MOSFET – Single, N-Channel, POWERTRENCH®

30 V, 11 A, 13 mΩ

FDMA7630

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 $R_{DS(on)}$ = 13 mΩ at V_{GS} = 10 V, I_D = 11 A
- Max $R_{DS(on)}$ = 20 mΩ at V_{GS} = 4.5 V, I_D = 9 A
- Low Profile – 0.8 mm Maximum – in the New Package MicroFET™ 2x2 mm
- Free from halogenated compounds and antimony oxides
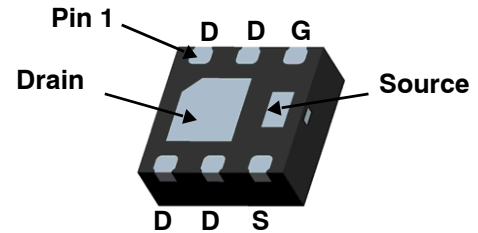- These Devices is Pb−Free, Halide Free and is RoHS Compliant

Typical Applications

- DC–DC Buck Converters

MicroFET 2X2 (Bottom View)

WDFN6 2X2, 0.65P
CASE 511CZ

Bottom Drain Contact

MARKING DIAGRAM

&Z&2&K
630
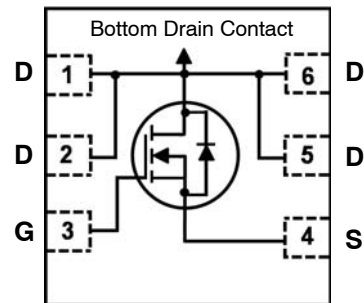
&Z = Assembly Plant Code
&2 = Date Code (Year & Week)
&K = Lot Traceability Code
630 = Specific Device Code

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 T_A = 25°C (Note 1a) – Pulsed	11 24	A
P_D	Power Dissipation T_A = 25°C (Note 1)	24	W
	Power Dissipation T_A = 25°C (Note 1)	0.9	
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.
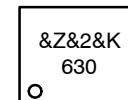
ORDERING INFORMATION

Device	Package	Shipping†
FDMA7630	WDFN−6 (Pb−Free)	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.

THERMAL CHARACTERISTICS

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

ELECTRICAL CHARACTERISTICS $T_J = 25°C$ 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	–	15	–	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	$V_{GS} = +/–20\ V$, $V_{DS} = 0\ V$	–	–	100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\ \mu A$	1.0	2.0	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–Source On–Resistance	$V_{GS} = 10\ V$, $I_D = 11\ A$ $V_{GS} = 4.5\ V$, $I_D = 9\ A$, $V_{GS} = 10\ V$, $I_D = 11\ A$, $T_J = 125°C$	– – –	10 14 14	13 20 18	mΩ
g_{FS}	Forward Transconductance	$V_{DS} = 5\ V$, $I_D = 11\ A$		36	–	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 15\ V$, $V_{GS} = 0\ V$, $f = 1.0\ MHz$	–	1020	1360	pF
C_{oss}	Output Capacitance		–	315	415	pF
C_{rss}	Reverse Transfer Capacitance		–	35	55	pF
R_g	Gate Resistance		–	1.7	–	Ω
Switching Characteristics (Note 2)						
$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = 15\ V$, $I_D = 11\ A$, $V_{GS} = 10\ V$, $R_{GEN} = 6\ \Omega$	–	8	15	ns
t_r	Rise Time		–	3	10	ns
$t_{d(off)}$	Turn–Off Delay Time		–	19	34	ns
t_f	Fall Time		–	3	10	ns
Q_g	Total Gate Charge	$V_{GS} = 0\ V$ to $10\ V$ $V_{DD} = 15\ V$, $I_D = 11\ A$	–	16	22	nC
		$V_{GS} = 0\ V$ to $4.5\ V$, $V_{DD} = 15\ V$, $I_D = 11\ A$	–	8	10	nC
Q_{gs}	Gate to Source Gate Charge	$V_{DD} = 15\ V$, $I_D = 11\ A$	–	3.0	–	nC
Q_{gd}	Gate to Drain "Miller" Charge		–	2.2	–	nC
Drain–Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain–Source Diode Forward Current		–	–	2	A
V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0\ V$, $I_S = 2\ A$ (Note 2)	–	0.8	1.2	V
t_{rr}	Reverse Recovery Time	$I_F = 11\ A$, $di/dt = 100\ A/\mu s$	–	21	33	ns
Q_{rr}	Reverse Recovery Charge		–	6	12	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.
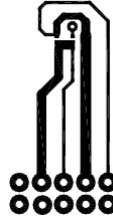
NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 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. 52 °C/W when mounted on a 1 in^2 pad of 2 oz copper.

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

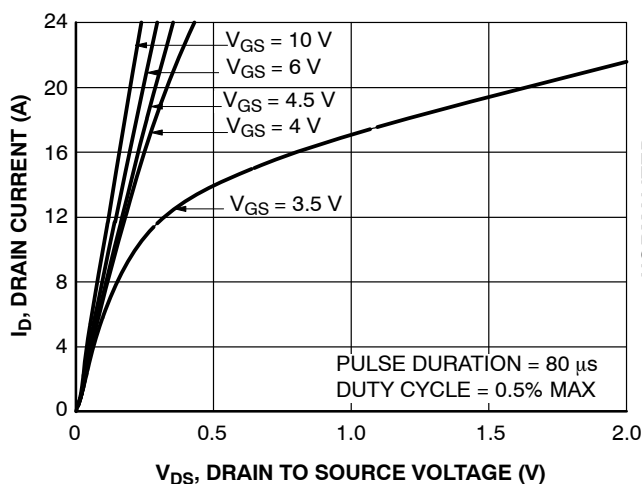2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

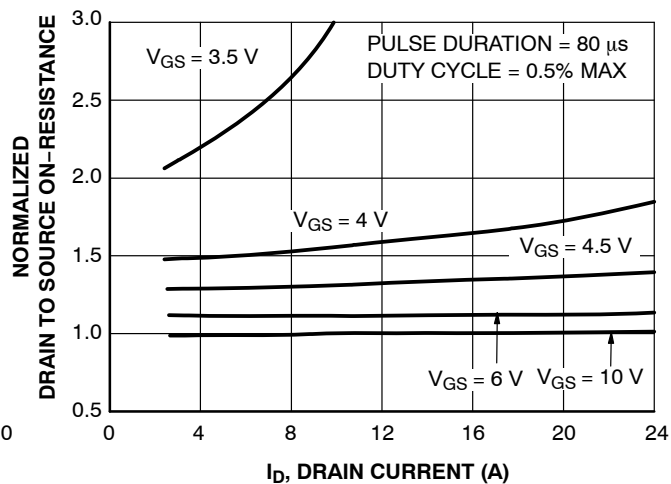## TYPICAL CHARACTERISTICS

Figure 1. On−Region Characteristics

**Figure 2. Normalized On−Resistance vs.
Drain Current and Gate Voltage**
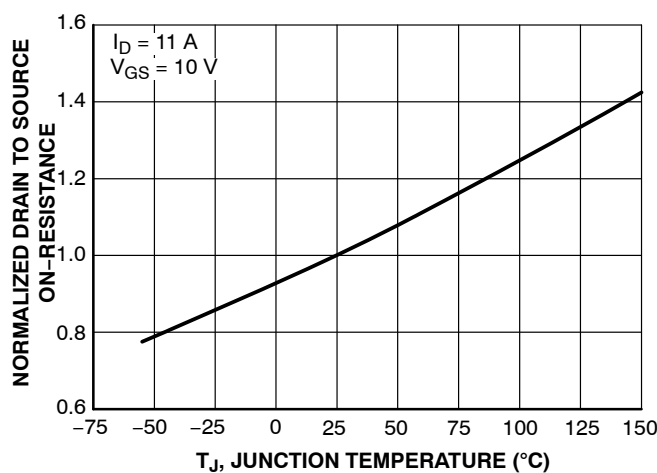
**Figure 3. Normalized On−Resistance vs
Junction Temperature**
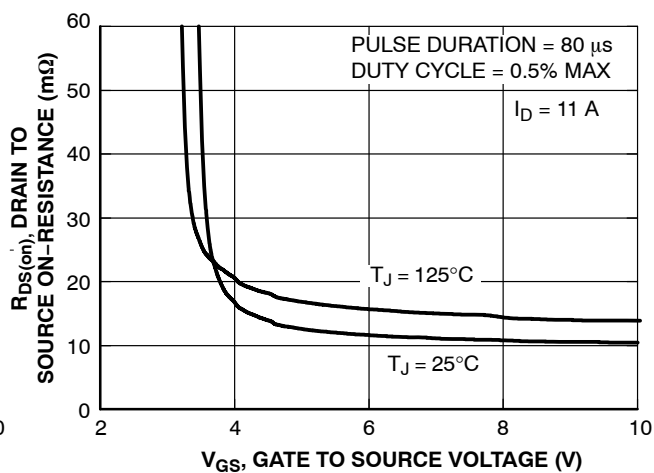
**Figure 4. On−Resistance vs Gate to
Source Voltage**
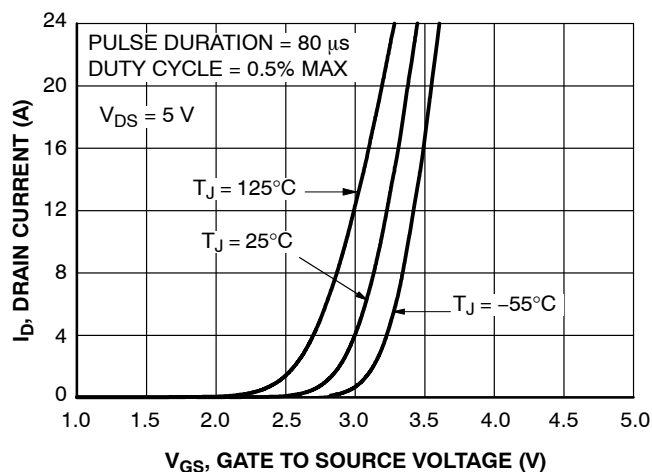
Figure 5. Transfer Characteristics
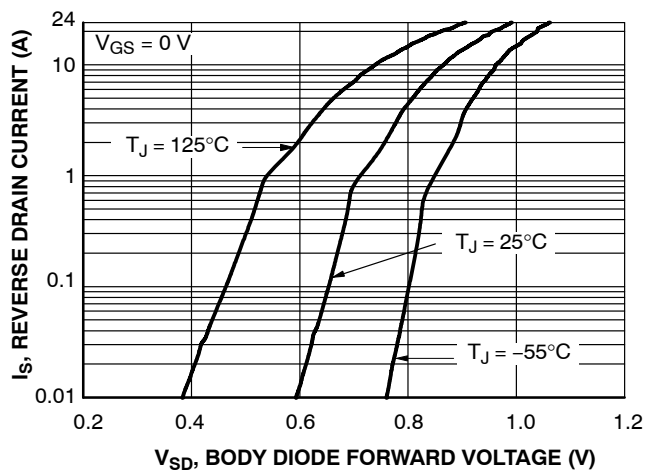
**Figure 6. Source to Drain Diode Forward Voltage vs
Source Current**

TYPICAL CHARACTERISTICS (CONTINUED)
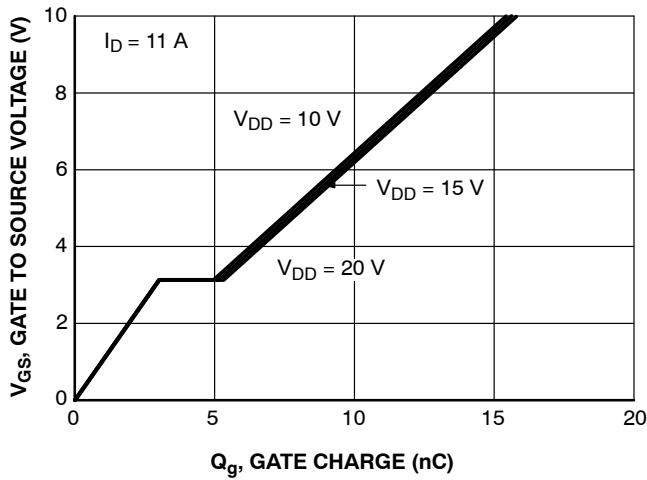
Figure 7. Gate Charge Characteristics
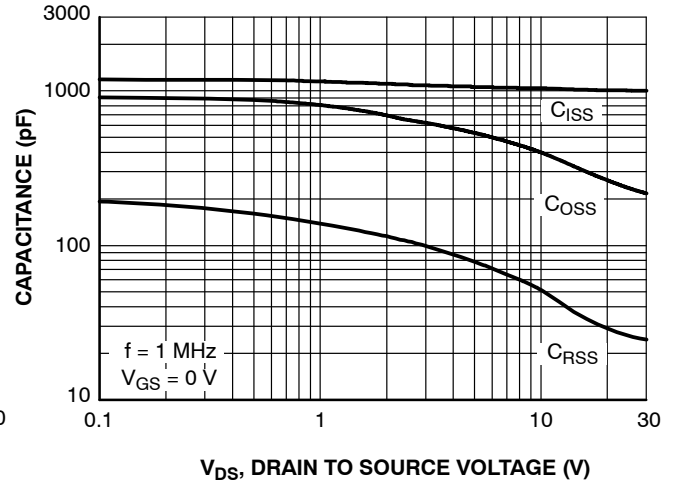
Figure 8. Capacitance vs Drain to Source Voltage
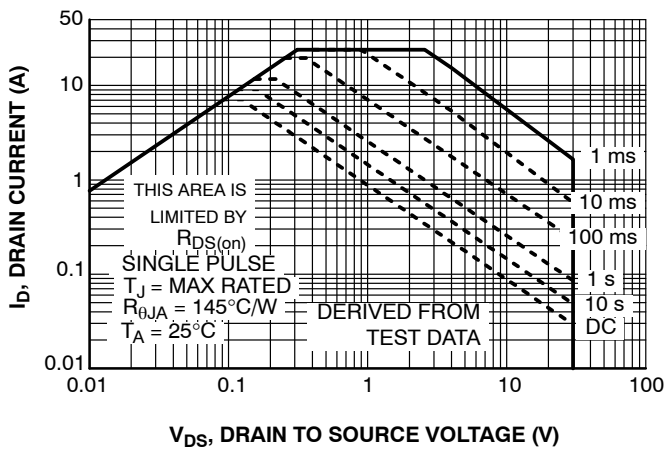
Figure 9. Forward Bias Safe Operating Area
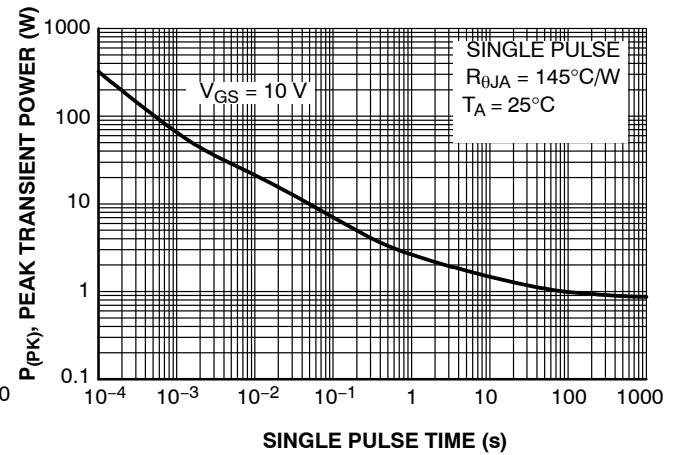
Figure 10. Single Pulse Maximum Power Dissipation
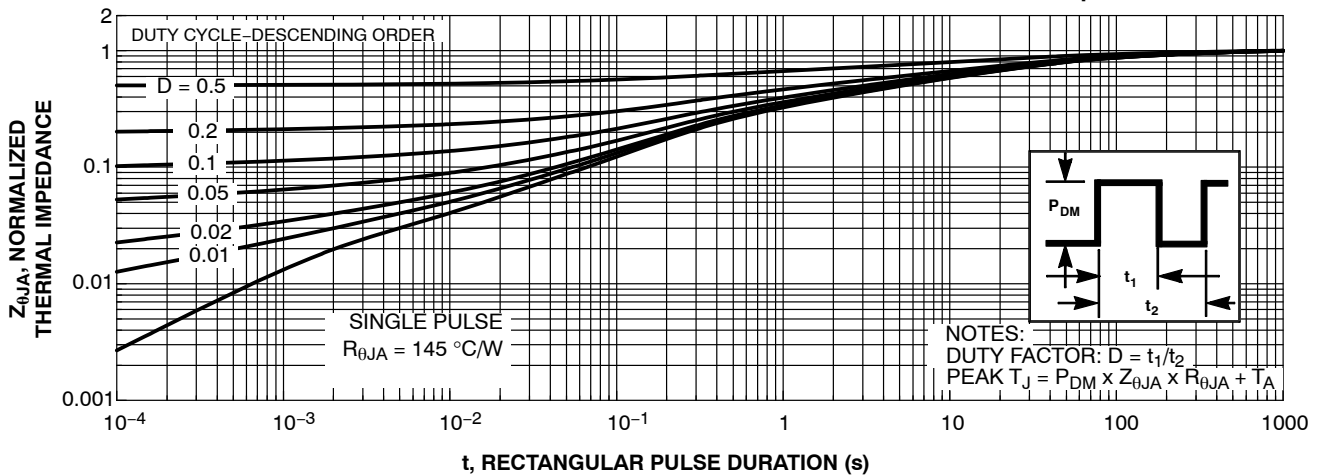
Figure 11. Transient Thermal Response Curve

WDFN6 2x2, 0.65P
CASE 511CZ
ISSUE O

DATE 31 JUL 2016

| ⌒ | 0.05 | C |

2X

2.0

A

B

2.0

| ⌒ | 0.05 | C |

2X

PIN#1 IDENT

TOP VIEW

| // | 0.10 | C |

0.75±0.05

0.20±0.05

| ⌒ | 0.08 | C |

SIDE VIEW

0.025±0.025

C

SEATING
PLANE

2.00±0.05

(0.15)

0.90±0.05

(0.50)

0.30±0.05

PIN #1 IDENT

(0.20)4X

1

3

0.28±0.05

(6X)

0.56±0.05

1.00±0.05

(0.50)

2.00±0.05

6

4

0.30±0.05 (6X)

0.65

| ⊕ | 0.10 Ⓜ | C | A | B |
| | 0.05 Ⓜ | C | | |

1.30

BOTTOM VIEW

RECOMMENDED LAND PATTERN OPT 1

1.70

(0.20)

1.00

No Traces
allowed in
this Area

6

4

1.05

2.30

0.47(6X)

1

3

0.65

0.40(6X)

RECOMMENDED LAND PATTERN OPT 2

1.70

0.45

(0.20)

1.00

6

4

1.05

0.66

2.30

0.47(6X)

1

3

0.65

0.40(7X)
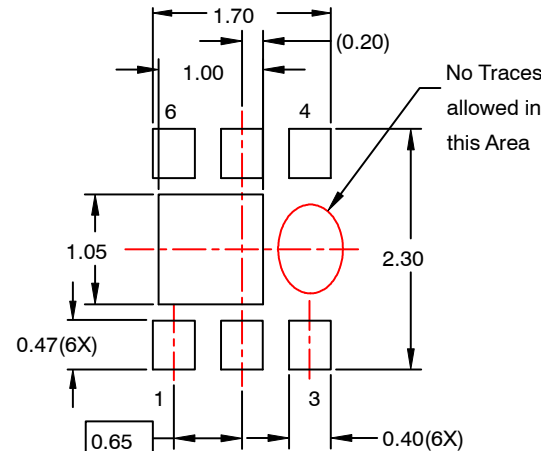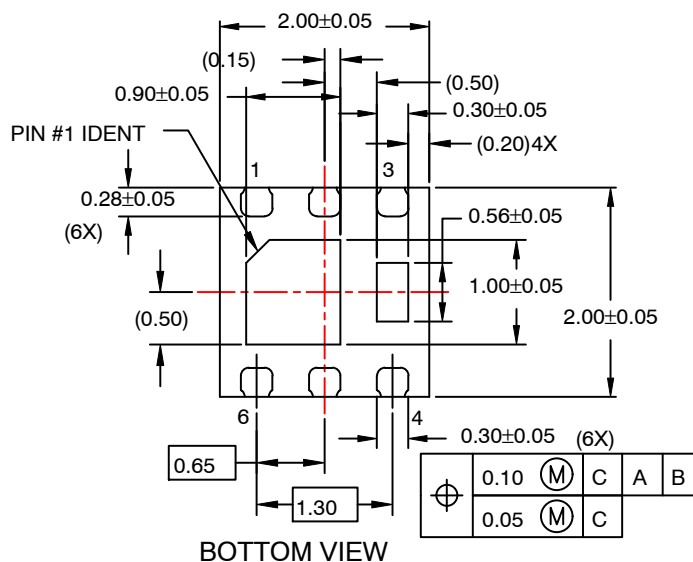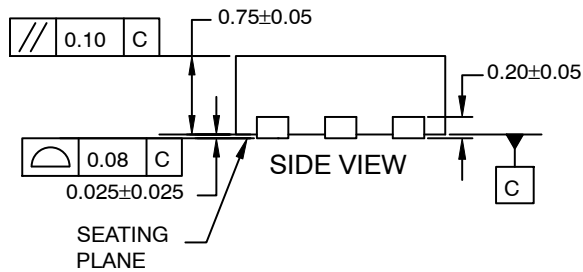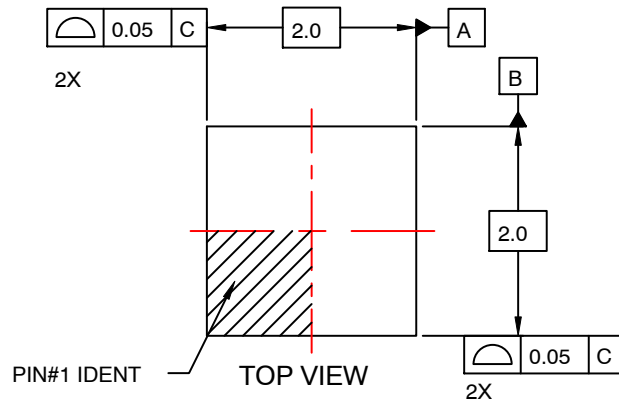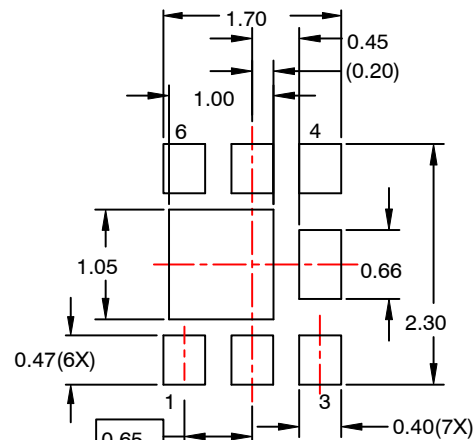
NOTES:

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.

DOCUMENT NUMBER:	98AON13614G	
DESCRIPTION:	WDFN6 2X2, 0.65P	PAGE 1 OF 1

ADDITIONAL INFORMATION

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