NTLUD4C26N

Power MOSFET

30 V, 7.3 A, Dual N−Channel, 2.0x2.0x0.55 mm μCool™ UDFN6 Package

Features

- UDFN Package with Exposed Drain Pads for Excellent Thermal Conduction
- Low Profile UDFN 2.0 x 2.0 x 0.55 mm for Board Space Saving
- Ultra Low $R_{DS(on)}$
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Power Load Switch
- Wireless Charging
- DC−DC Converters

MAXIMUM RATINGS (T_J = 25°C unless otherwise stated)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	30	V
Gate-to-Source Voltage			V_{GS}	±12	V
Continuous Drain Current (Note 1)	Steady State	T_A = 25°C	I_D	7.3	A
		T_A = 85°C		5.3	
	t ≤ 5 s	T_A = 25°C		9.1	
Power Dissipation (Note 1)	Steady State	T_A = 25°C	P_D	1.70	W
	t ≤ 5 s	T_A = 25°C		2.63	
Continuous Drain Current (Note 2)	Steady State	T_A = 25°C	I_D	4.8	A
		T_A = 85°C		3.4	
Power Dissipation (Note 2)		T_A = 25°C	P_D	0.72	W
Pulsed Drain Current		t_p = 10 μs	I_{DM}	22	A
MOSFET Operating Junction and Storage Temperature			T_J, T_{STG}	-55 to 150	°C
Source Current (Body Diode) (Note 1)			I_S	3.0	A
Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)			T_L	260	°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.

1. Surface Mounted on FR4 Board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).
2. Surface-mounted on FR4 board using the minimum recommended pad size, 2 oz. Cu.

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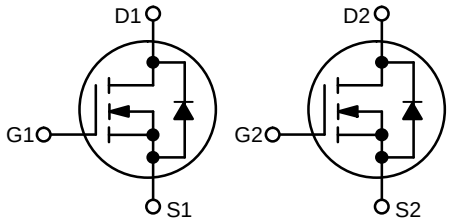
MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
30 V	21 mΩ @ 10 V	7.3 A
	24 mΩ @ 4.5 V	
	26 mΩ @ 3.7 V	
	28 mΩ @ 3.3 V	
	36 mΩ @ 2.5 V	
	65 mΩ @ 1.8 V	



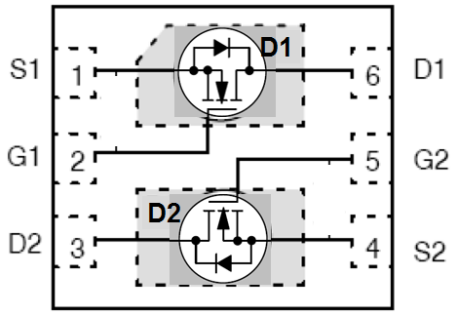
Dual N−Channel MOSFET

MARKING DIAGRAM

UDFN6
CASE 517BF
μCOOL™

AC = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)



(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information on page 3 of this data sheet.

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	73.6	°C/W
Junction-to-Ambient – t ≤ 5 s (Note 3)	$R_{\theta JA}$	47.6	
Junction-to-Ambient – Steady State min Pad (Note 4)	$R_{\theta JA}$	174.4	

3. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).
4. Surface-mounted on FR4 board using the minimum recommended pad size, 2 oz. Cu.

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

Parameter	Symbol	Test Condition		Min	Typ	Max	Units
OFF CHARACTERISTICS							
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA		30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 250 μA, ref to 25°C			7		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 24 V	T_J = 25°C			1	μA
			T_J = 125°C			10	
Gate-to-Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±12 V				±100	nA
ON CHARACTERISTICS (Note 5)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250 μA		0.6		1.1	V
Negative Threshold Temp. Coefficient	$V_{GS(TH)}/T_J$				2.8		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 6.0 A			17.5	21	mΩ
		V_{GS} = 4.5 V, I_D = 5.0 A			20	24	
		V_{GS} = 3.7 V, I_D = 3.0 A			21	26	
		V_{GS} = 3.3 V, I_D = 3.0 A			22	28	
		V_{GS} = 2.5 V, I_D = 2.0 A			25	36	
		V_{GS} = 1.8 V, I_D = 1.0 A			40	65	
Forward Transconductance	g_{FS}	V_{DS} = 1.5 V, I_D = 5.0 A			23		S
CHARGES, CAPACITANCES & GATE RESISTANCE							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 15 V			460		pF
Output Capacitance	C_{OSS}				225		
Reverse Transfer Capacitance	C_{RSS}				27		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 15 V; I_D = 5.0 A			5.5		nC
Threshold Gate Charge	$Q_{G(TH)}$				0.55		
Gate-to-Source Charge	Q_{GS}				2.5		
Gate-to-Drain Charge	Q_{GD}				1.1		
SWITCHING CHARACTERISTICS, V_{GS} = 4.5 V (Note 6)							
Turn-On Delay Time	$t_{d(ON)}$	V_{GS} = 4.5 V, V_{DD} = 15 V, I_D = 5.0 A, R_G = 1 Ω			5		ns
Rise Time	t_r				15		
Turn-Off Delay Time	$t_{d(OFF)}$				13		
Fall Time	t_f				1.7		
DRAIN-SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 2.0 A	T_J = 25°C		0.7	1.0	V
			T_J = 125°C		0.6		

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.

5. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
6. Switching characteristics are independent of operating junction temperatures.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
DRAIN-SOURCE DIODE CHARACTERISTICS						
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dIs/dt = 100 A/μs, I_S = 2.0 A		18.5		ns
Charge Time	t_a			9.3		
Discharge Time	t_b			9.1		
Reverse Recovery Charge	Q_{RR}			7.8		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.

5. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
6. Switching characteristics are independent of operating junction temperatures.

DEVICE ORDERING INFORMATION

Device	Package	Shipping†
NTLUD4C26NTAG	UDFN6 (Pb−Free)	3000 / Tape & Reel
NTLUD4C26NTBG	UDFN6 (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.

TYPICAL CHARACTERISTICS

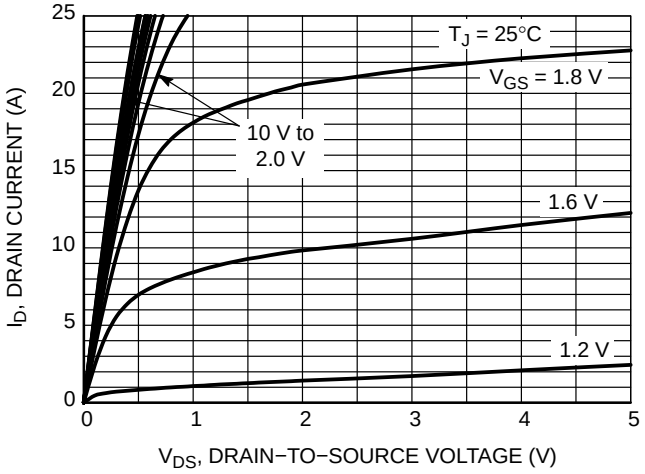


Figure 1. On−Region Characteristics

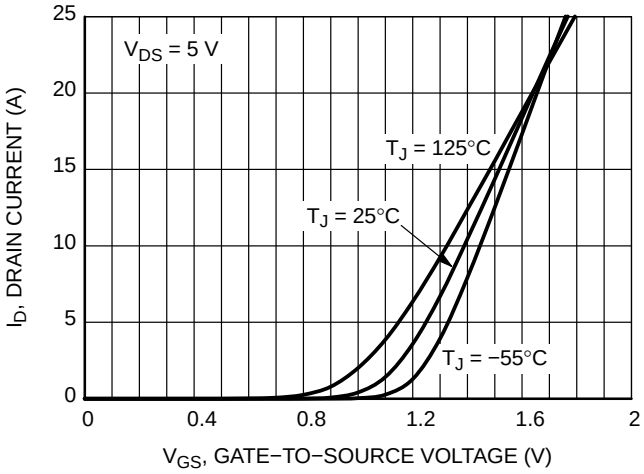


Figure 2. Transfer Characteristics

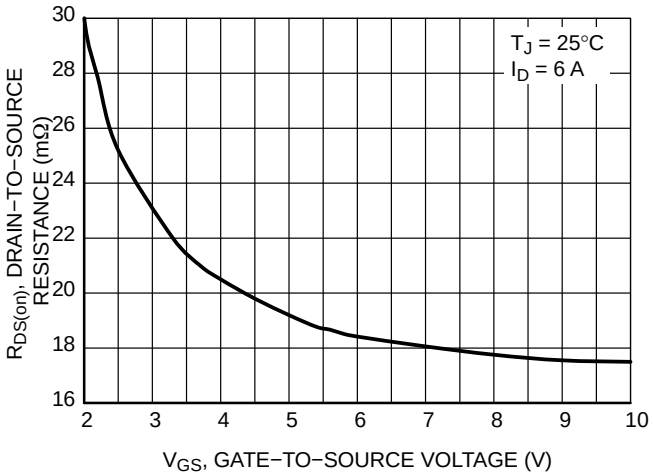


Figure 3. On−Resistance vs. Gate−to−Source Voltage

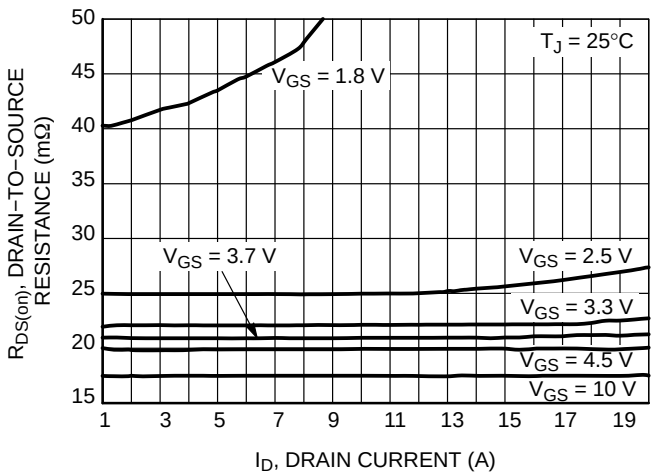


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

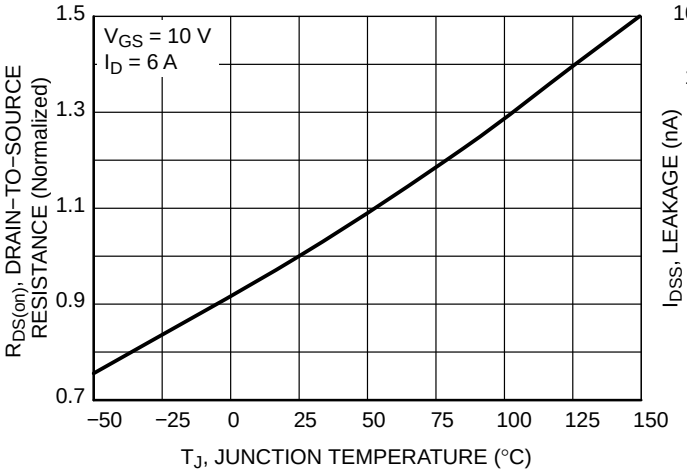


Figure 5. On−Resistance Variation with Temperature

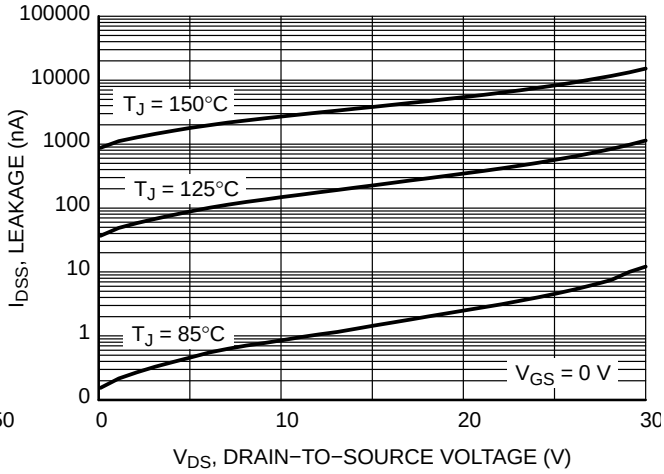


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

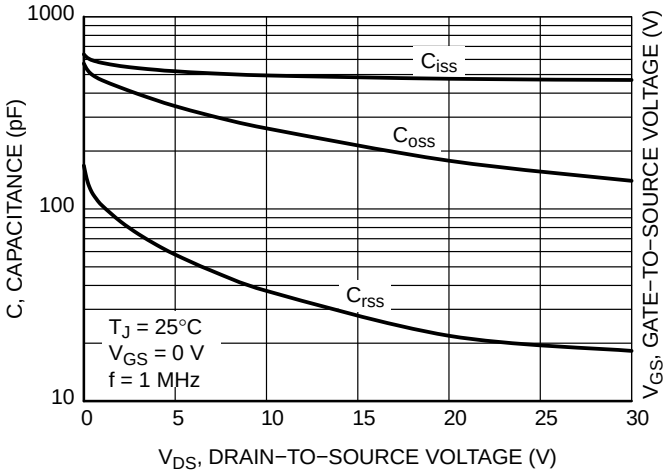


Figure 7. Capacitance Variation

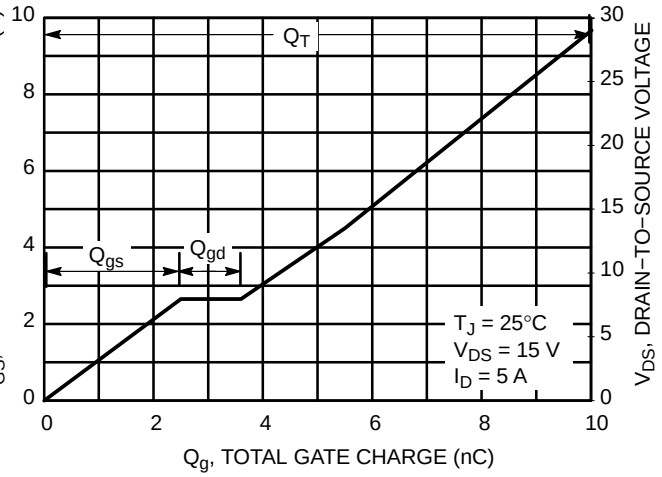


Figure 8. Gate−to−Source vs. Total Charge

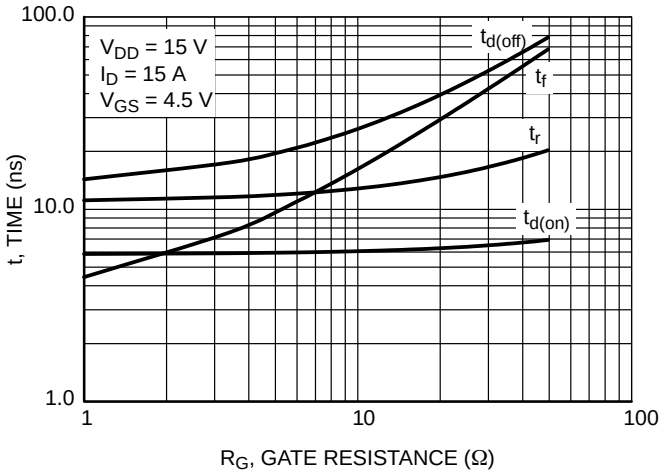


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

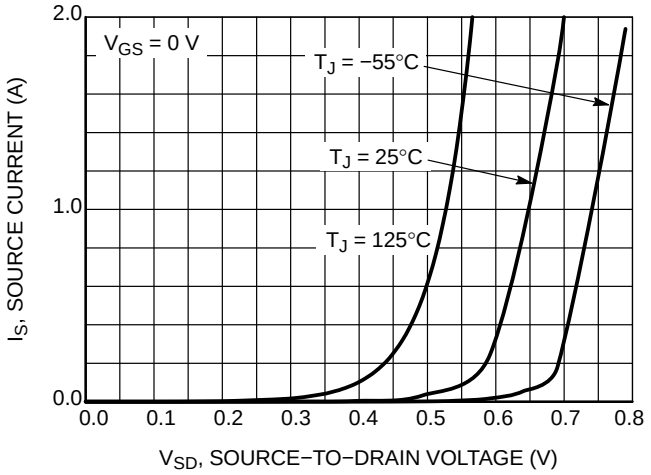


Figure 10. Diode Forward Voltage vs. Current

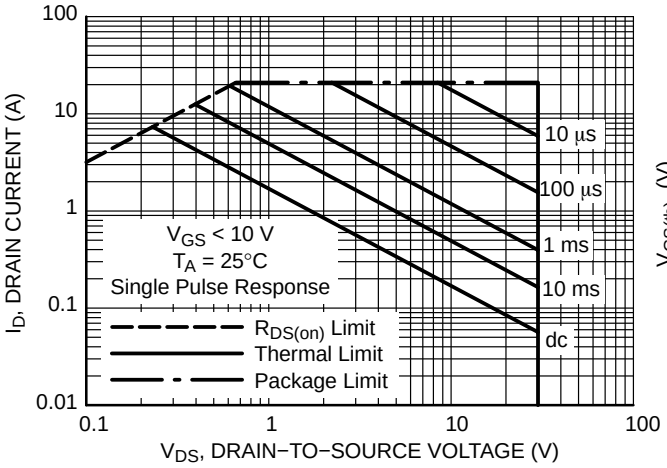


Figure 11. Maximum Rated Forward Biased Safe Operating Area

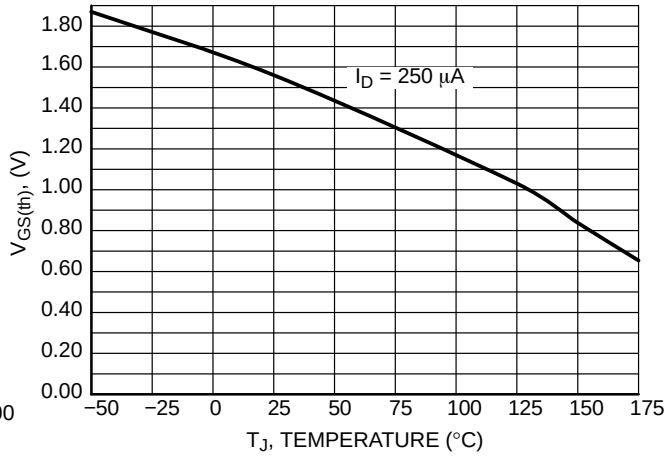


Figure 12. Threshold Voltage

TYPICAL CHARACTERISTICS

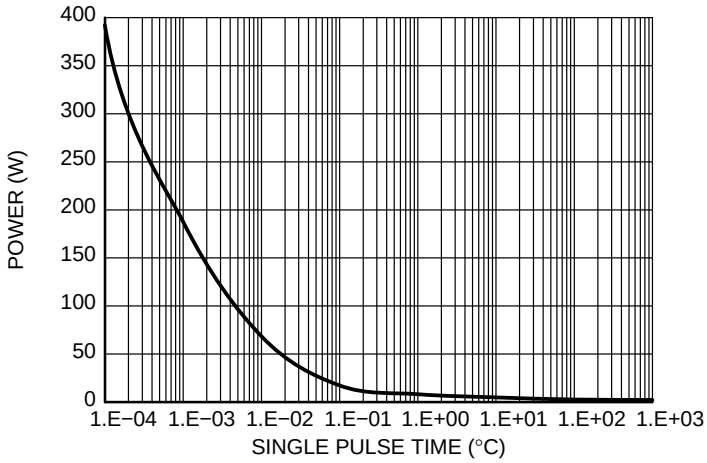


Figure 13. Single Pulse Maximum Power Dissipation

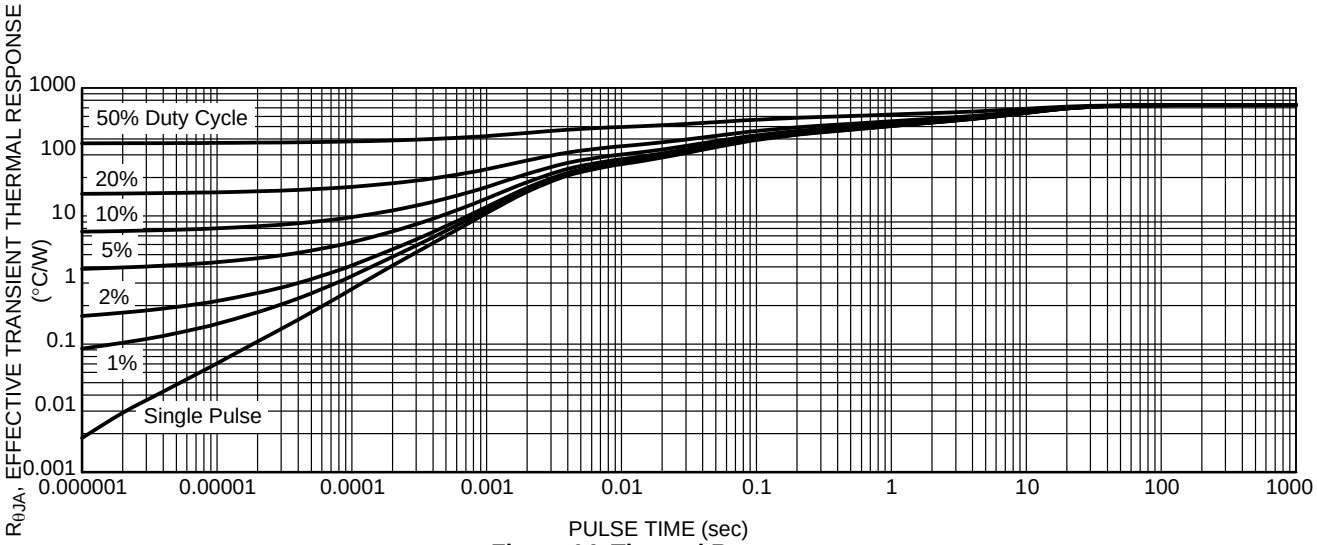
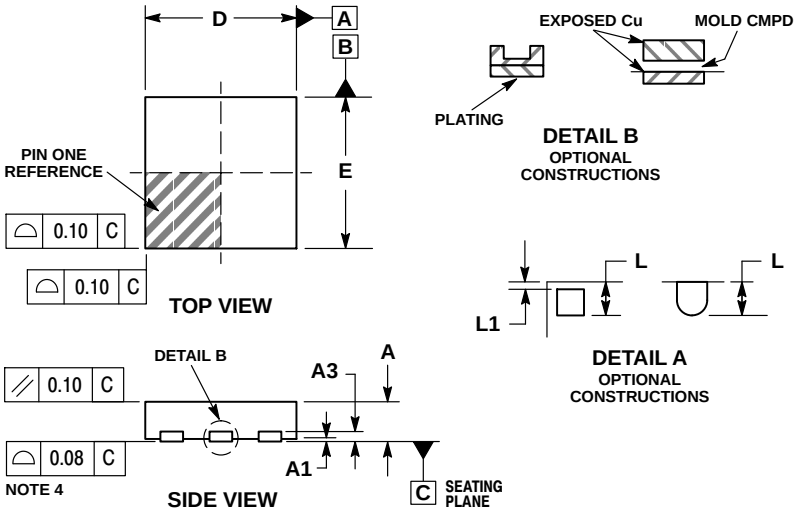


Figure 14. Thermal Response

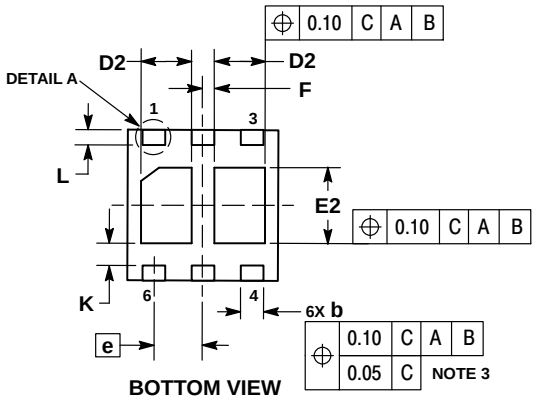
PACKAGE DIMENSIONS

UDFN6 2x2, 0.65P
CASE 517BF
ISSUE B

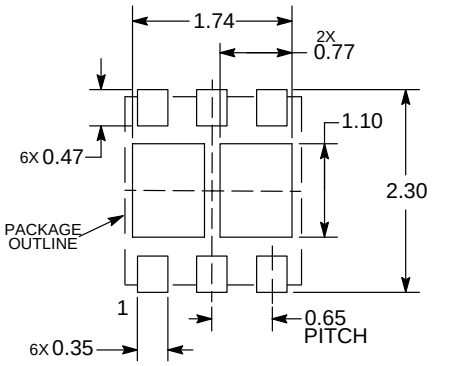


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

	MILLIMETERS	
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.13 REF	
b	0.25	0.35
D	2.00 BSC	
D2	0.57	0.77
E	2.00 BSC	
E2	0.90	1.10
e	0.65 BSC	
F	0.15 BSC	
K	0.25 REF	
L	0.20	0.30
L1	---	0.10



RECOMMENDED MOUNTING FOOTPRINT



DIMENSIONS: MILLIMETERS

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

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