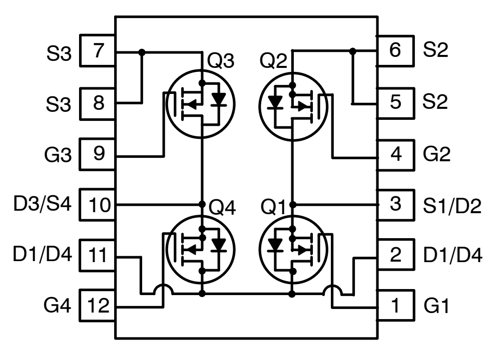
FDMQ8403 = Specific Device Code
$Y = **onsemi** Logo
&Z = Assembly plant code
&2 = Date Code format (Year and Week)
&K = Lot Run Traceability Code

MOSFET MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Symbol	Rating	Value	Unit
V_{DS}	Drain to Source Voltage	100	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current – Continuous (Package Limited) T_C = 25°C – Continuous (Silicon Limited) T_C = 25°C – Continuous (Note 1a.) T_A = 25°C – Pulsed	 6 9 3.1 12	A
P_D	Power Dissipation T_C = 25°C	17	W
	Power Dissipation (Note 1a.) T_A = 25°C	1.9	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	–55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

PIN CONNECTION



THERMAL CHARACTERISTICS

Symbol	Rating	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a.)	65	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1b.)	135	

ORDERING INFORMATION

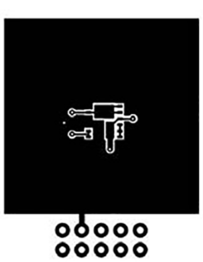
See detailed ordering and shipping information on page 5 of this data sheet.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

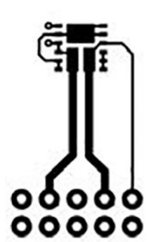
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	100	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	–	72	–	mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS} = 0 V, V_{DS} = 80 V	–	–	1	nA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V	–	–	±100	μA
OFF CHARACTERISTICS						
$V_{GS(th)}$	Drain to Source Breakdown Voltage	V_{GS} = V_{DS}, I_D = 250 μA	2	2.8	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	–	−8	–	mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 3 A	–	85	110	mΩ
		V_{GS} = 6 V, I_D = 2.4 A	–	115	175	
		V_{GS} = 10 V, I_D = 3 A, T_J = 125°C	–	147	191	
g_{FS}	Forward Transconductance	V_{DS} = 10 V, I_D = 3 A	–	6	–	S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	–	162	215	pF
C_{oss}	Output Capacitance		–	43	60	pF
C_{rss}	Reverse Transfer Capacitance		–	2.6	5	pF
DYNAMIC CHARACTERISTICS						
$t_{d(on)}$	Turn−On Delay Time	V_{DD} = 50 V, I_D = 3 A, V_{GS} = 10 V, R_{GEN} = 6 Ω	–	4.1	10	ns
t_r	Rise Time		–	1.2	10	ns
$t_{d(off)}$	Turn−Off Delay Time		–	7.2	15	ns
t_f	Fall Time		–	1.8	10	ns
Q_g	Total Gate Charge	V_{GS} = 0 V to 10 V; V_{DD} = 50 V, I_D = 3 A	–	3	5	nC
Q_g	Total Gate Charge	V_{GS} = 0 V to 5 V	–	1.7	3	nC
Q_{gs}	Gate to Source Charge	V_{DD} = 50 V, I_D = 3 A	–	0.9	–	nC
Q_{gd}	Gate to Drain “Miller” Charge		–	0.8	–	nC
DRAIN−SOURCE DIODE CHARACTERISTICS						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 3 A (Note 2)	–	0.86	1.3	V
t_{rr}	Reverse Recovery Time	I_F = 3 A, di/dt = 100 A/μs	–	33	53	ns
Q_{rr}	Reverse Recovery Charge		–	23	37	nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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. 65°C/W when mounted on a 1 in^2 pad of 2 oz copper, the board designed Q1 + Q3 or Q2 + Q4.



b. 135°C/W when mounted on a minimum pad of 2 oz copper, the board designed Q1 + Q3 or Q2 + Q4.

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

TYPICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted.)

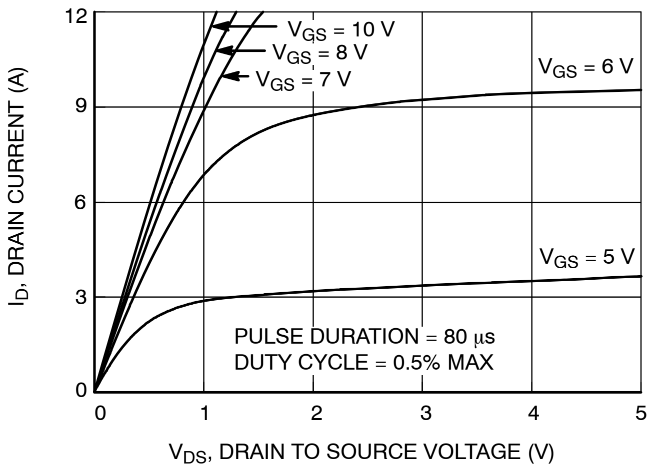


Figure 1. On Region Characteristics

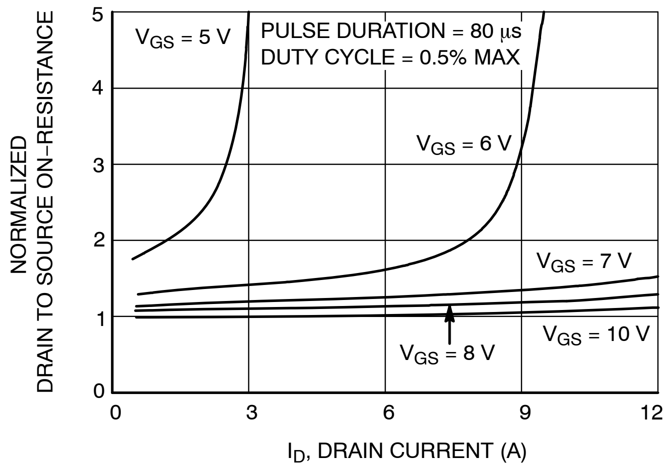


Figure 2. Normalized On−Resistance vs. Drain Current and Gate Voltage

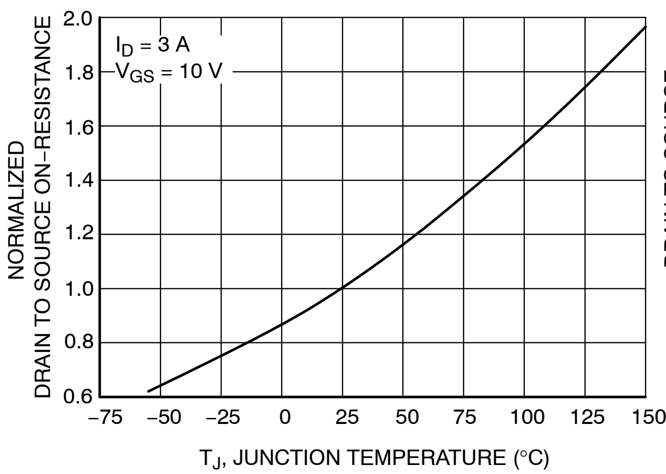


Figure 3. Normalized On Resistance vs. Junction Temperature

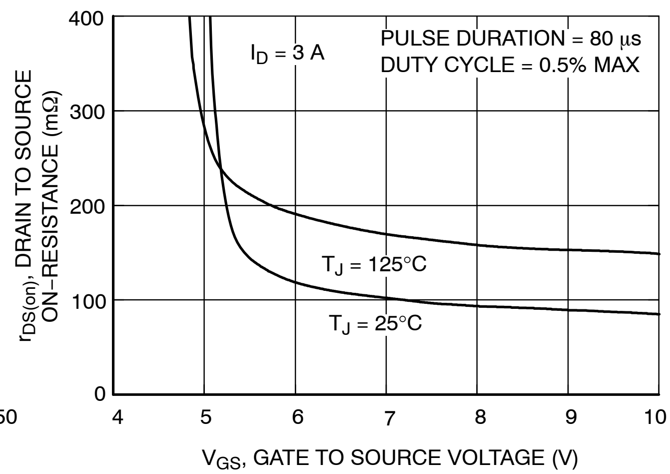


Figure 4. On−Resistance vs. Gate to Source Voltage

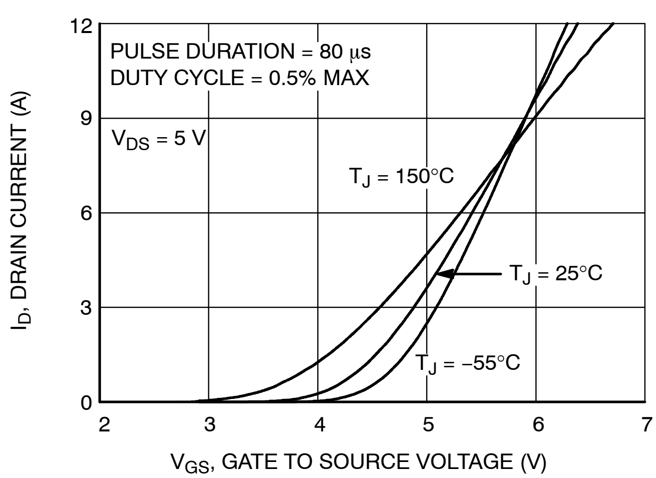


Figure 5. Transfer Characteristics

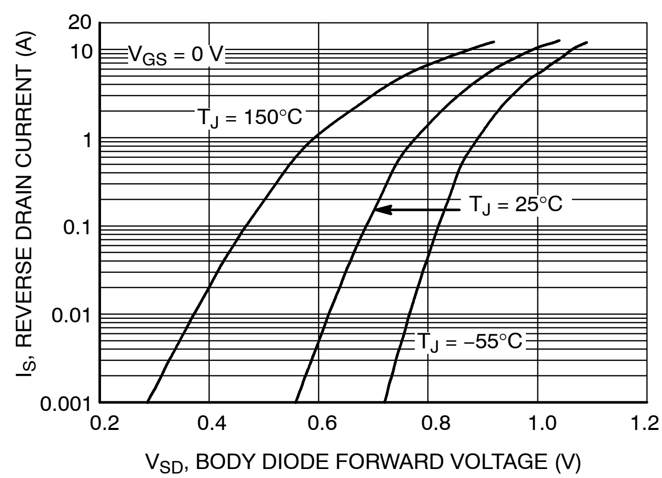


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

TYPICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted) (continued)

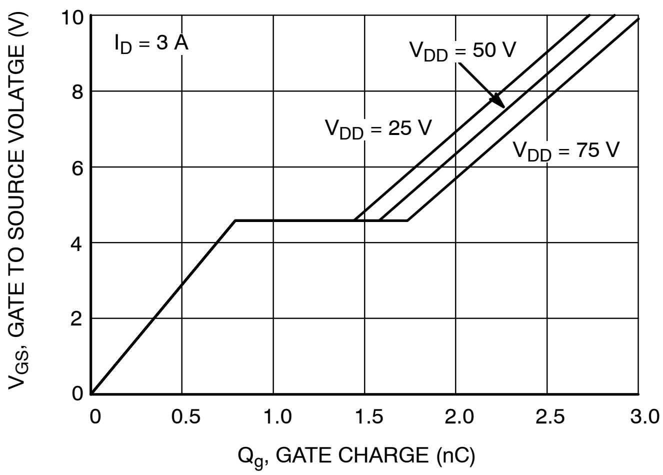


Figure 7. Gate Charge Characteristics

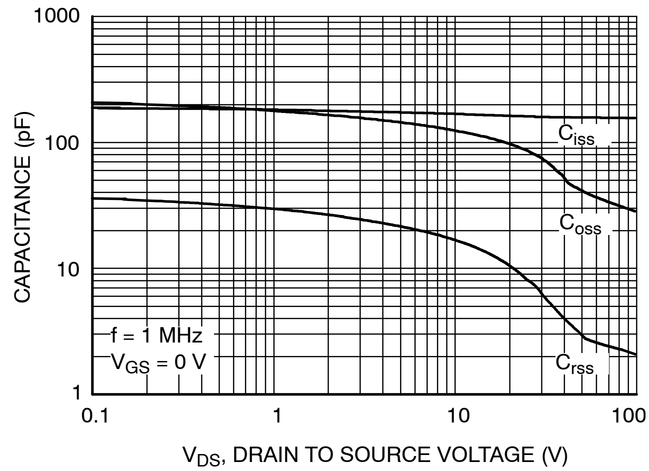


Figure 8. Capacitance vs. Drain to Source Voltage

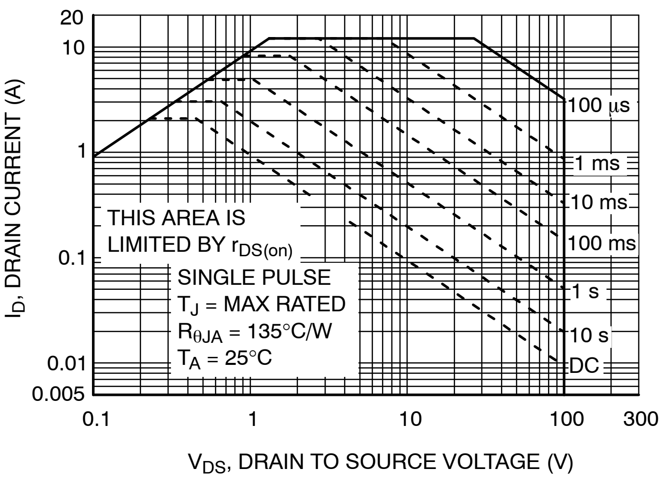


Figure 9. Forward Bias Safe Operating Area

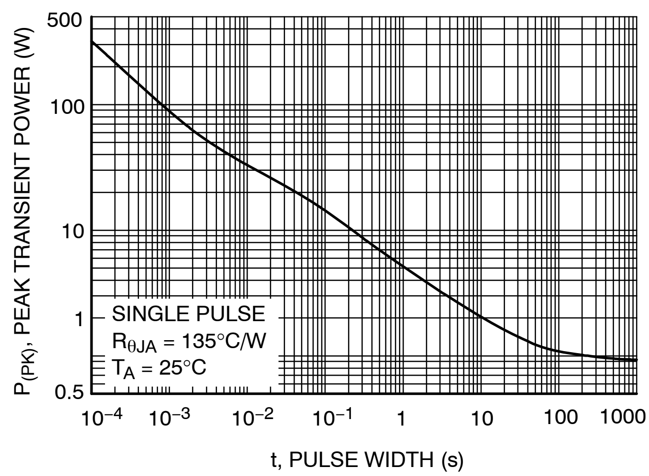


Figure 10. Single Pulse Maximum Power Dissipation

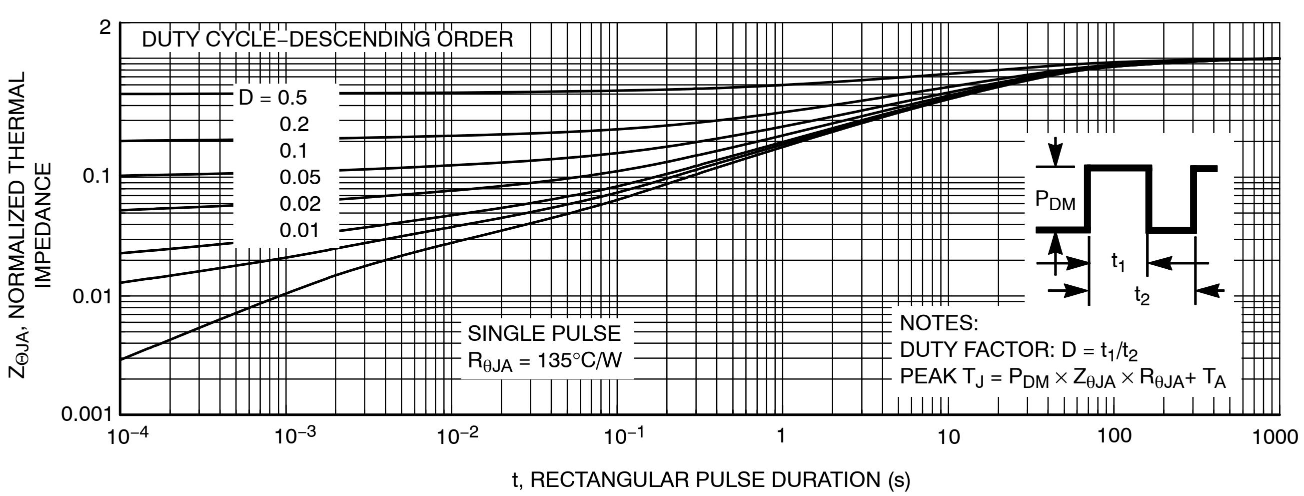


Figure 11. Junction−to−Ambient Transient Thermal Response Curve

ORDERING INFORMATION

Device Marking	Device	Package	Reel Size	Tape Width	Shipping†
FDMQ8403	FDMQ8403	WDFN12 (Pb−Free)	13”	12 mm	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

WDFN12 5x4.5, 0.8P
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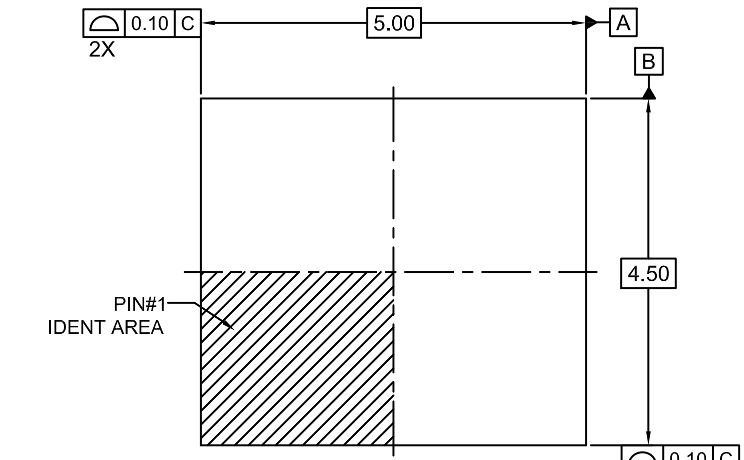
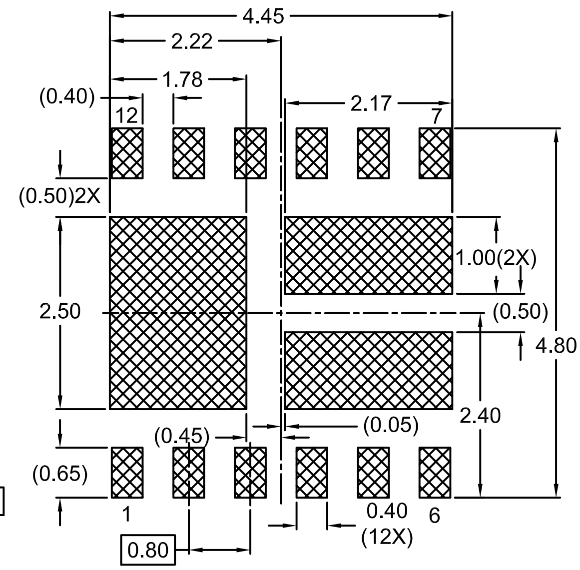
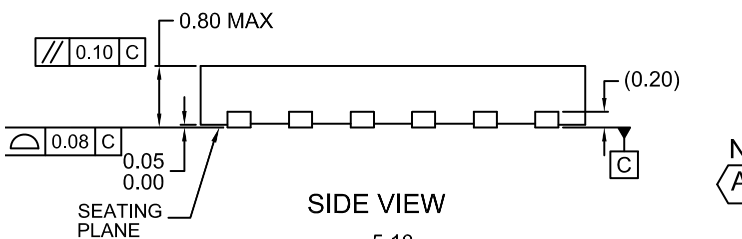
DATE 21 MAR 2017



TOP VIEW

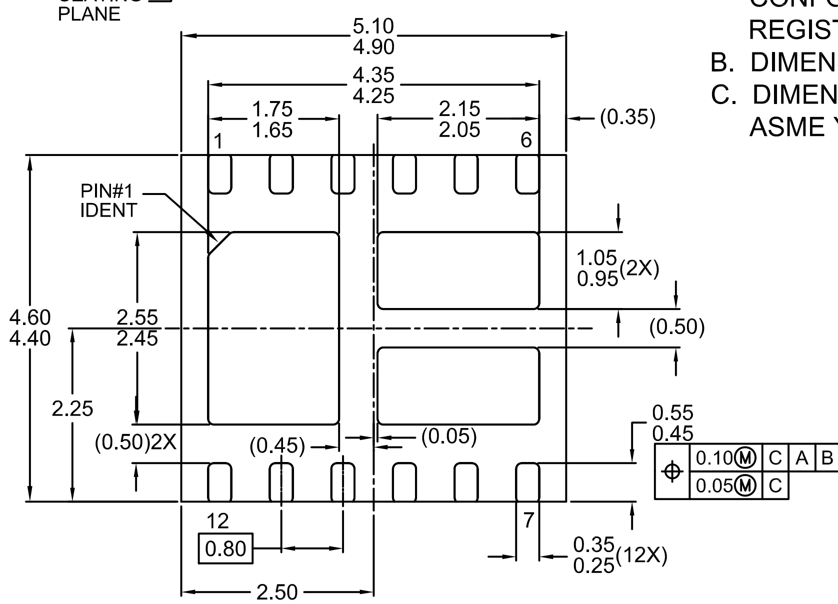


RECOMMENDED LAND PATTERN



SIDE VIEW

NOTES:
A. THIS MKT. DWG. DOES NOT FULLY CONFORM TO JEDEC MO-229 REGISTRATION
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.



BOTTOM VIEW

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DESCRIPTION:	WDFN12 5X4.5, 0.8P	PAGE 1 OF 1

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