MOSFET – Single N-Channel, POWERTRENCH®

30 V, 9.0 A, 21 mΩ

FDMA7672

General Description

This device has been designed to provide maximum efficiency and thermal performance for synchronous buck converters. The low $R_{DS(on)}$ and gate charge provide excellent switching performance.

Features

- Max $R_{DS(on)}$ = 21 mΩ @ V_{GS} = 10 V, I_D = 9.0 A
- Max $R_{DS(on)}$ = 32 mΩ @ V_{GS} = 4.5 V, I_D = 7 A
- Low Profile – 0.8 mm Maximum – in the New Package MicroFET™ 2x2 mm
- This Device is Pb−Free, Halide Free and RoHS Compliant
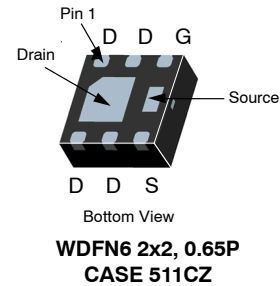
Applications

- DC−DC Buck Converters

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

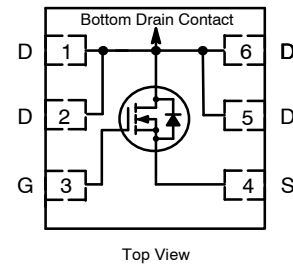| Symbol	Parameter	Value	Unit
V_{DSS}	Drain to Source Voltage	30	V
V_{GSS}	Gate to Source Voltage	±20	V
I_D	Drain Current − Continuous (Note 1a) T_A = 25°C − Pulsed	9 24	A
P_D	Power Dissipation (Note 1a) T_A = 25°C Power Dissipation (Note 1b) T_A = 25°C	2.4 0.9	W
T_J, T_{STG}	Operating and Storage Junction 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.
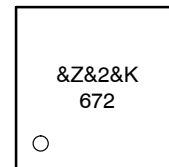
THERMAL CHARACTERISTICS

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	6.9	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	52	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1b)	145	

WDFN6 2x2, 0.65P
CASE 511CZ

Pin 1
Drain
D D G
Source
D D S
Bottom View

PIN CONNECTIONS

Bottom Drain Contact

D	1		6	D
D	2		5	D
G	3		4	S

Top View

MARKING DIAGRAM

&Z&2&K
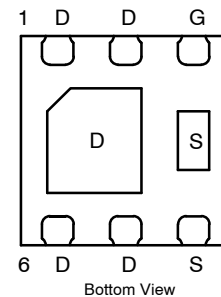672

&Z = Assembly Plant Code
&2 = 2−Digit Date Code (Year and Week)
&K = 2−Digit Lot Run Code
672 = Specific Device Code

PIN ASSIGNMENT

1   D   D   G

D   S

6   D   D   S

Bottom View

ORDERING INFORMATION

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

FDMA7672

ELECTRICAL CHARACTERISTICS $T_A = 25°C$ unless otherwise noted.

| Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\ \mu A$, $V_{GS} = 0\ V$	30	–	–	V
$\dfrac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu A$, Referenced to 25°C	–	16	–	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	$V_{GS} = \pm20\ V$, $V_{DS} = 0\ V$	–	–	100	nA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\ \mu A$	1.0	2.1	3.0	V
$\dfrac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250\ \mu A$, Referenced to 25°C	–	–6	–	mV/°C
$R_{DS(on)}$	Static Drain to Source On−Resistance	$V_{GS} = 10\ V$, $I_D = 9.0\ A$	–	14	21	$m\Omega$
		$V_{GS} = 4.5\ V$, $I_D = 7\ A$	–	20	32	
		$V_{GS} = 10\ V$, $I_D = 9\ A$, $T_J = 125°C$	–	19	28	
g_{FS}	Forward Transconductance	$V_{DS} = 5\ V$, $I_D = 9.0\ A$	–	35	–	S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	$V_{DS} = 15\ V$, $V_{GS} = 0\ V$, f = 1.0 MHz	–	570	760	pF
C_{oss}	Output Capacitance		–	195	260	
C_{rss}	Reverse Transfer Capacitance		–	25	40	
R_G	Gate Resistance		–	1.5	–	Ω
SWITCHING CHARACTERISTICS						
$t_{d(on)}$	Turn−On Delay Time	$V_{DD} = 15\ V$, $I_D = 9.0\ A$, $V_{GS} = 10\ V$, $R_{GEN} = 6\ \Omega$	–	6	12	ns
t_r	Rise Time		–	2	10	
$t_{d(off)}$	Turn−Off Delay Time		–	14	25	
t_f	Fall Time		–	2	10	
Q_g	Total Gate Charge	$V_{GS} = 0\ V$ to $10\ V$, $V_{DD} = 15\ V$, $I_D = 9.0\ A$	–	9.3	13	nC
		$V_{GS} = 0\ V$ to $4.5\ V$, $V_{DD} = 15\ V$, $I_D = 9.0\ A$	–	4.4	6	
Q_{gs}	Gate to Source Gate Charge	$V_{DD} = 15\ V$, $I_D = 9.0\ A$	–	1.9	–	
Q_{gd}	Gate to Drain "Miller" Charge		–	1.5	–	
DRAIN−SOURCE DIODE CHARACTERISTICS						
I_S	Maximum Continuous Drain−Source Diode Forward Current				2	A
V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0\ V$, $I_S = 2.0\ A$ (Note 2)	–	0.8	1.2	V
t_{rr}	Reverse Recovery Time	$I_F = 9.0\ A$, di/dt = 100 A/μs	–	18	32	ns
Q_{rr}	Reverse Recovery Charge		–	5	10	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.

NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 in² 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 $R_{\theta JA}$ is determined by the user's board design.

a) 52°C/W when mounted on a 1 in² pad of 2 oz. copper.
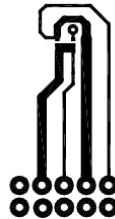
b) 145°C/W when mounted on a minimum pad of 2 oz copper.

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

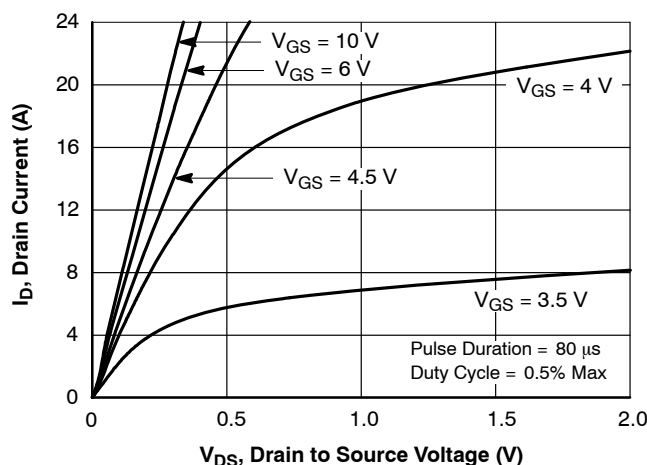**TYPICAL CHARACTERISTICS** (T_J = 25°C unless otherwise noted)
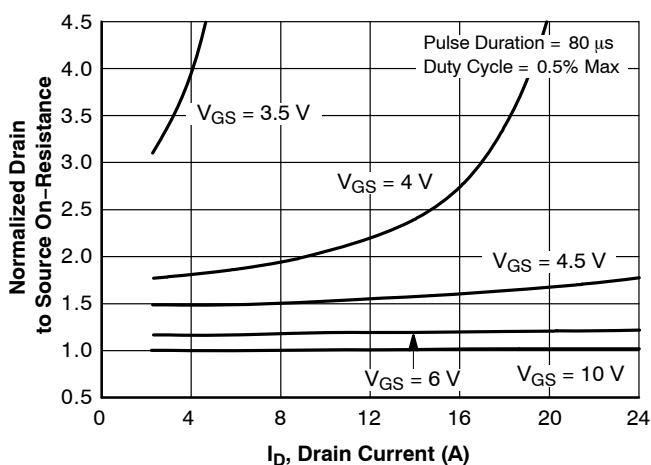

Figure 1. On−Region Characteristics

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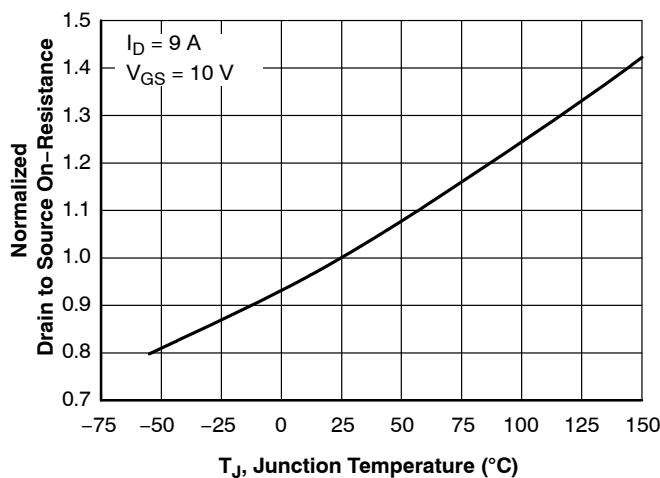vs. Drain Current and Gate Voltage

Figure 3. Normalized On−Resistance
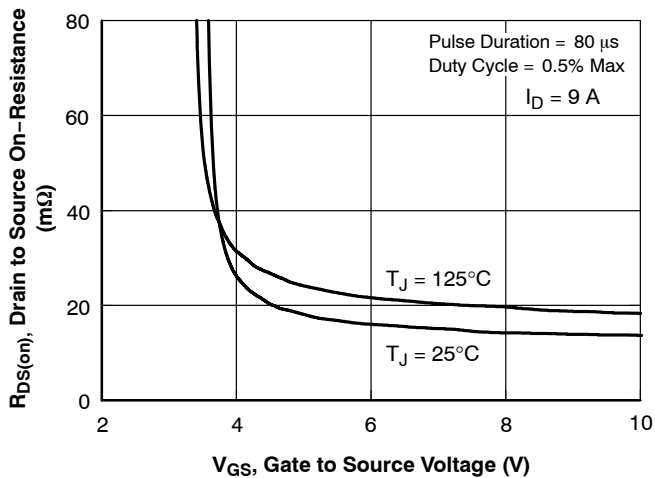vs. Junction Temperature

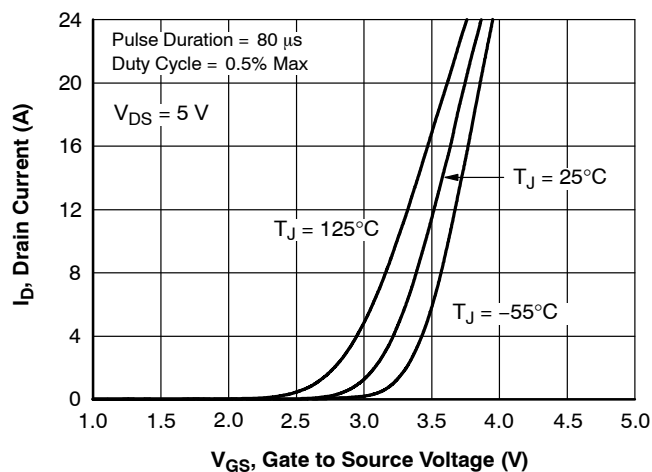
Figure 4. On−Resistance vs. Gate to
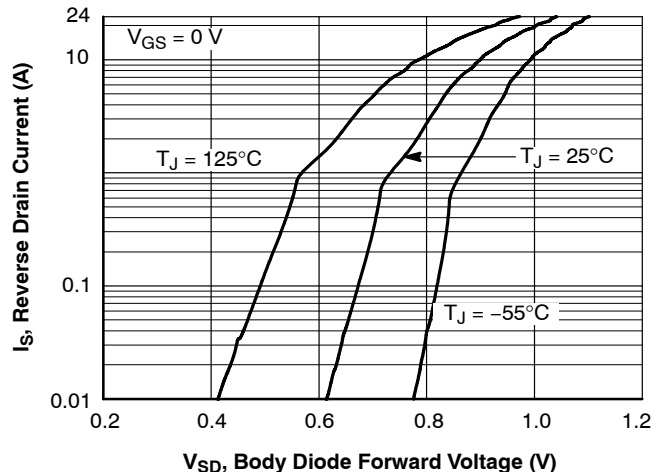Source Voltage

Figure 5. Transfer Characteristics

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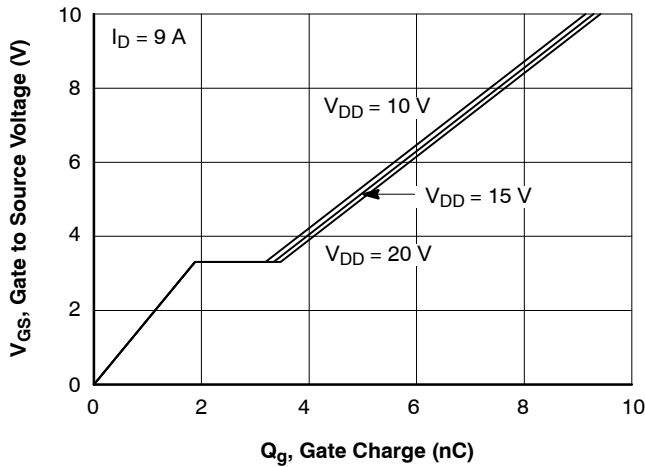Forward Voltage vs. Source Current

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

Figure 9. Gate Charge Characteristics
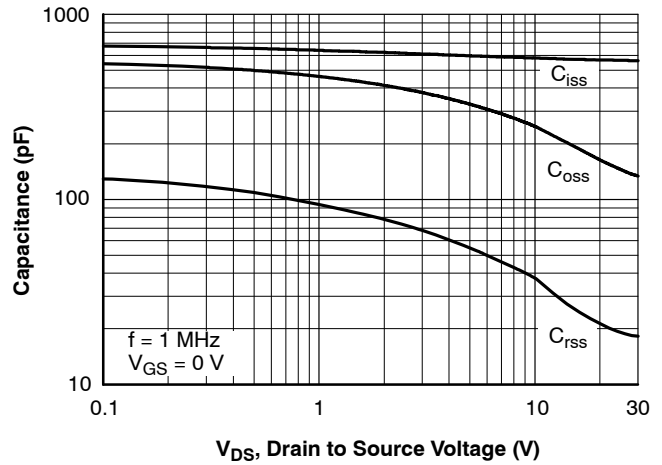
Figure 10. Capacitance vs. Drain to Source Voltage
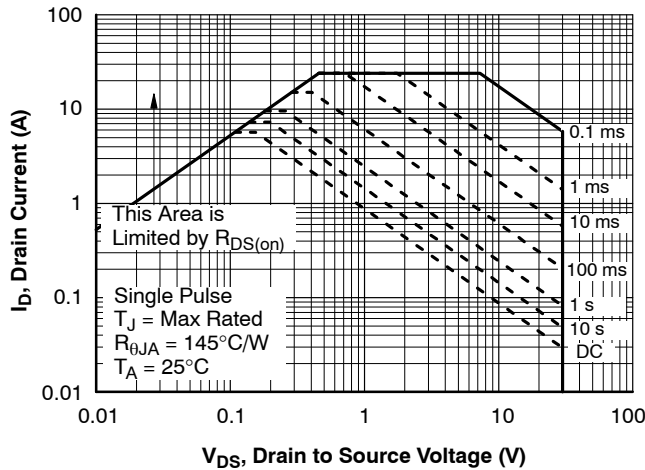
Figure 7. Forward Bias Safe Operating Area
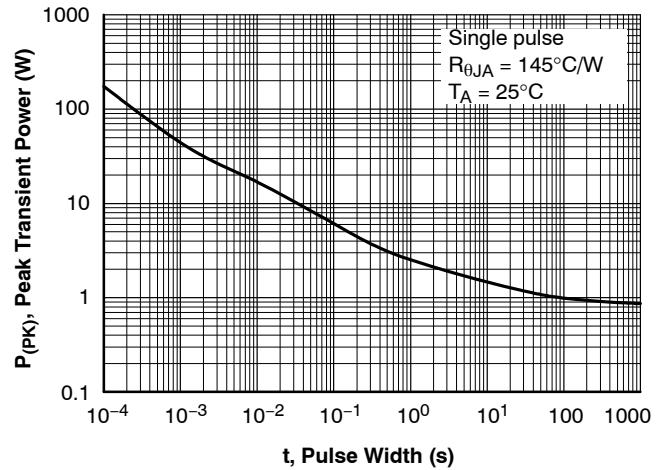
Figure 8. Single Pulse Maximum Power Dissipation

NOTES:
Duty Factor: $D = t_1/t_2$
Peak $T_J = P_{DM} \times Z_{\theta JA} \times R_{\theta JA} + T_A$
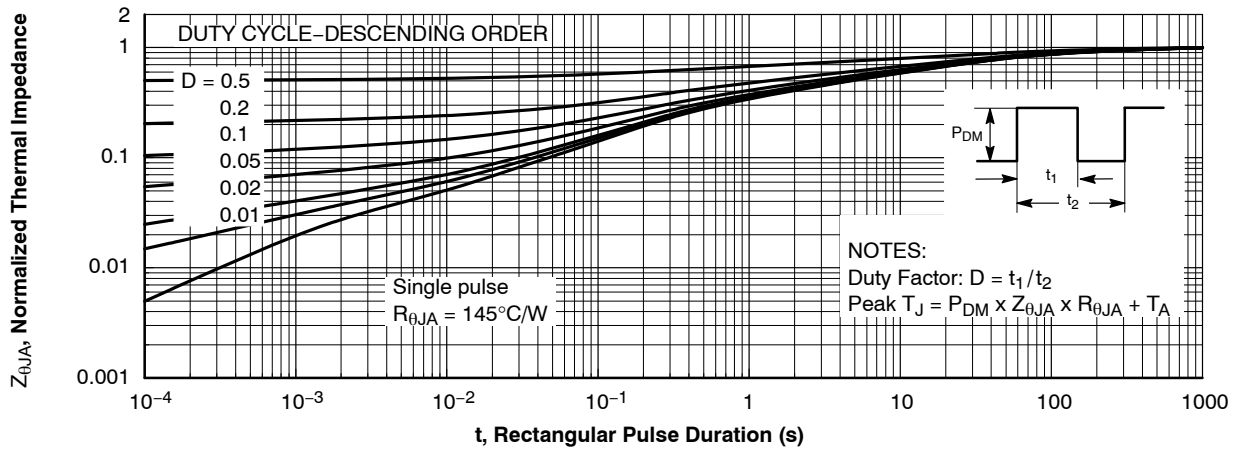
Figure 11. Transient Thermal Response Curve

FDMA7672

ORDERING INFORMATION

Device	Device Marking	Package Type	Reel Size	Tape Width	Shipping[†]
FDMA7672	672	WDFN6 2x2, 0.65P (Pb−Free / Halide Free)	7"	8 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.

WDFN6 2x2, 0.65P
CASE 511CZ
ISSUE O

DATE 31 JUL 2016

TOP VIEW

PIN#1 IDENT

2X

2.0

2.0

0.05 C

0.05 C

A

B

C

SIDE VIEW

SEATING PLANE

0.10 C

0.75±0.05

0.20±0.05

0.08 C

0.025±0.025

C

BOTTOM VIEW

PIN #1 IDENT

2.00±0.05

(0.15)

0.90±0.05

(0.50)

0.30±0.05

(0.20)4X

0.28±0.05
(6X)

0.56±0.05

1.00±0.05

(0.50)

2.00±0.05

0.65

1.30

0.30±0.05 (6X)

0.10 (M) C A B
0.05 (M) C

RECOMMENDED
LAND PATTERN OPT 1

1.70

1.00

(0.20)

No Traces allowed in this Area

1.05

0.47(6X)

2.30

0.65

0.40(6X)

RECOMMENDED
LAND PATTERN OPT 2

1.70

0.45

1.00

(0.20)

1.05

0.66

0.47(6X)

2.30

0.65

0.40(7X)
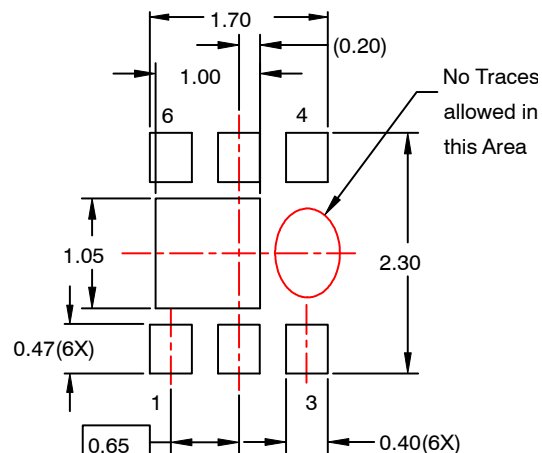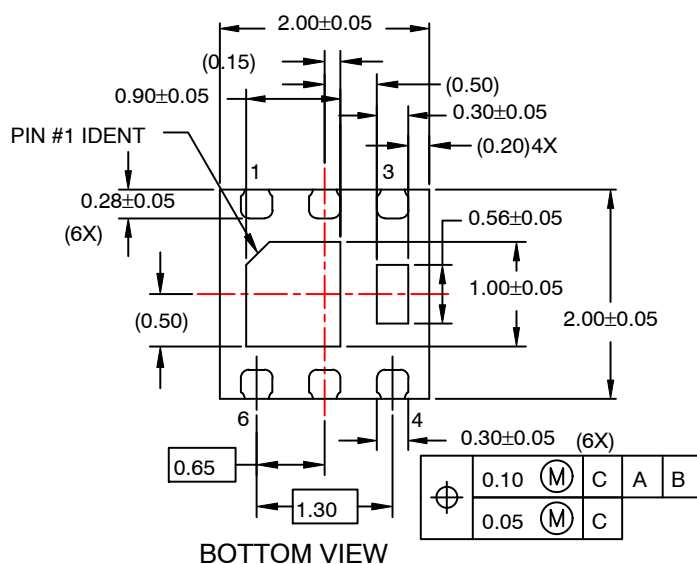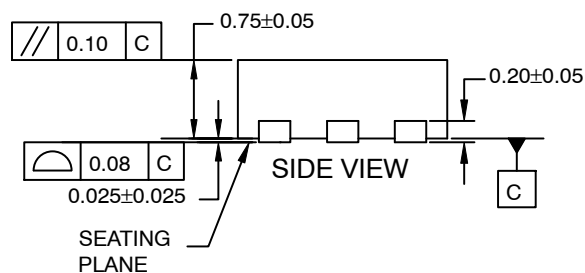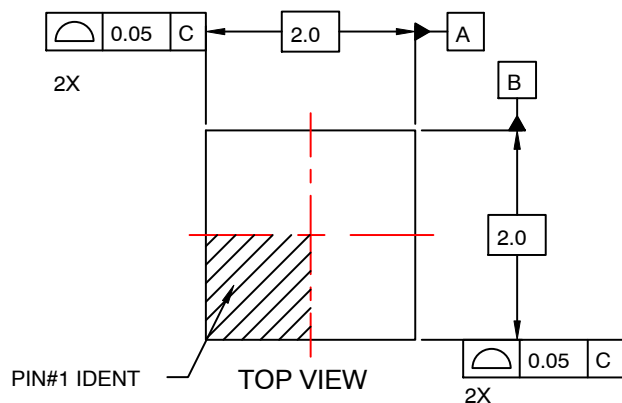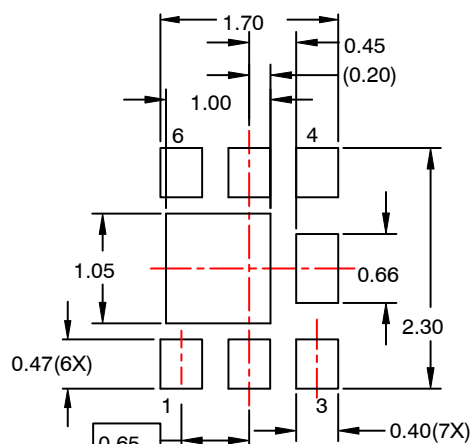
NOTES:

A. PACKAGE DOES NOT FULLY CONFORM TO JEDEC MO–229 REGISTRATION

B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009.

D. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.

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DESCRIPTION:	WDFN6 2X2, 0.65P		PAGE 1 OF 1

ADDITIONAL INFORMATION

◊

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    [FDMA7672](#)