

# 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

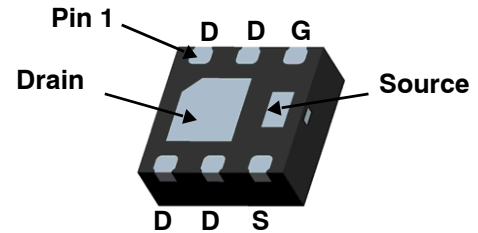
### Typical Applications

- DC–DC Buck Converters

### ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$ unless otherwise noted

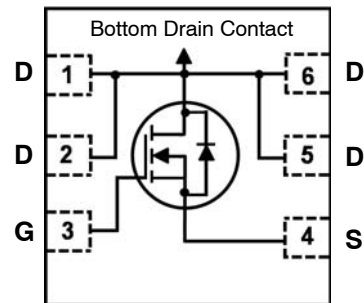
Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain to Source Voltage	30	V
$V_{GSS}$	Gate to Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous $T_A = 25^\circ\text{C}$ (Note 1a) – Pulsed	11 24	A
$P_D$	Power Dissipation $T_A = 25^\circ\text{C}$ (Note 1) Power Dissipation $T_A = 25^\circ\text{C}$ (Note 1)	24 0.9	W
$T_J, T_{stg}$	Operating and Storage Junction Temperature Range	$-55$ to $+150$	$^\circ\text{C}$

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.

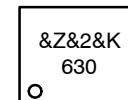


MicroFET 2X2 (Bottom View)

WDFN6 2X2, 0.65P  
CASE 511CZ



MARKING DIAGRAM



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

### 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](http://www.onsemi.com/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  $T_J = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain to Source Breakdown Voltage	$I_D = 250\ \mu\text{A}$ , $V_{GS} = 0\ \text{V}$	30	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$	–	15	–	mV/°C
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 24\ \text{V}$ , $V_{GS} = 0\ \text{V}$	–	–	1	$\mu\text{A}$
$I_{GSS}$	Gate to Source Leakage Current	$V_{GS} = \pm 20\ \text{V}$ , $V_{DS} = 0\ \text{V}$	–	–	100	nA

## On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$ , $I_D = 250\ \mu\text{A}$	1.0	2.0	3.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$	–	–6	–	mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = 10\ \text{V}$ , $I_D = 11\ \text{A}$ $V_{GS} = 4.5\ \text{V}$ , $I_D = 9\ \text{A}$ , $V_{GS} = 10\ \text{V}$ , $I_D = 11\ \text{A}$ , $T_J = 125^\circ\text{C}$	–	10 14 14	13 20 18	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5\ \text{V}$ , $I_D = 11\ \text{A}$	–	36	–	S

## Dynamic Characteristics

$C_{iss}$	Input Capacitance	$V_{DS} = 15\ \text{V}$ , $V_{GS} = 0\ \text{V}$ , $f = 1.0\ \text{MHz}$	–	1020	1360	pF
$C_{oss}$	Output Capacitance		–	315	415	pF
$C_{rss}$	Reverse Transfer Capacitance		–	35	55	pF
$R_g$	Gate Resistance		–	1.7	–	$\Omega$

## Switching Characteristics (Note 2)

$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = 15\ \text{V}$ , $I_D = 11\ \text{A}$ , $V_{GS} = 10\ \text{V}$ , $R_{GEN} = 6\ \Omega$	–	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	$V_{GS} = 0\ \text{V}$ to $10\ \text{V}$ , $V_{DD} = 15\ \text{V}$ , $I_D = 11\ \text{A}$	–	16	22	nC
		$V_{GS} = 0\ \text{V}$ to $4.5\ \text{V}$ , $V_{DD} = 15\ \text{V}$ , $I_D = 11\ \text{A}$	–	8	10	nC
$Q_{gs}$	Gate to Source Gate Charge	$V_{DD} = 15\ \text{V}$ , $I_D = 11\ \text{A}$	–	3.0	–	nC
$Q_{gd}$	Gate to Drain “Miller” Charge		–	2.2	–	nC

## Drain–Source Diode Characteristics and Maximum Ratings

I <sub>S</sub>	Maximum Continuous Drain–Source Diode Forward Current		–	–	2	A
V <sub>SD</sub>	Source to Drain Diode Forward Voltage	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 2 A (Note 2)	–	0.8	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 11 A, di/dt = 100 A/μs	–	21	33	ns
Q <sub>rr</sub>	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.

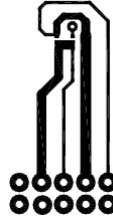
## FDMA7630

### NOTES:

1.  $R_{\theta JA}$  is determined with the device mounted on a 1 in<sup>2</sup> 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<sup>2</sup> pad of 2 oz copper.



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

2. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

## TYPICAL CHARACTERISTICS

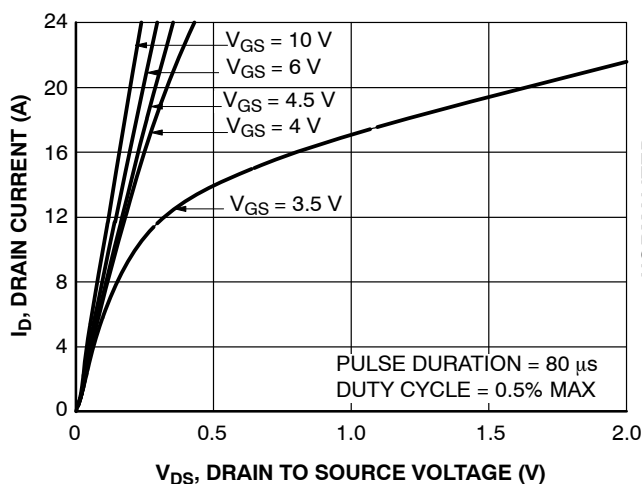


Figure 1. On-Region Characteristics

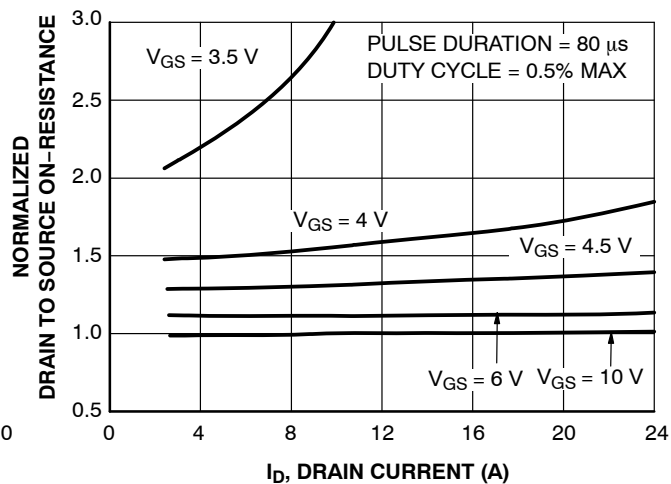


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

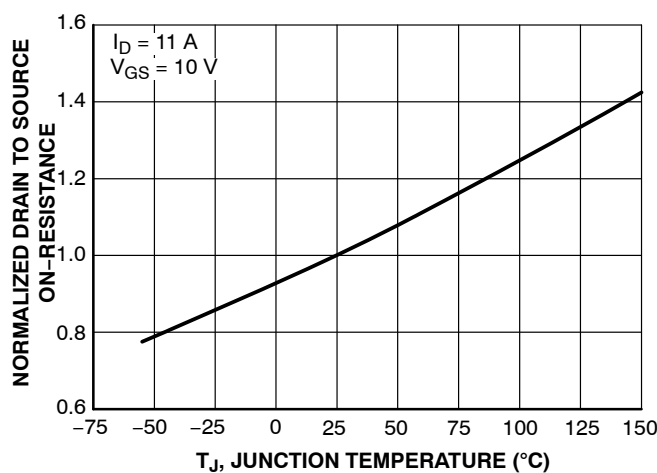


Figure 3. Normalized On-Resistance vs. Junction Temperature

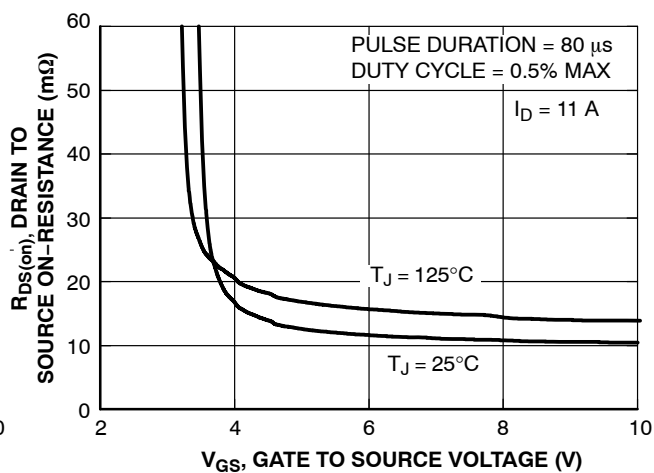


Figure 4. On-Resistance vs. Gate to Source Voltage

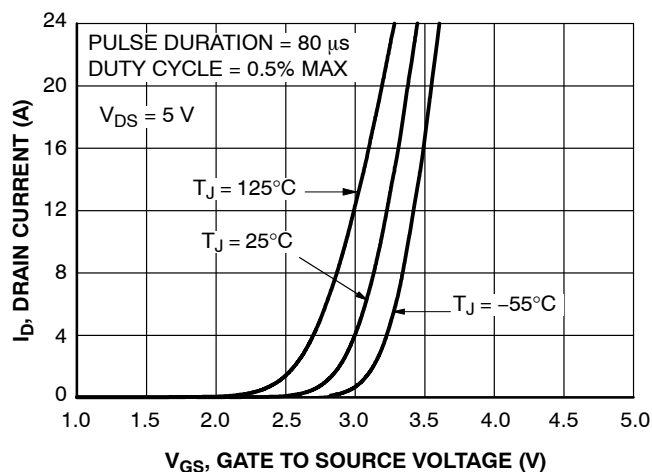


Figure 5. Transfer Characteristics

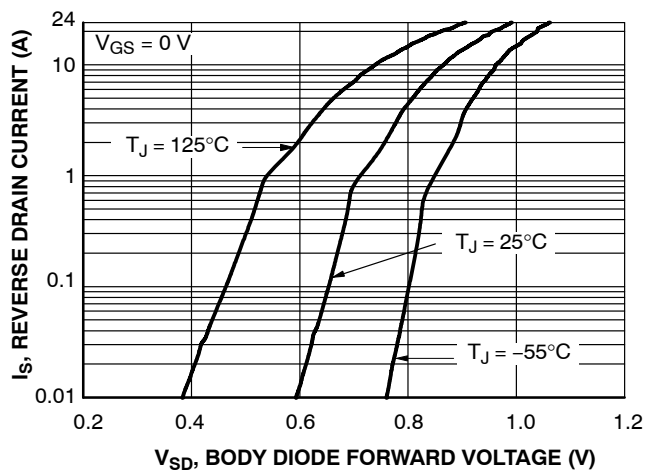


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

## TYPICAL CHARACTERISTICS (CONTINUED)

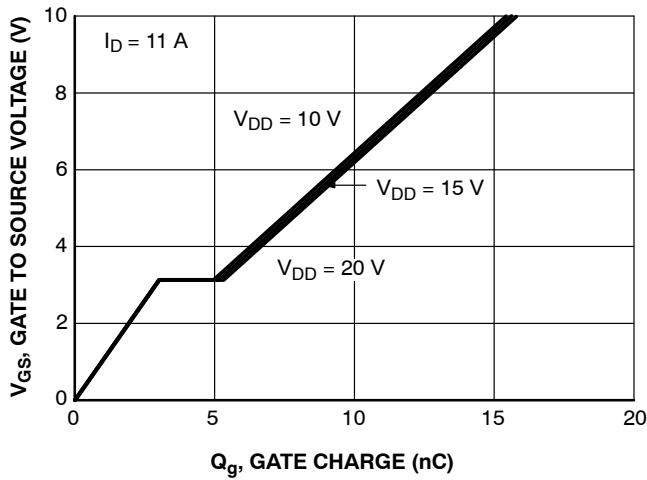


Figure 7. Gate Charge Characteristics

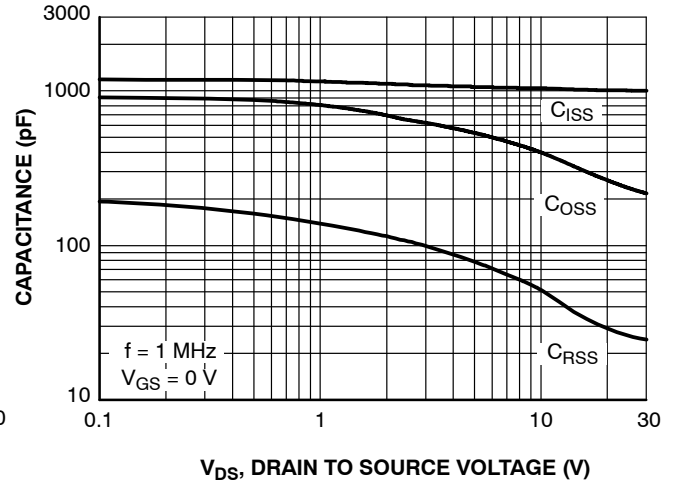


Figure 8. Capacitance vs Drain to Source Voltage

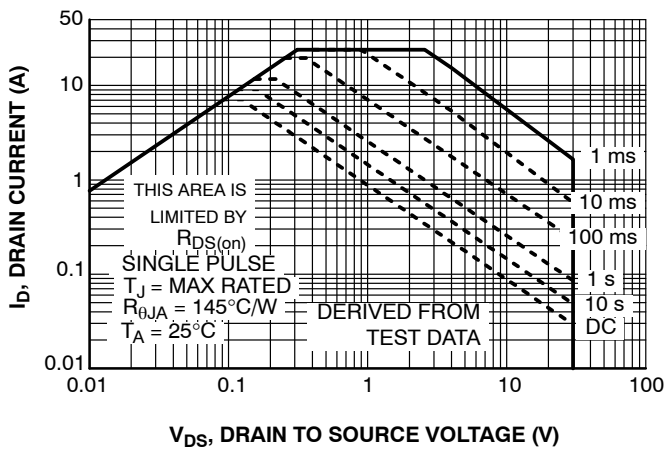


Figure 9. Forward Bias Safe Operating Area

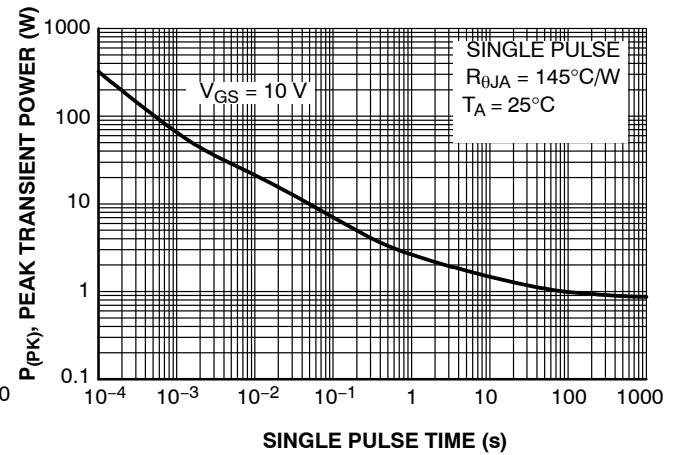


Figure 10. Single Pulse Maximum Power Dissipation

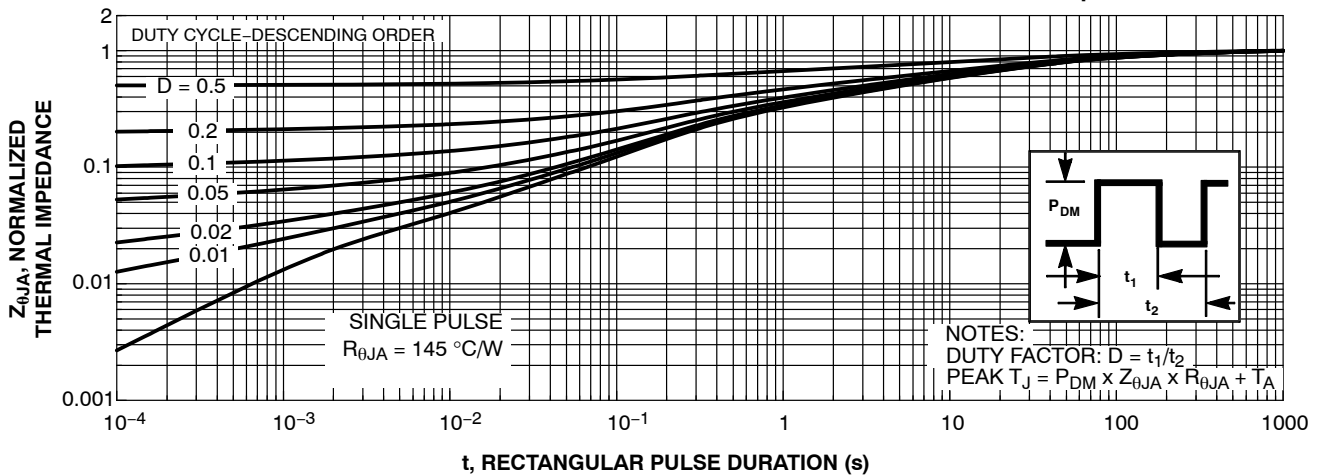
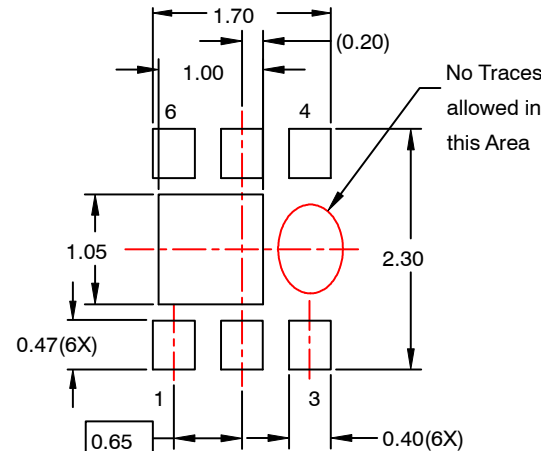
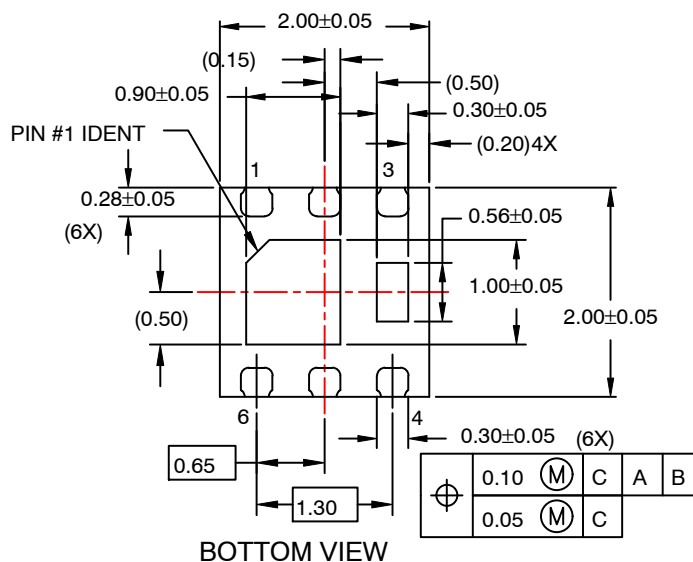
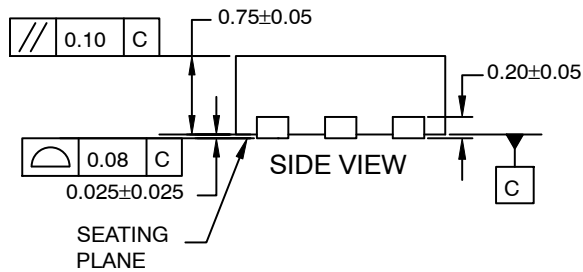
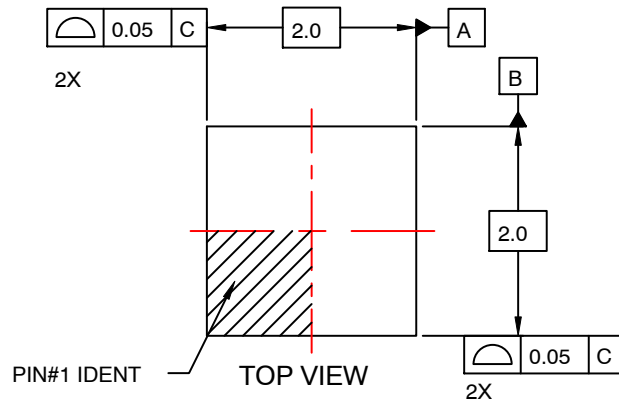


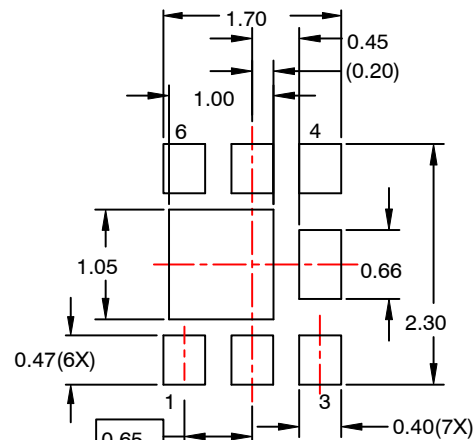
Figure 11. Transient Thermal Response Curve

**WDFN6 2x2, 0.65P**  
**CASE 511CZ**  
**ISSUE O**

DATE 31 JUL 2016



**RECOMMENDED**  
**LAND PATTERN OPT 1**



**RECOMMENDED**  
**LAND PATTERN OPT 2**

**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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