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MOSFET - Small Signal, Dual N-Channel, XLLGA6, 0.65mm x 0.90mm x 0.4mm 23 V, 200 mA



NTND3184NZ

Features

- Dual N-Channel MOSFET
- Offers a Low $R_{DS(ON)}$ Solution in the Ultra Small 0.65 mm x 0.90 mm Package
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Small Signal Load Switch
- Analog Switch
- High Speed Interfacing
- Optimized for Power Management in Ultra Portable Products

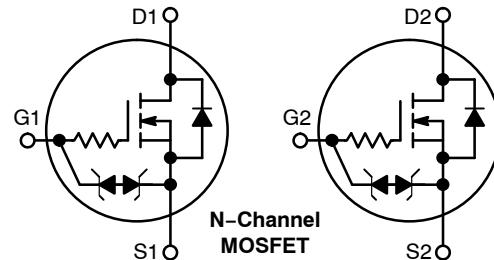
MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter			Symbol	Value	Unit	
Drain-to-Source Voltage			V_{DSS}	23	V	
Gate-to-Source Voltage			V_{GS}	± 8	V	
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	I_D	200	mA	
		$T_A = 85^\circ\text{C}$		140		
	$t \leq 5\text{ s}$	$T_A = 25^\circ\text{C}$		220		
	Steady State	$T_A = 25^\circ\text{C}$		125	mW	
Power Dissipation (Note 1)		$t \leq 5\text{ s}$		166		
Pulsed Drain Current		$t_p = 10\text{ }\mu\text{s}$	I_{DM}	800	mA	
Operating Junction and Storage Temperature		T_J, T_{STG}	$-55 \text{ to } 150$	$^\circ\text{C}$		
Source Current (Body Diode) (Note 2)			I_S	200	mA	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T_L	260	$^\circ\text{C}$	

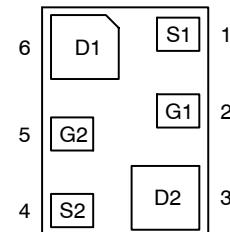
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface-mounted on FR4 board using the minimum recommended pad size, 1 oz Cu.
2. Pulse Test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ Max}$
23 V	1.5 Ω @ 4.5 V	200 mA
	2.0 Ω @ 2.5 V	
	3.0 Ω @ 1.8 V	
	4.5 Ω @ 1.5 V	

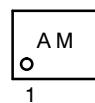


PINOUT DIAGRAM



(Bottom View)

MARKING DIAGRAM



A = Specific Device Code
M = Date Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

NTND3184NZ

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	998	$^{\circ}\text{C}/\text{W}$
Junction-to-Ambient – $t \leq 5 \text{ s}$ (Note 3)		751	

3. Surface-mounted on FR4 board using the minimum recommended pad size, 1 oz Cu.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}, I_D = 250 \mu\text{A}$	23			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{GS}} = 0 \text{ V}, V_{\text{DS}} = 5 \text{ V}$	$T_J = 25^{\circ}\text{C}$		50	nA
			$T_J = 85^{\circ}\text{C}$		200	nA
		$V_{\text{GS}} = 0 \text{ V}, V_{\text{DS}} = 16 \text{ V}$	$T_J = 25^{\circ}\text{C}$		100	
Gate-to-Source Leakage Current	I_{GSS}	$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 5.0 \text{ V}$			± 100	nA

ON CHARACTERISTICS (Note 4)

Gate Threshold Voltage	$V_{\text{GS}(\text{TH})}$	$V_{\text{GS}} = V_{\text{DS}}, I_D = 250 \mu\text{A}$	0.4		1.0	V
$V_{\text{GS}(\text{TH})}$ Delta D1, D2	$\Delta V_{\text{GS}(\text{TH})}$	$ V_{\text{GS}(\text{TH})} \text{ D1} - V_{\text{GS}(\text{TH})} \text{ D2} $	0		200	mV
Drain-to-Source On Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}} = 4.5 \text{ V}, I_D = 100 \text{ mA}$		0.8	1.5	Ω
		$V_{\text{GS}} = 2.5 \text{ V}, I_D = 50 \text{ mA}$		1.1	2.0	
		$V_{\text{GS}} = 1.8 \text{ V}, I_D = 20 \text{ mA}$		1.4	3.0	
		$V_{\text{GS}} = 1.5 \text{ V}, I_D = 10 \text{ mA}$		1.8	4.5	
Forward Transconductance	g_{FS}	$V_{\text{DS}} = 5.0 \text{ V}, I_D = 125 \text{ mA}$		0.48		S
Forward Diode Voltage	V_{SD}	$V_{\text{GS}} = 0 \text{ V}, I_S = 10 \text{ mA}$		0.6	1.0	V

CAPACITANCES

Input Capacitance	C_{ISS}	$f = 1 \text{ MHz}, V_{\text{GS}} = 0 \text{ V}$ $V_{\text{DS}} = 15 \text{ V}$		12.3		pF
Output Capacitance	C_{OSS}			3.4		
Reverse Transfer Capacitance	C_{RSS}			2.5		

SWITCHING CHARACTERISTICS, $V_{\text{GS}} = 4.5 \text{ V}$ (Note 4)

Turn-On Delay Time	$t_{\text{d}(\text{ON})}$	$V_{\text{GS}} = 4.5 \text{ V}, V_{\text{DD}} = 10 \text{ V},$ $I_D = 200 \text{ mA}, R_G = 3 \Omega$		16.5		ns
Rise Time	t_r			25.5		
Turn-Off Delay Time	$t_{\text{d}(\text{OFF})}$			142		
Fall Time	t_f			80		

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.

4. Switching characteristics are independent of operating junction temperatures.

ORDERING INFORMATION

Device	Package	Shipping [†]
NTND3184NZTAG	XLLGA6 (Pb-Free)	8000 / 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

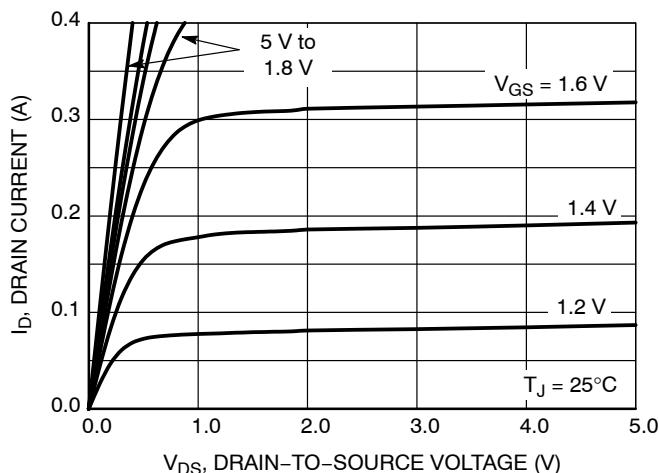


Figure 1. On-Region Characteristics

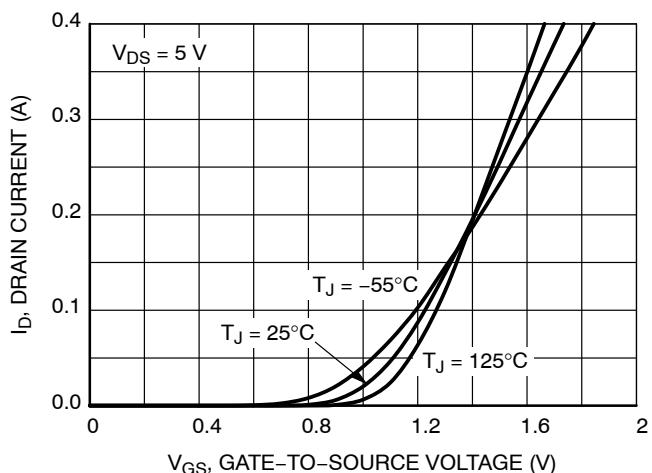


Figure 2. Transfer Characteristics

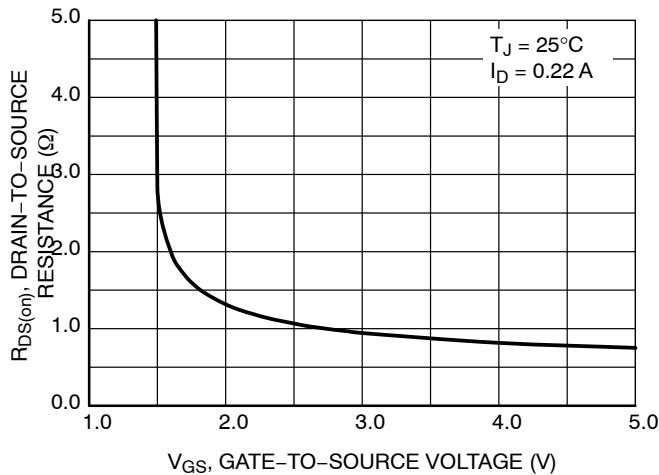


Figure 3. On-Resistance vs. Gate-to-Source Voltage

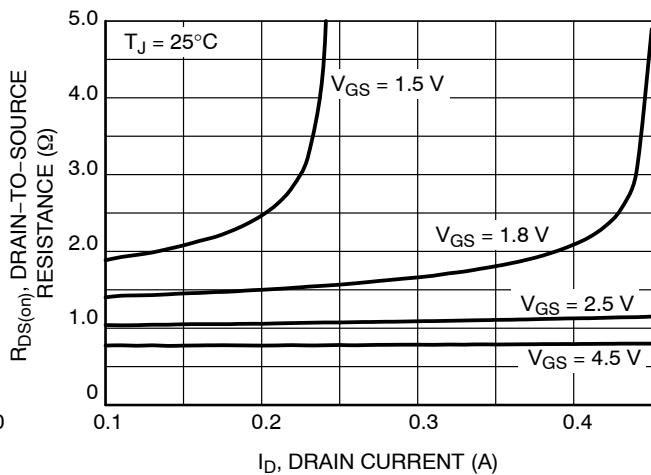


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

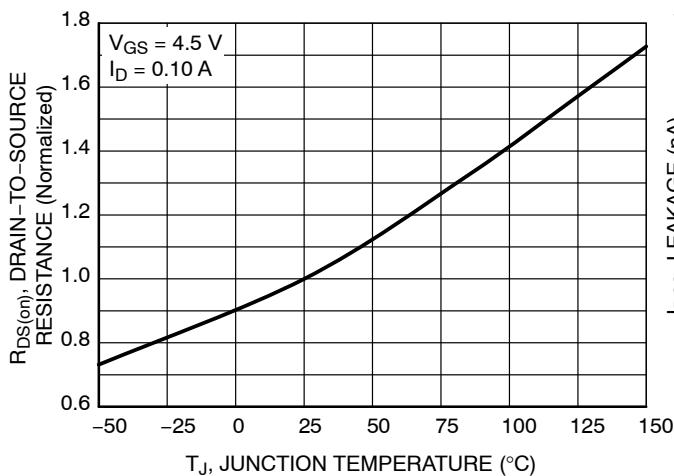


Figure 5. On-Resistance Variation with Temperature

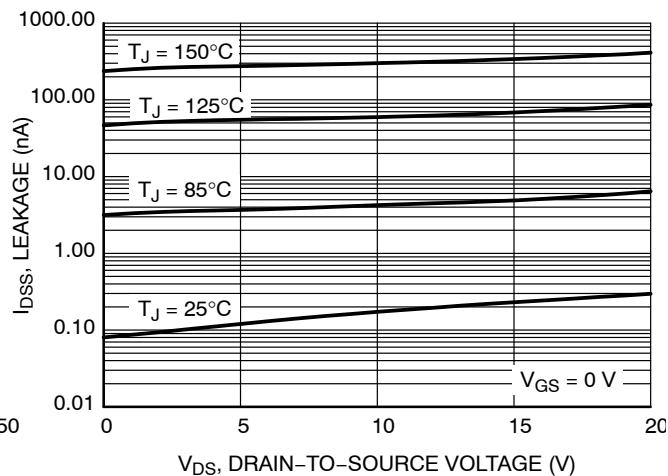


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

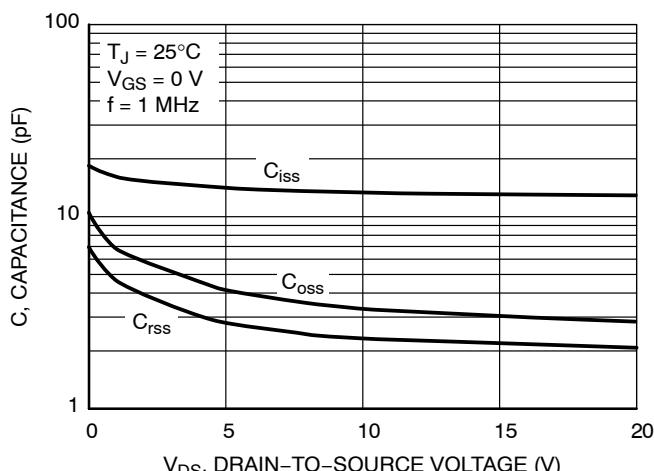


Figure 7. Capacitance Variation

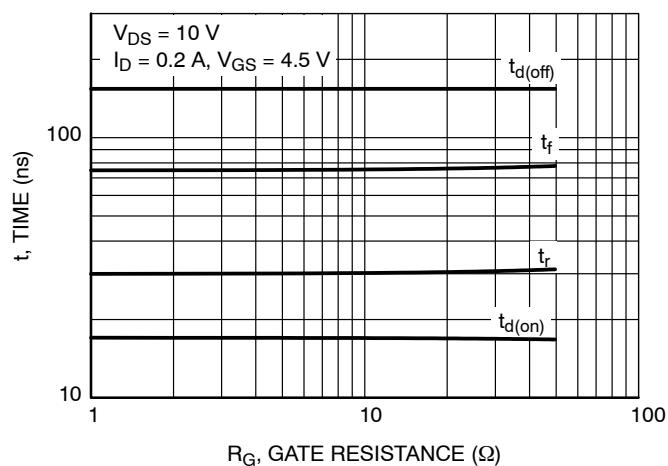


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

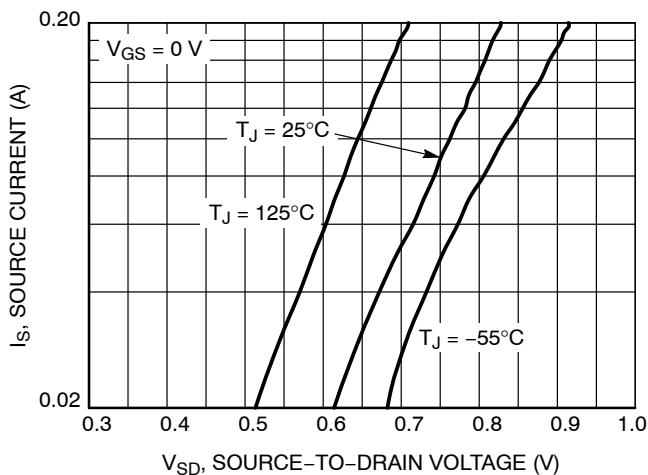


Figure 9. Diode Forward Voltage vs. Current

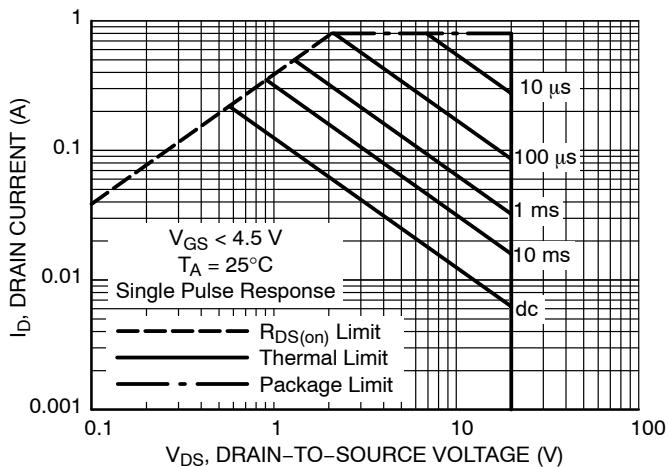


Figure 10. Maximum Rated Forward Biased Safe Operating Area

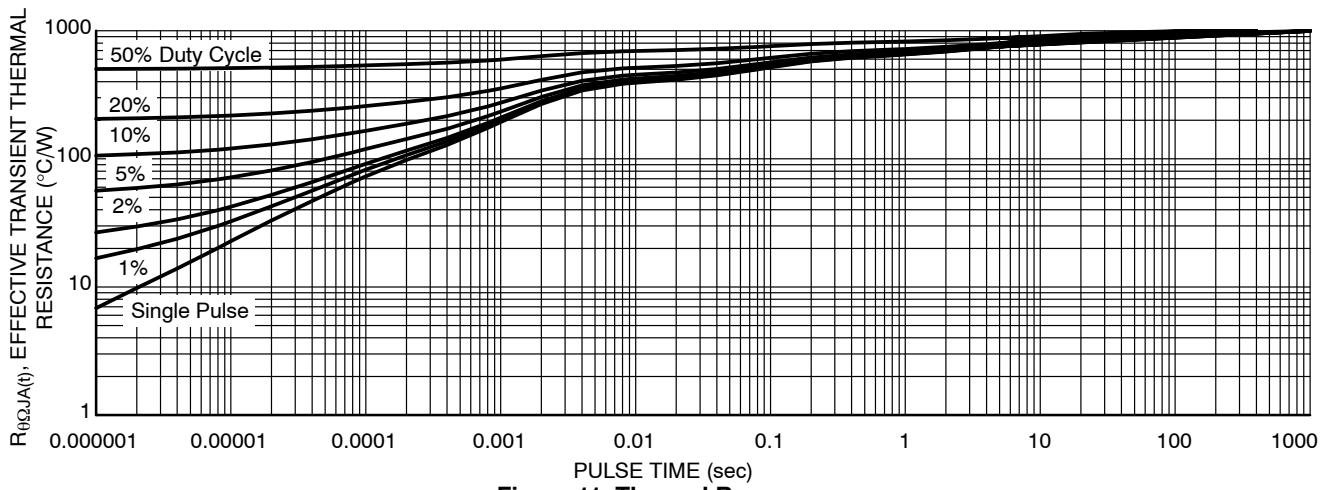
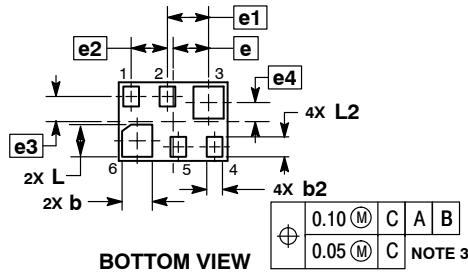
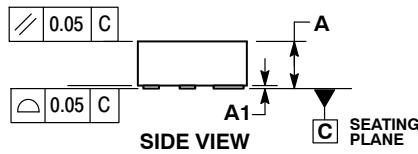
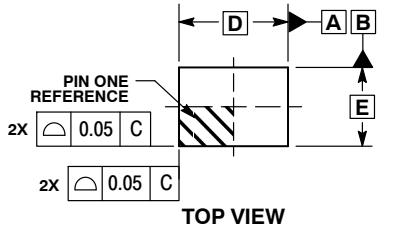


Figure 11. Thermal Response

NTND3184NZ

PACKAGE DIMENSIONS

XLLGA6 0.90x0.65
CASE 713AC
ISSUE O

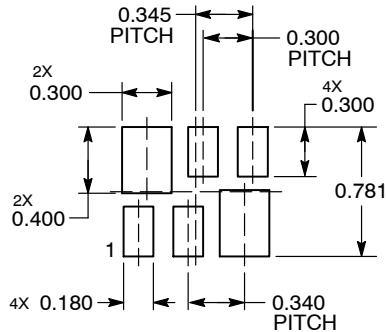


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994 .
2. CONTROLLING DIMENSION: MILLIMETERS.
3. POSITIONAL TOLERANCE APPLIES TO ALL SIX LEADS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.340	0.440
A1	0.000	0.050
b	0.200	0.300
b2	0.080	0.180
D	0.900	BSC
E	0.650	BSC
e	0.295	BSC
e1	0.340	BSC
e2	0.300	BSC
e3	0.208	BSC
e4	0.158	BSC
L	0.215	0.315
L2	0.115	0.215

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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