NTLTD7900N

Power MOSFET

8.5 A, 20 V, Logic Level, N−Channel Micro8™ Leadless

EZFETs™ are an advanced series of Power MOSFETs which contain monolithic back−to−back zener diodes. These zener diodes provide protection against ESD and unexpected transients. These miniature surface mount MOSFETs feature ultra low $R_{DS(on)}$ and true logic level performance. EZFET devices are designed for use in low voltage, high speed switching applications where power efficiency is important. Typical applications are dc−dc converters, and power management in portable and battery powered products such as computers, printers, cellular and cordless phones.

Applications

- Zener Protected Gates Provide Electrostatic Discharge Protection
- Designed to Withstand 4000 V Human Body Model
- Ultra Low $R_{DS(on)}$ Provides Higher Efficiency and Extends Battery Life
- Logic Level Gate Drive − Can be Driven by Logic ICs
- Micro8 Leadless Surface Mount Package − Saves Board Space
- I_{DSS} Specified at Elevated Temperature
- Pb−Free Package is Available*

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

Rating	Symbol	10 Secs	Steady State	Unit
Drain−to−Source Voltage	V_{DSS}	20		V
Gate−to−Source Voltage	V_{GS}	±12		V
Continuous Drain Current (Note 1) T_A = 25°C T_A = 85°C	I_D	 8.5 6.1	 6.0 4.2	A
Pulsed Drain Current (tp ≤ 600 μs)	I_{DM}	30		A
Continuous Source−Diode Conduction (Note 1)	I_S	2.9	1.4	A
Total Power Dissipation (Note 1) T_A = 25°C T_A = 85°C	P_D	 3.1 1.6	 1.5 0.79	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	−55 to 150		°C
Thermal Resistance (Note 1) Junction−to−Ambient	$R_{\theta JA}$	40	82	°C/W

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. When surface mounted to 1″ x 1″ FR−4 board.

*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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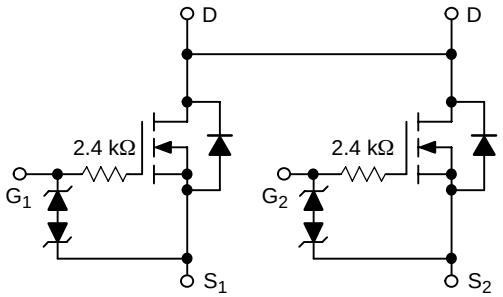
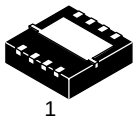
$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D MAX
20 V	20 mΩ @ 4.5 V	8.5 A
	22 mΩ @ 2.5 V	



N−Channel **N−Channel**



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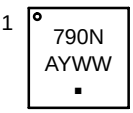
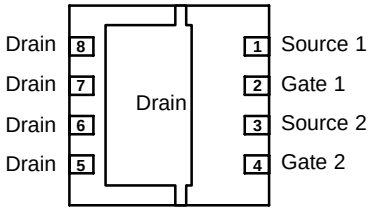
Micro8 Leadless CASE 846C

MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

PIN ASSIGNMENT



(Bottom View)

ORDERING INFORMATION

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

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain−to−Source Breakdown Voltage (Note 2) (V_{GS} = 0 Vdc, I_D = 250 μAdc)		$V_{(BR)DSS}$	20	−	−	Vdc
Zero Gate Voltage Drain Current (V_{DS} = 16 Vdc, V_{GS} = 0 Vdc) (V_{DS} = 16 Vdc, V_{GS} = 0 Vdc, T_J = 85°C)		I_{DSS}	− −	− −	1.0 20	μAdc
Gate−Body Leakage Current (V_{GS} = ±4.5 Vdc, V_{DS} = 0 Vdc) (V_{GS} = ±12 Vdc, V_{DS} = 0 Vdc)		I_{GSS}	− −	− −	1.0 500	μAdc
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage (Note 2) (V_{DS} = V_{GS}, I_D = 250 μAdc)		$V_{GS(th)}$	0.4	−	0.9	Vdc
Static Drain−to−Source On−Resistance (Note 2) (V_{GS} = 4.5 Vdc, I_D = 6.5 Adc) (V_{GS} = 2.5 Vdc, I_D = 5.8 Adc)		$R_{DS(on)}$	− −	20 22	26 31	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V_{DS} = 16 Vdc, V_{GS} = 0 V, f = 10 kHz)	C_{iss}	−	785	−	pF
Output Capacitance		C_{oss}	−	135	−	
Transfer Capacitance		C_{rss}	−	100	−	
SWITCHING CHARACTERISTICS (Note 3)						
Gate Charge	(V_{GS} = 4.5 Vdc, I_D = 6.5 Adc, V_{DS} = 10 Vdc) (Note 2)	Q_T	−	12.4	16	nC
		Q_1	−	1.3	−	
		Q_2	−	3.5	−	
Turn−On Delay Time	(V_{GS} = 4.5 Vdc, V_{DD} = 10 Vdc, I_D = 1.0 Adc, R_G = 9.1 Ω) (Note 2)	$t_{d(on)}$	−	0.55	1.1	μs
Rise Time		t_r	−	1.17	2.2	
Turn−Off Delay Time		$t_{d(off)}$	−	2.9	5.8	
Fall Time		t_f	−	3.8	7.7	
SOURCE−DRAIN DIODE CHARACTERISTICS						
Forward On−Voltage	(I_S = 1.5 Adc, V_{GS} = 0 Vdc) I_S = 1.5 Adc, V_{GS} = 0 Vdc, T_J = 85°C) (Note 2)	V_{SD}	− −	0.65 0.60	1.0 −	Vdc

2. Pulse Test: Pulse Width • 300 μs, Duty Cycle • 2%.
3. Switching characteristics are independent of operating junction temperatures.

TYPICAL ELECTRICAL CHARACTERISTICS

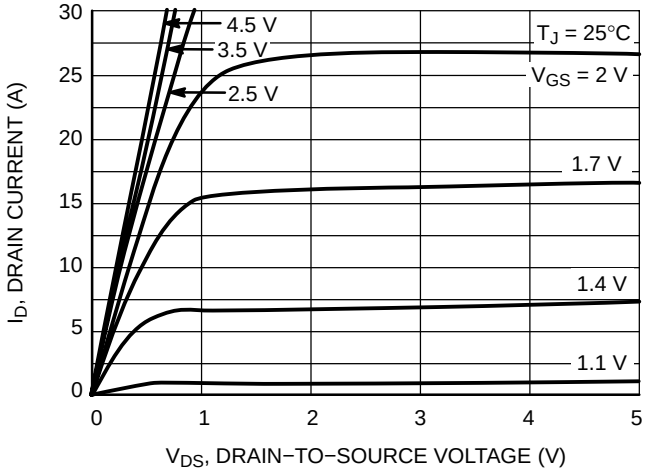


Figure 1. On−Region Characteristics

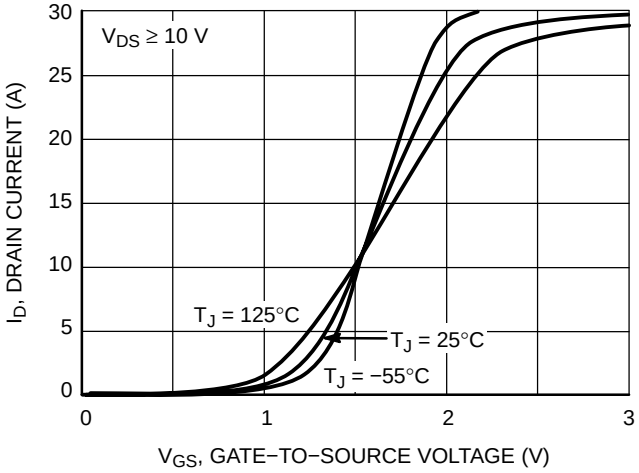


Figure 2. Transfer Characteristics

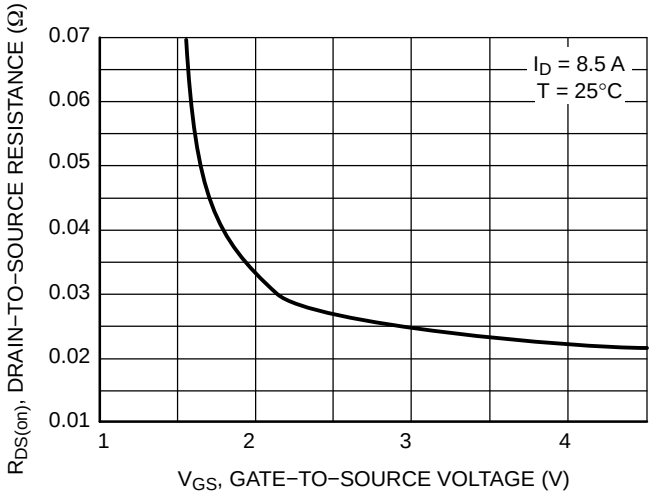


Figure 3. On−Resistance versus Gate Voltage

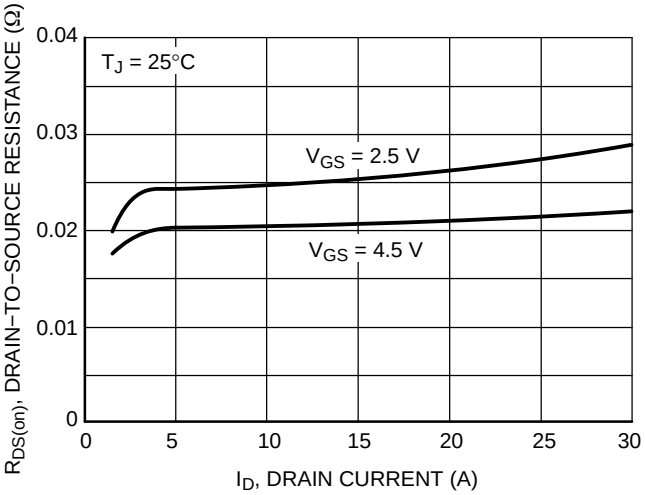


Figure 4. On−Resistance versus Drain Current and Gate Voltage

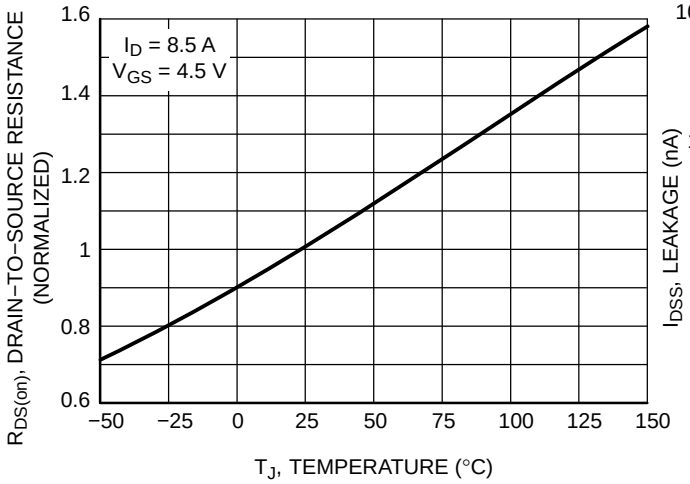


Figure 5. On−Resistance Variation with Temperature

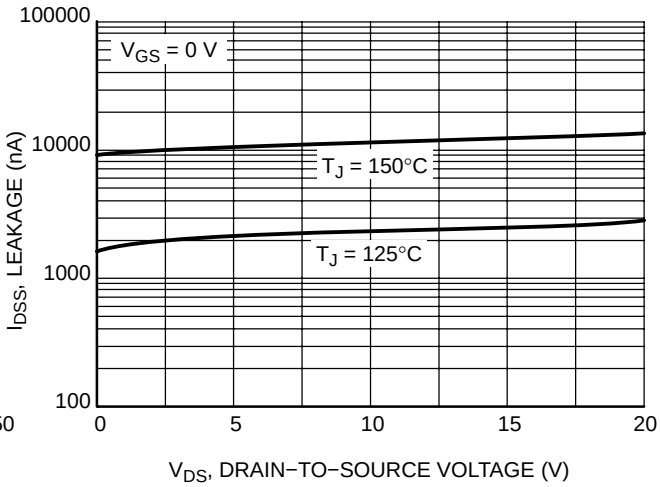


Figure 6. Drain−to−Source Leakage Current versus Voltage

TYPICAL ELECTRICAL CHARACTERISTICS

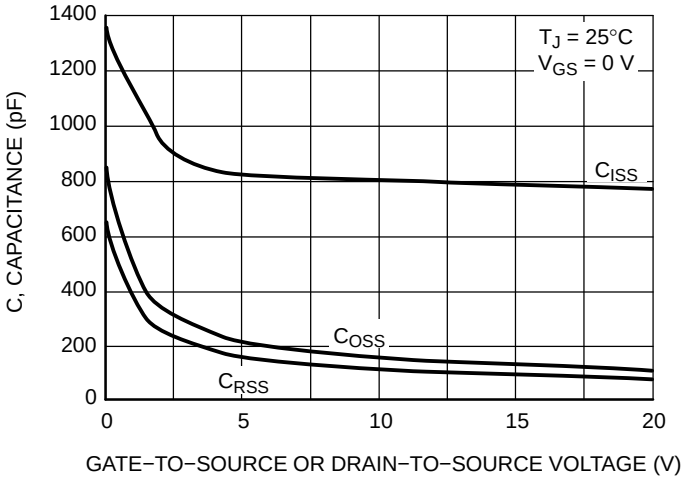


Figure 7. Capacitance Variation

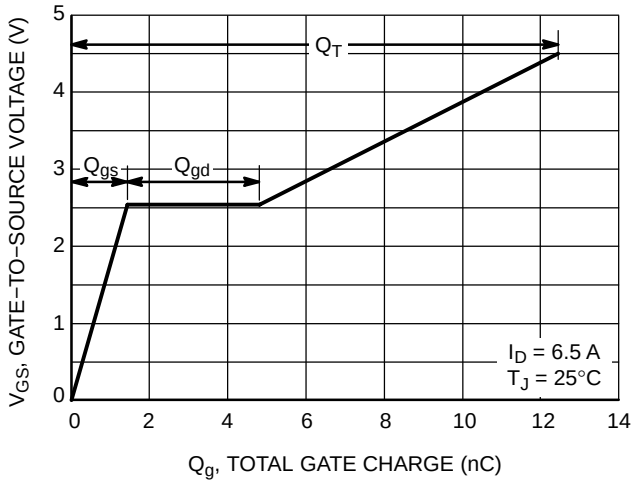


Figure 8. Gate−to−Source and Drain−to−Source Voltage versus Total Charge

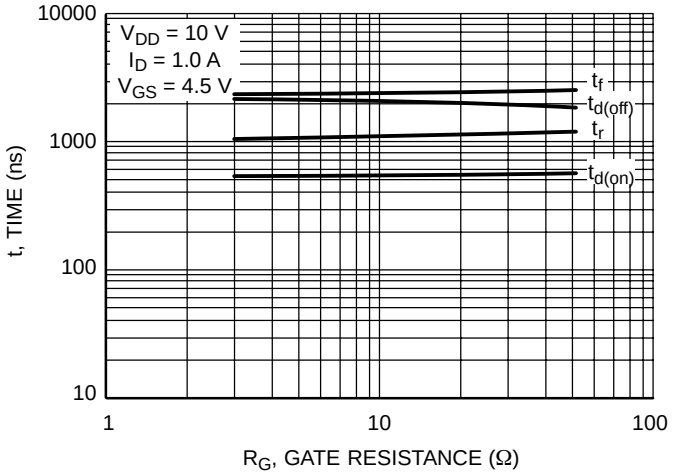


Figure 9. Resistive Switching Time Variation versus Gate Resistance

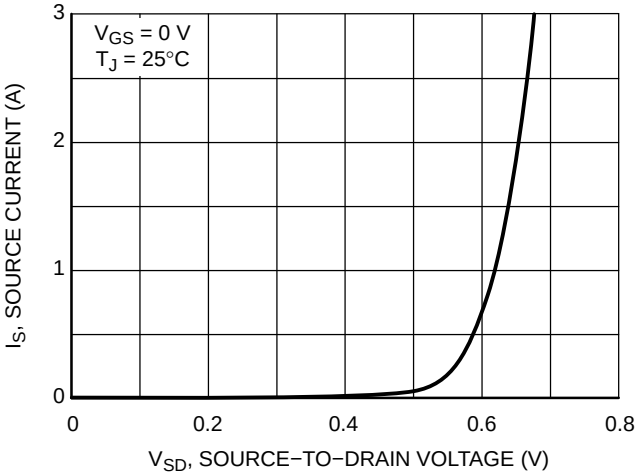


Figure 10. Diode Forward Voltage versus Current

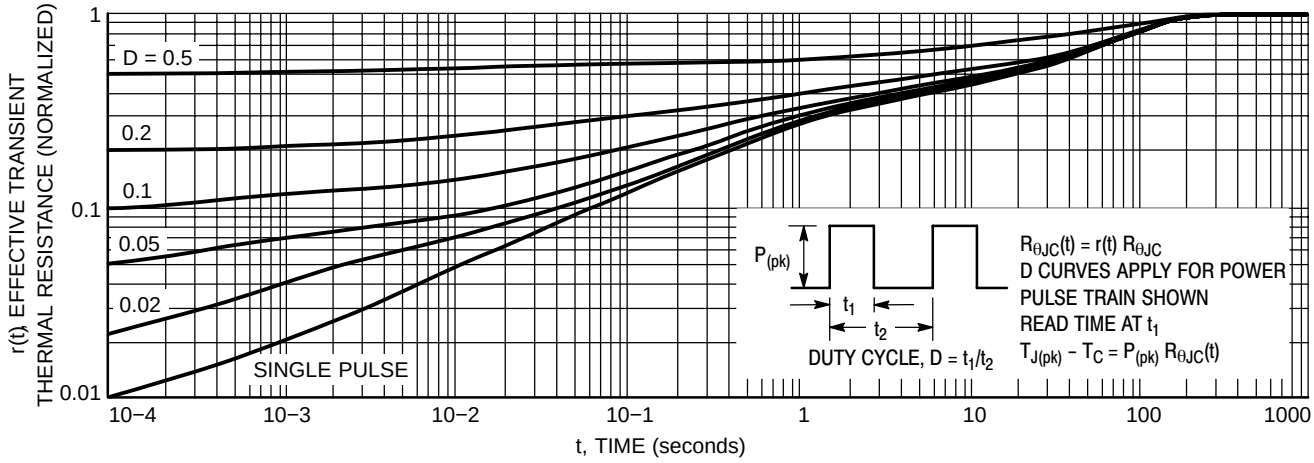


Figure 11. Thermal Response

ORDERING INFORMATION

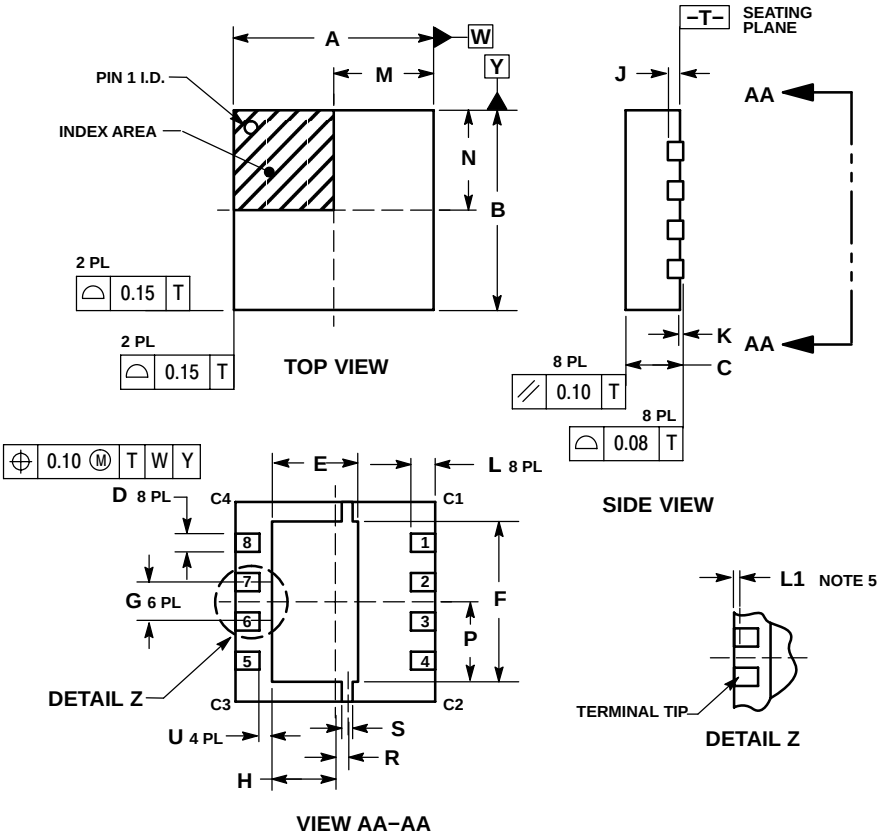
Device	Package	Shipping†
NTLTD7900NR2G	Micro8 LL (Pb−Free)	2500 / Tape & Reel

†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.

NTLTD7900N

PACKAGE DIMENSIONS

Micro8 Leadless
CASE 846C−01
ISSUE O



NOTES:
1. DIMENSIONS AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. THE TERMINAL #1 IDENTIFIER AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JESD 95−1 SPP−012. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.
4. DIMENSION D APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.25 MM AND 0.30 MM FROM TERMINAL TIP. DIMENSION L1 IS THE TERMINAL PULL BACK FROM PACKAGE EDGE, UP TO 0.1 MM IS ACCEPTABLE. L1 IS OPTIONAL.
5. DEPOPULATION IS POSSIBLE IN A SYMMETRICAL FASHION.

	MILLIMETERS	
DIM	MIN	MAX
A	3.20	3.40
B	3.20	3.40
C	0.85	0.95
D	0.28	0.33
E	1.30	1.50
F	2.55	2.75
G	0.65 BSC	
H	0.95	1.15
J	0.25 BSC	
K	0.00	0.05
L	0.35	0.45
M	1.60	1.70
N	1.60	1.70
P	1.28	1.38
R	0.200	0.250
S	0.18	0.23
U	0.20	---

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Micro8 is a trademark of International Rectifier.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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