

MOSFET - Small Signal, Complementary, XLLGAS6, $0.65 \text{mm} \times 0.90 \text{mm} \times 0.4 \text{mm}$

20 V

NTND31225CZ

Features

- Advanced Trench Complementary MOSFET
- Offers a Low R_{DS(ON)} Solution in the Ultra Small $0.65 \text{ mm} \times 0.90 \text{ mm Package}$
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

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

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

Symbol	Para	Value	Unit			
V _{DSS}	Drain-to-Source Voltage		NMOS	20	V	
		PMOS	-20			
V _{GSS}	Gate-to-Source Voltage)	NMOS	±8	V	
			PMOS	±8		
I _D	N-Channel	Steady	$T_A = 25^{\circ}C$	220	mA	
	Continuous Drain Current (Note 1)	State	$T_A = 85^{\circ}C$	158		
	, ,	t ≤ 5 s	$T_A = 25^{\circ}C$	253		
I _D	P-Channel	Steady	$T_A = 25^{\circ}C$	-127	mA	
	Continuous Drain Current (Note 1)	State	$T_A = 85^{\circ}C$	-91		
	, ,	t ≤ 5 s	$T_A = 25^{\circ}C$	-146		
P _D	Power Dissipation (Note 1)	Steady State	$T_A = 25^{\circ}C$	125	mW	
		t ≤ 5 s		166		
I _{DM}	Pulsed Drain Current	NMOS	t _p = 10 μs	846	mA	
		PMOS		-488		
I _S	Source Current (Body Diode)			200	mA	
				-200		
T _J , T _{STG}	Operating Junction and Storage Temperature			–55 to 150	°C	
TL	Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			260	°C	

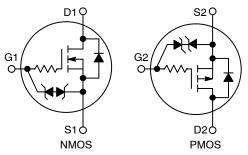
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

V _{(BR)DSS}	R _{DS(ON)} MAX	I _D Max	
	1.5 Ω @ 4.5 V		
N-Channel	2.0 Ω @ 2.5 V	220 mA	
20 V	3.0 Ω @ 1.8 V	220 IIIA	
	4.5 Ω @ 1.5 V		
	5.0 Ω @ -4.5 V		
P-Channel	6.0 Ω @ -2.5 V	–127 mA	
–20 V	7.0 Ω @ –1.8 V	-127 1117	
	10.0 Ω @ -1.5 V		



Case 713AC

DEVICE SYMBOL

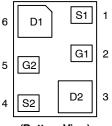


MARKING DIAGRAM



= Specific Device Code = Date Code

PINOUT DIAGRAM



(Bottom View)

ORDERING INFORMATION

See detailed ordering and shipping information on page 8 of this data sheet.

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

THERMAL RESISTANCE RATINGS

Symbol	Parameter	Max	Unit
$R_{ heta JA}$	Junction-to-Ambient (Note 2) Steady State t ≤ 5 s	998 751	°C/W

^{2.} Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq), 1 oz copper

ELECTRICAL CHARACTERISTICS (T_{.1} = 25°C unless otherwise specified)

Symbol	Parameter	FET	Test Con	dition	Min	Тур	Max	Unit
OFF CHARA	CTERISTICS	•	•			•		
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	N	$V_{GS} = 0 V, I_{I}$	ο = 250 μΑ	20			V
		Р	V _{GS} = 0 V, I _D = -250 μA		-20			
I _{DSS}	Zero Gate Voltage Drain Current	N	V _{GS} = 0 V, V _{DS} = 5 V	T _J = 25°C			50	nA
				T _J = 85°C			200	
			V _{GS} = 0 V, V _{DS} = 16 V	T _J = 25°C			100	
		Р	V _{GS} = 0 V, V _{DS} = -5 V	T _J = 25°C			-50	
			V _{DS} = -5 V	T _J = 85°C			-200	
			V _{GS} = 0 V, V _{DS} = -16 V	T _J = 25°C			-100	
I _{GSS}	Gate-to-Source Leakage Current	N	V _{GS} = 0 V, V	_{DS} = ±5 V			±100	nΑ
		Р	V _{GS} = 0 V, V	_{DS} = ±5 V			±100	
ON CHARAC	TERISTICS							
V _{GS(TH)}	Gate Threshold Voltage	N	$V_{GS} = V_{DS}, I_D = 250 \mu A$		0.4		1.0	V
		Р	$V_{GS} = V_{DS}, I_D = -250 \mu A$		-0.4		-1.0	
R _{DS(ON)}	Drain-to-Source On Resistance	N	$V_{GS} = 4.5 \text{ V}, I_D = 100 \text{ mA}$			0.8	1.5	Ω
			V _{GS} = 2.5 V, I _D = 50 mA			1.1	2.0	
			$V_{GS} = 1.8 \text{ V}, I_D = 20 \text{ mA}$			1.4	3.0	
			V _{GS} = 1.5 V, I _D = 10 mA			1.8	4.5	
		Р	$V_{GS} = -4.5 \text{ V}, I_D = -100 \text{ mA}$			2.1	5.0	
			$V_{GS} = -2.5 \text{ V}, I_D = -50 \text{ mA}$			2.7	6.0	
			V _{GS} = -1.8 V, I	$V_{GS} = -1.8 \text{ V}, I_D = -20 \text{ mA}$		3.6	7.0	
			V _{GS} = −1.5 V, I	_D = -10 mA		4.2	10.0	
9FS	Forward Transconductance	N	$V_{DS} = 5 \text{ V}, I_{D}$	= 125 mA		0.48		S
		Р	$V_{DS} = -5 \text{ V}, I_{D}$	= -125 mA		0.35		
V_{SD}	Forward Diode Voltage	N	V _{GS} = 0 V, I _S	_S = 10 mA		0.6	1.0	V
		Р	$V_{GS} = 0 \text{ V, } I_{S} = -10 \text{ mA}$			-0.6	-1.0	
CAPACITANO	CES							
C _{ISS}	Input Capacitance	N	$V_{GS} = 0 \text{ V, f} = 1 \text{ MHz,}$ $V_{DS} = 15 \text{ V}$			12.3		pF
C _{OSS}	Output Capacitance					3.4		
C _{RSS}	Reverse Capacitance					2.5		
C _{ISS}	Input Capacitance	Р	$V_{GS} = 0 \text{ V, } f = 1 \text{ MHz,}$ $V_{DS} = -15 \text{ V}$			12.8		
C _{OSS}	Output Capacitance	7				2.8		
C _{RSS}	Reverse Capacitance					2.0		

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

Symbol	Parameter	FET	Test Condition	Min	Тур	Max	Unit
SWITCHING	CHARACTERISTICS, V _{GS} = 4.5 V						
t _{d(ON)}	Turn-On Delay Time	N N	V_{GS} = 4.5 V, V_{DS} = 15 V, I_{D} = 200 mA, R_{G} = 2 Ω		16.5		ns
t _r	Rise Time				25.5		
t _{d(OFF)}	Turn-Off Delay Time				142		
t _f	Fall Time				80		
t _{d(ON)}	Turn-On Delay Time	Р	V_{GS} = -4.5 V, V_{DS} = -15 V, I_D = -200 mA, R_G = 2 Ω		37		
t _r	Rise Time	1			71		
t _{d(OFF)}	Turn-Off Delay Time	1			280		
t _f	Fall Time	1			171		

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.

3. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS - P-CHANNEL

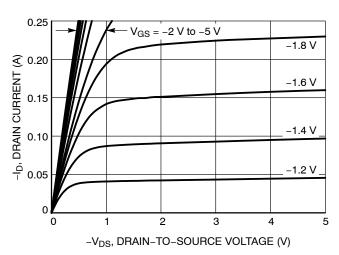


Figure 1. On-Region Characteristics

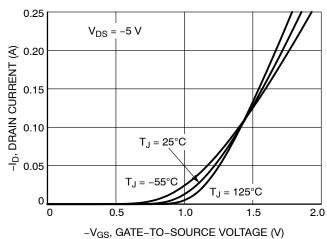


Figure 2. Transfer Characteristics

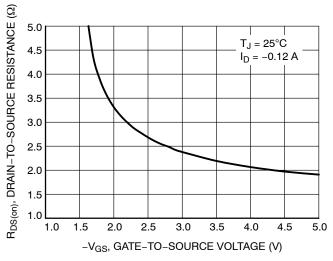


Figure 3. On-Resistance vs. Gate-to-Source Voltage

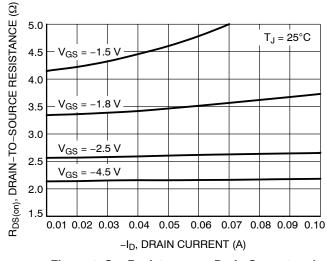


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

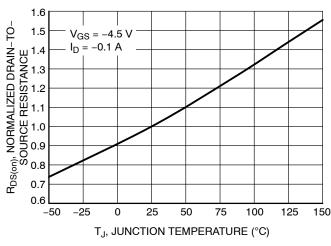


Figure 5. On–Resistance Variation with Temperature

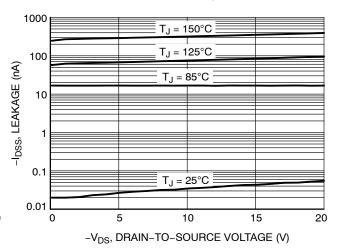


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS - P-CHANNEL (continued)

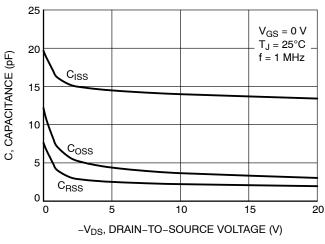


Figure 7. Capacitance Variation

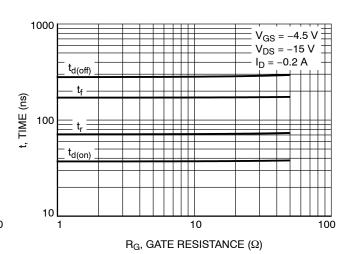


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

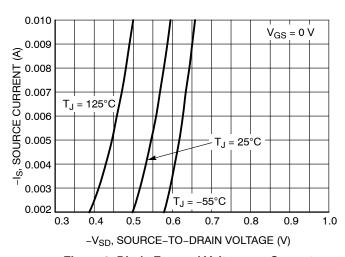


Figure 9. Diode Forward Voltage vs. Current

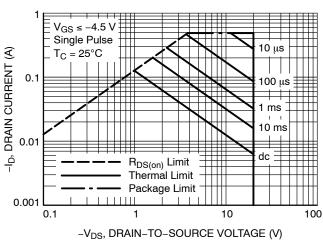


Figure 10. Maximum Rated Forward Biased Safe Operating Area

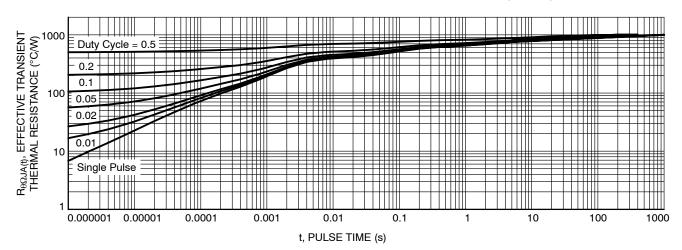


Figure 11. Thermal Response

TYPICAL CHARACTERISTICS - N-CHANNEL

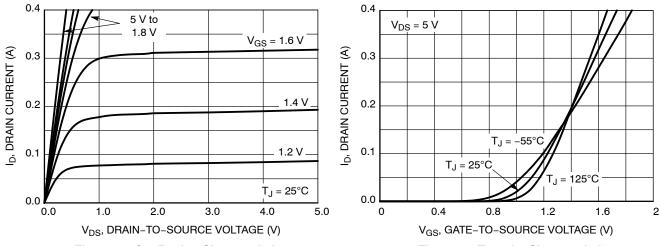


Figure 12. On-Region Characteristics

Figure 13. Transfer Characteristics

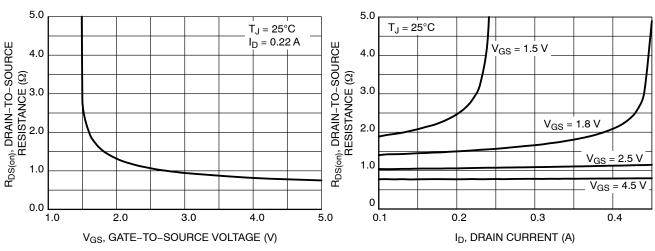


Figure 14. On-Resistance vs. Gate-to-Source Voltage

Figure 15. On-Resistance vs. Drain Current and Gate Voltage

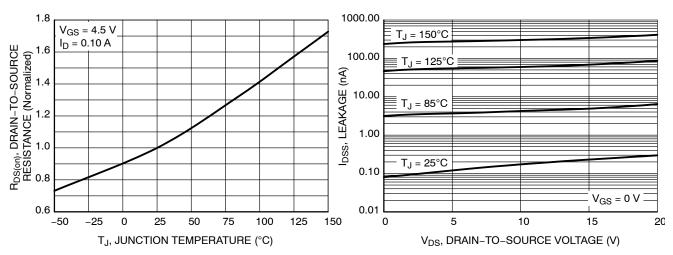


Figure 16. On–Resistance Variation with Temperature

Figure 17. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS - N-CHANNEL (continued)

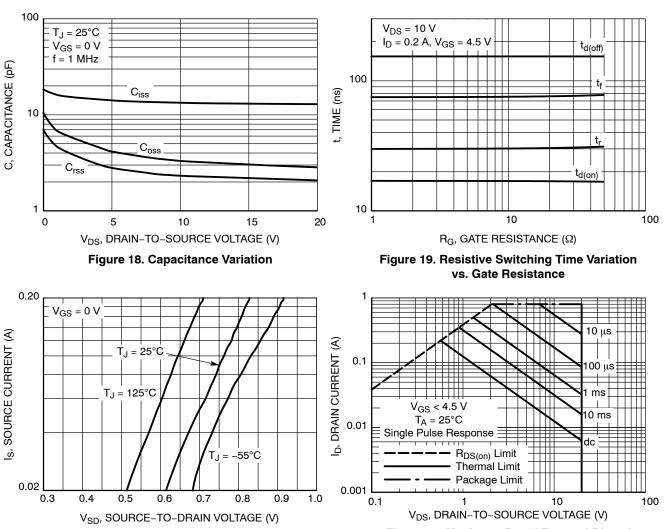


Figure 20. Diode Forward Voltage vs. Current

Figure 21. Maximum Rated Forward Biased Safe Operating Area

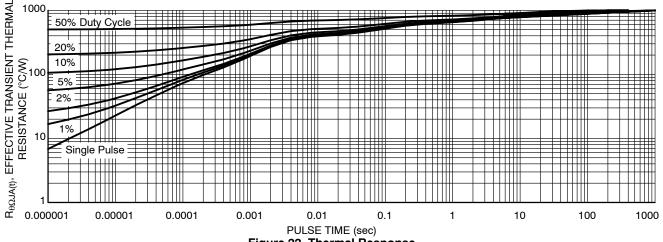


Figure 22. Thermal Response

ORDERING INFORMATION

Device	Package	Shipping [†]
NTND31225CZTAG	XLLGA6 (Pb-Free)	8,000 / Tape & Reel

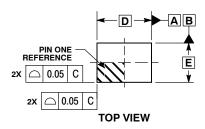
[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

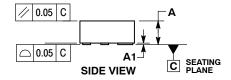


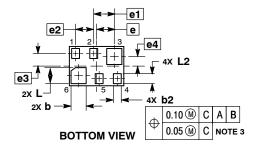


XLLGA6 0.90x0.65 CASE 713AC ISSUE O

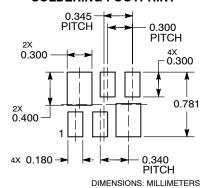
DATE 19 JUN 2014







RECOMMENDED SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting

Techniques Reference Manual, SOLDERRM/D.

NOTES:

- NOTES:

 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.

 2. CONTROLLING DIMENSION: MILLIMETERS.

 3. POSITIONAL TOERANCE APPLIES TO ALL
- SIX LEADS.

	MILLIMETERS			
DIM	MIN	MAX		
Α	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			
е	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		

GENERIC MARKING DIAGRAM*



= Specific Device Code

Μ = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ■", may or may not be present.

DOCUMENT NUMBER:	98AON86873F	Electronic versions are uncontrolled except when accessed directly fron Printed versions are uncontrolled except when stamped "CONTROLLED		
DESCRIPTION:	XLLGA6 0.90X0.65		PAGE 1 OF 1	

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