



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



NTLUD3A50PZ

Power MOSFET

-20 V, -5.6 A, μ Cool™ Dual P-Channel, 2.0x2.0x0.55 mm UDFN Package

Features

- UDFN Package with Exposed Drain Pads for Excellent Thermal Conduction
- Low $R_{DS(on)}$
- Low Profile UDFN 2.0x2.0x0.55 mm for Board Space Saving
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- High Side Load Switch
- Reverse Current Protection
- Battery Switch
- Optimized for Power Management Applications for Portable Products, such as Cell Phones, PMP, DSC, GPS, and others

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter		Symbol	Value	Units	
Drain-to-Source Voltage		V_{DSS}	-20	V	
Gate-to-Source Voltage		V_{GS}	± 8.0	V	
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	I_D	-4.4	A
			$T_A = 85^\circ\text{C}$	-3.2	
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$		-5.6	
Power Dissipation (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	P_D	1.4	W
			$T_A = 25^\circ\text{C}$	2.2	
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$			
Continuous Drain Current (Note 2)	Steady State	$T_A = 25^\circ\text{C}$	I_D	-2.8	A
		$T_A = 85^\circ\text{C}$		-2.0	
Power Dissipation (Note 2)		$T_A = 25^\circ\text{C}$	P_D	0.5	W
Pulsed Drain Current		$t_p = 10 \mu\text{s}$	I_{DM}	-13	A
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$	
ESD (HBM, JESD22-A114) (MM, JESD22-A114)		V_{ESD}	1400 200	V	
Source Current (Body Diode) (Note 2)		I_S	-1.0	A	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^\circ\text{C}$	

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.

1. Surface Mounted on FR4 Board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces) based on both FETs on.
2. Surface-mounted on FR4 board using the minimum recommended pad size of 30 mm², 1 oz. Cu based on both FETs on.

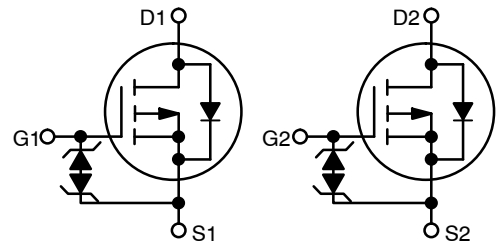


ON Semiconductor®

<http://onsemi.com>

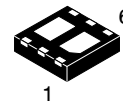
MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
-20 V	50 m Ω @ -4.5 V	-5.6 A
	70 m Ω @ -2.5 V	
	115 m Ω @ -1.8 V	
	175 m Ω @ -1.5 V	

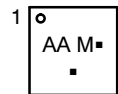


P-Channel MOSFET

MARKING DIAGRAM



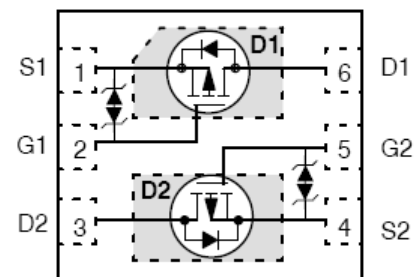
UDFN6
CASE 517BF
 μ COOL™



AA = Specific Device Code
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

NTLUD3A50PZ

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Units
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	91	°C/W
Junction-to-Ambient – $t \leq 5$ s (Note 3)	$R_{\theta JA}$	57	
Junction-to-Ambient – Steady State min Pad (Note 4)	$R_{\theta JA}$	228	

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
-----------	--------	----------------	-----	-----	-----	-------

OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-20			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = -250\ \mu\text{A}$, ref to 25°C		-13		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = -20\text{ V}$ $T_J = 25^\circ\text{C}$			-1.0	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 5.0\text{ V}$			± 5.0	μA

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\ \mu\text{A}$	-0.4		-1.0	V
Negative Threshold Temp. Coefficient	$V_{GS(TH)}/T_J$			3.0		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -4.0\text{ A}$		37	50	m Ω
		$V_{GS} = -2.5\text{ V}, I_D = -3.0\text{ A}$		46	70	
		$V_{GS} = -1.8\text{ V}, I_D = -2.0\text{ A}$		63	115	
		$V_{GS} = -1.5\text{ V}, I_D = -1.0\text{ A}$		86	175	
Forward Transconductance	g_{FS}	$V_{DS} = -5.0\text{ V}, I_D = -3.0\text{ A}$		16		S

CHARGES AND CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = -15\text{ V}$		920		pF
Output Capacitance	C_{OSS}			85		
Reverse Transfer Capacitance	C_{RSS}			80		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -15\text{ V}; I_D = -3.0\text{ A}$		10.4		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.5		
Gate-to-Source Charge	Q_{GS}			1.2		
Gate-to-Drain Charge	Q_{GD}			3.0		

SWITCHING CHARACTERISTICS, $V_{GS} = 4.5\text{ V}$ (Note 6)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = -4.5\text{ V}, V_{DD} = -15\text{ V}, I_D = -3.0\text{ A}, R_G = 1\ \Omega$		7.0		ns
Rise Time	t_r			12		
Turn-Off Delay Time	$t_{d(OFF)}$			39		
Fall Time	t_f			30		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	VSD	$V_{GS} = 0\text{ V}, I_S = -1.0\text{ A}$	$T_J = 25^\circ\text{C}$	-0.67	-1.0	V
			$T_J = 125^\circ\text{C}$	-0.56		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, \text{dis}/\text{dt} = 100\text{ A}/\mu\text{s}, I_S = -1.0\text{ A}$		12.1		ns
Charge Time	t_a			6.4		
Discharge Time	t_b			5.7		
Reverse Recovery Charge	Q_{RR}			4.0		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.

- Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces) based on both FETs on.
- Surface-mounted on FR4 board using the minimum recommended pad size of 30 mm², 1 oz. Cu based on both FETs on.
- Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- Switching characteristics are independent of operating junction temperatures.

NTLUD3A50PZ

TYPICAL CHARACTERISTICS

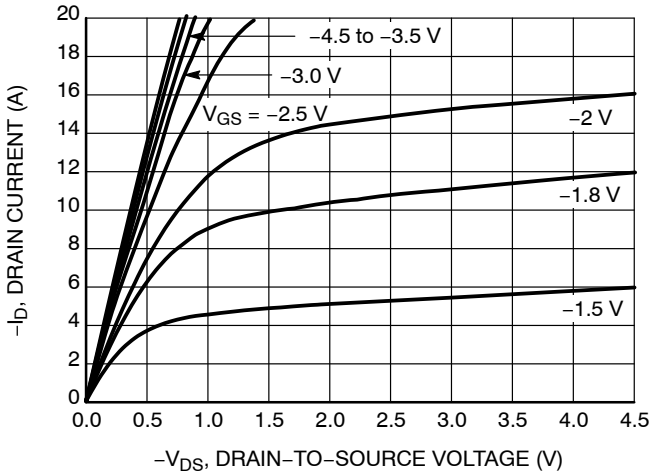


Figure 1. On-Region Characteristics

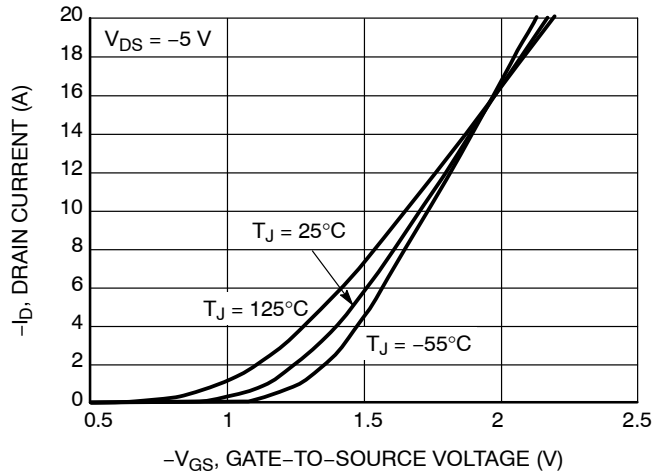


Figure 2. Transfer Characteristics

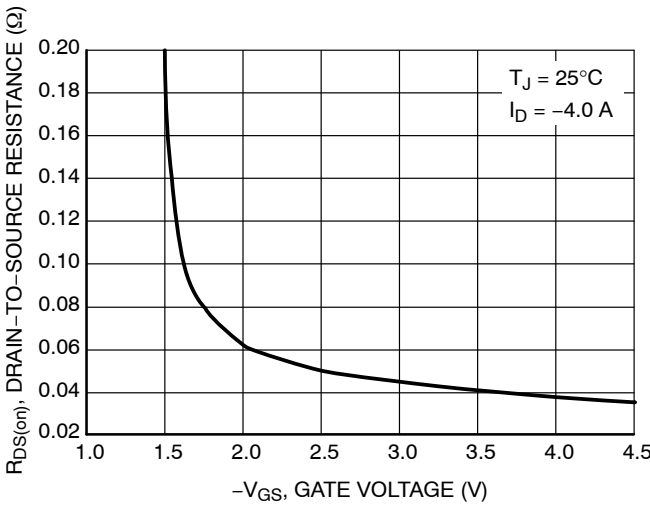


Figure 3. On-Resistance vs. Gate-to-Source Voltage

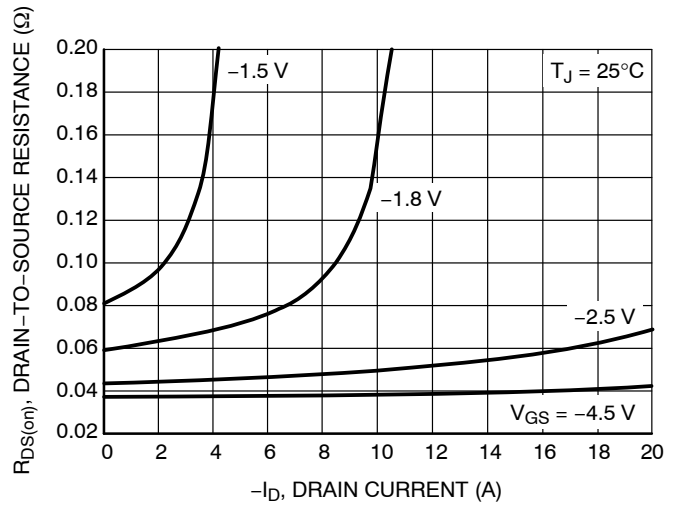


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

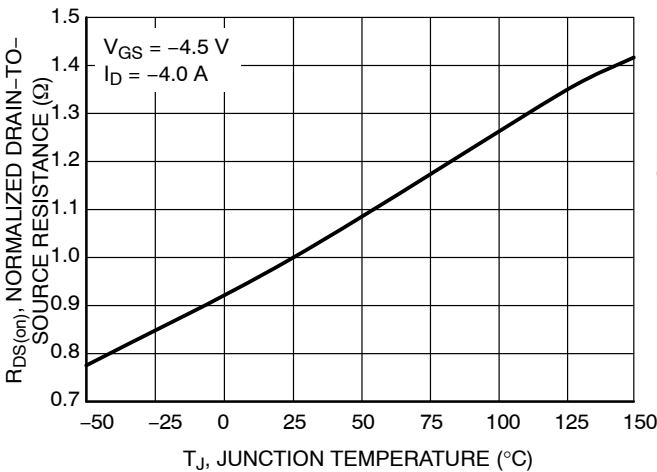


Figure 5. On-Resistance Variation with Temperature

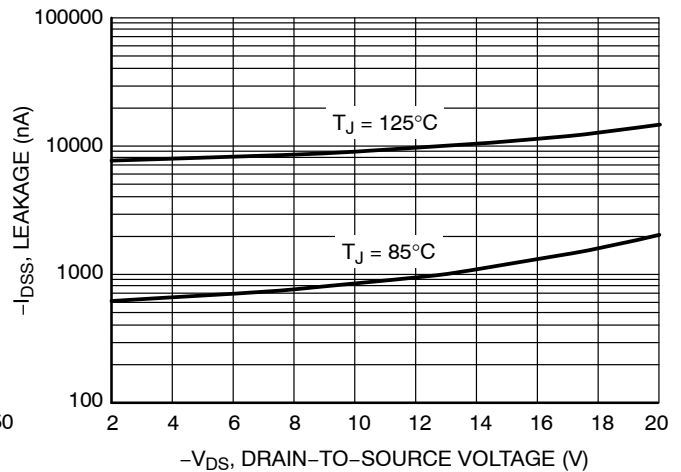


Figure 6. Drain-to-Source Leakage Current vs. Voltage

NTLUD3A50PZ

TYPICAL CHARACTERISTICS

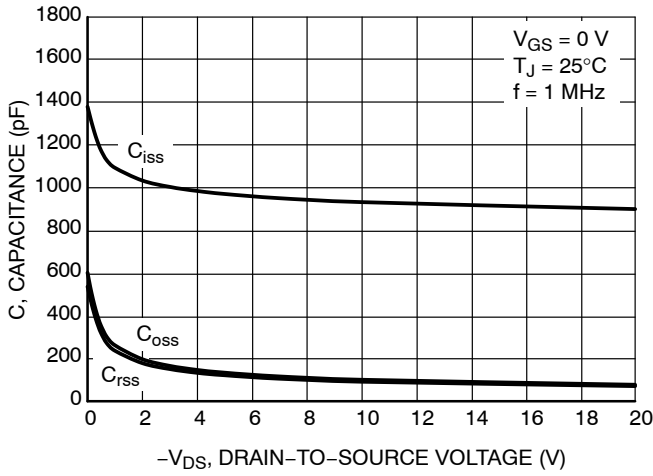


Figure 7. Capacitance Variation

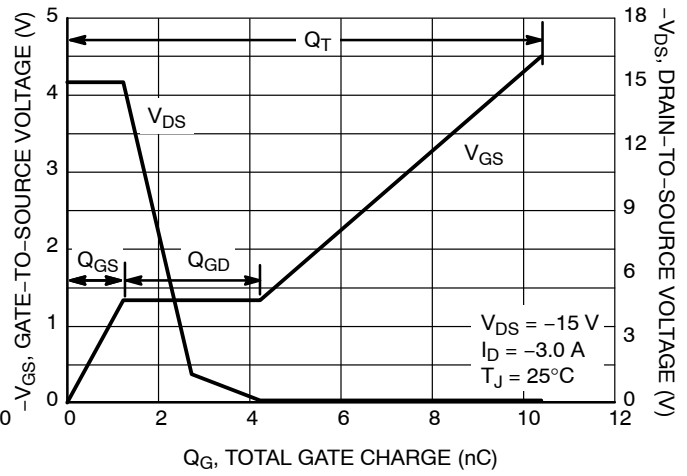


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

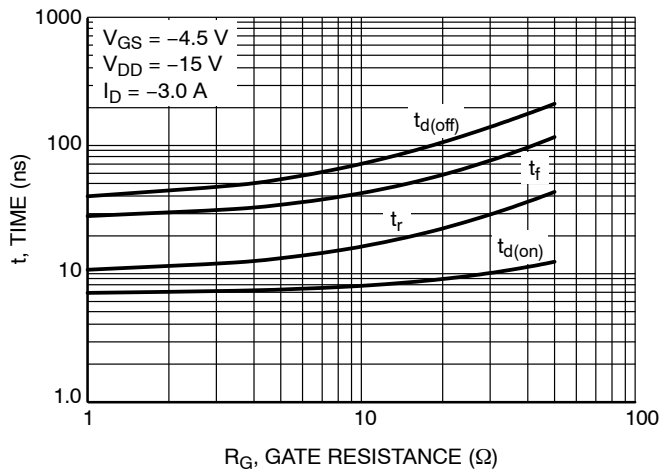


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

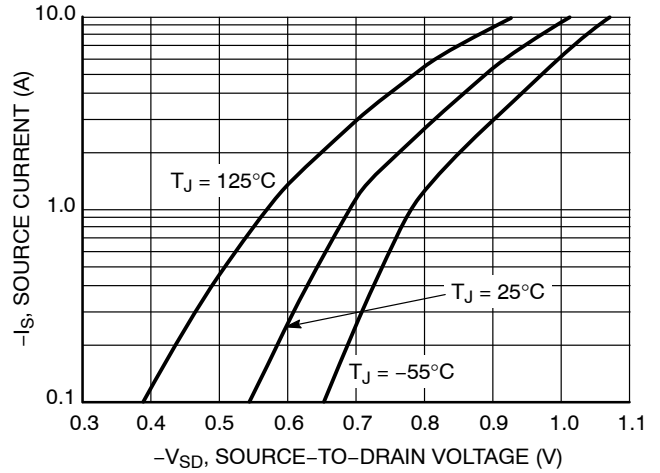


Figure 10. Diode Forward Voltage vs. Current

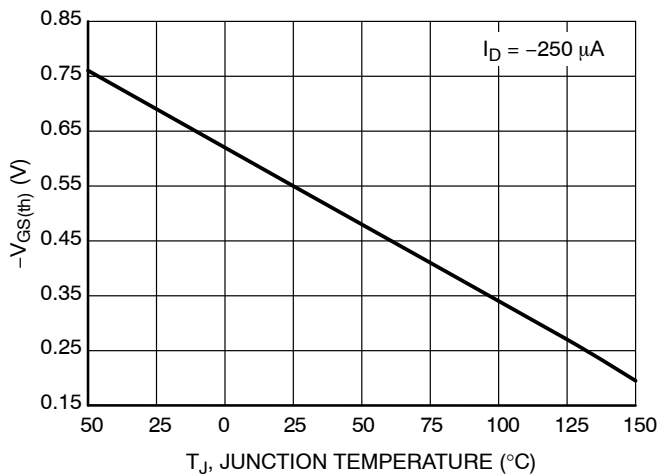


Figure 11. Threshold Voltage

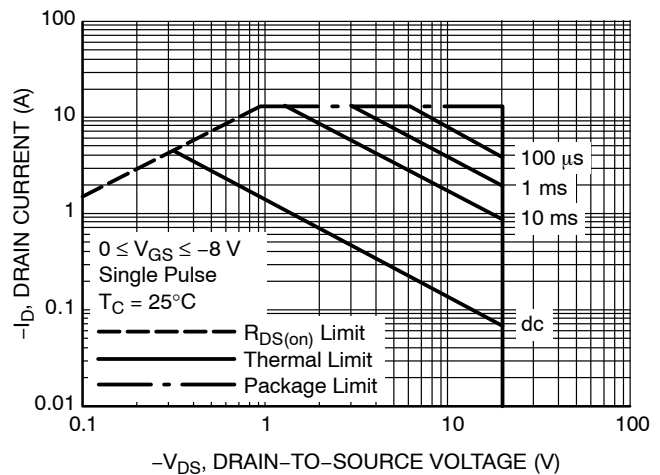


Figure 12. Maximum Rated Forward Biased Safe Operating Area

NTLUD3A50PZ

TYPICAL CHARACTERISTICS

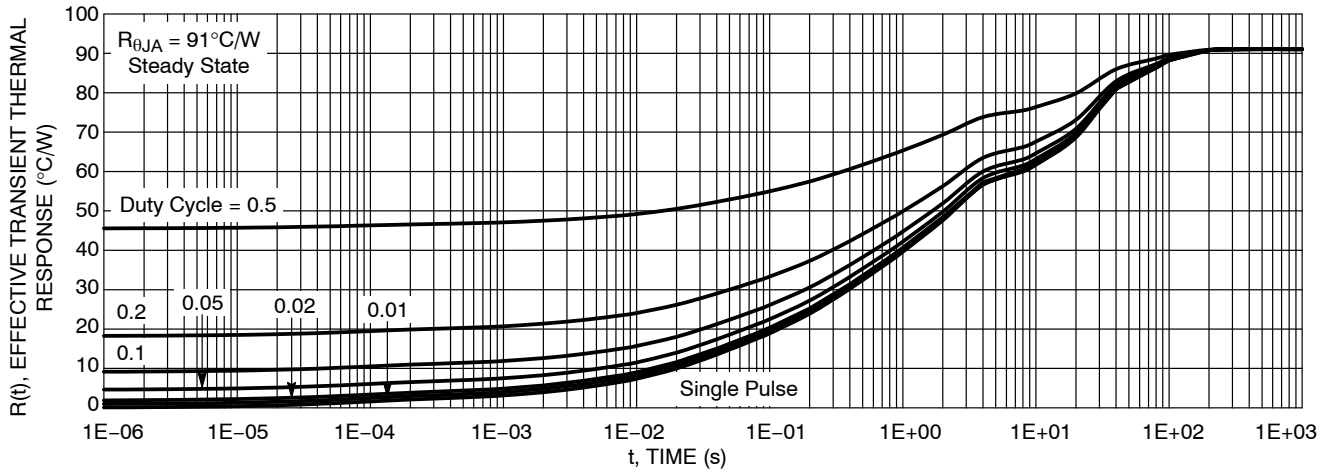


Figure 13. FET Thermal Response

DEVICE ORDERING INFORMATION

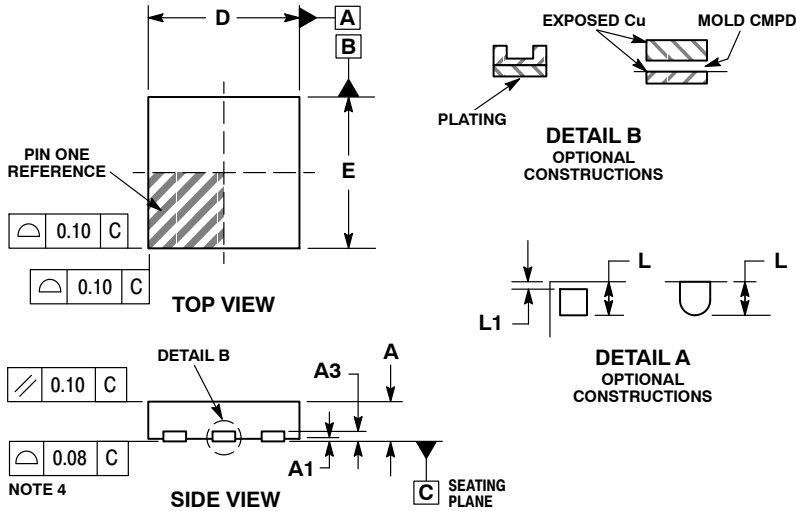
Device	Package	Shipping [†]
NTLUD3A50PZTAG	UDFN6 (Pb-Free)	3000 / Tape & Reel
NTLUD3A50PZTBG	UDFN6 (Pb-Free)	3000 / Tape & Reel

[†]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.

NTLUD3A50PZ

PACKAGE DIMENSIONS

UDFN6 2x2, 0.65P
CASE 517BF
ISSUE B

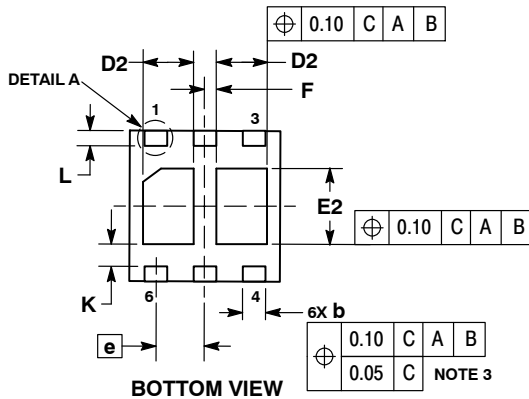
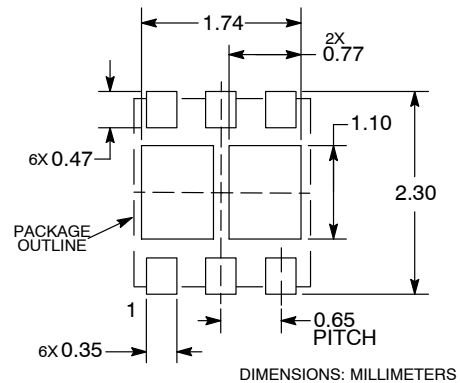


NOTES:

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.

DIM	MILLIMETERS	
	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



μCool is a trademark of Semiconductor Components Industries, LLC (SCILLC).

ON Semiconductor and **ON** are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

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

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local Sales Representative