NTNS3C68NZ

MOSFET – Single, N-Channel, Small Signal, SOT-883, (XDFN3), 1.0 x 0.6 x 0.4 mm

12 V, 758 mA

ON Semiconductor®

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Features

- Single N−Channel MOSFET
- Ultra Low Profile SOT−883 (XDFN3) 1.0 x 0.6 x 0.4 mm for Extremely Thin Environments such as Portable Electronics
- Low $R_{DS(on)}$ Solution in Ultra Small 1.0 x 0.6 mm Package
- 1.8 V Gate Drive
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

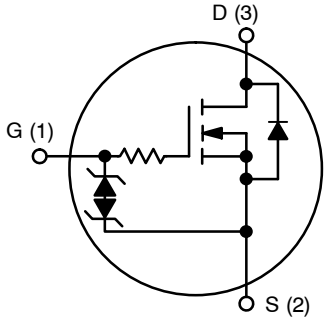
Applications

- Load Switch
- High Speed Interfacing
- Level Shift and Translate
- Optimized for Power Management in Ultra Portable Solutions

MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
12 V	0.160 Ω @ 4.5 V	758 mA
	0.175 Ω @ 3.7 V	
	0.185 Ω @ 3.3 V	
	0.230 Ω @ 2.5 V	
	0.440 Ω @ 1.8 V	

N−Channel MOSFET



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

Parameter			Symbol	Value	Units
Drain-to-Source Voltage			V_{DSS}	12	V
Gate-to-Source Voltage			V_{GS}	±8	V
Continuous Drain Current (Note 1)	Steady State	T_A = 25°C	I_D	758	mA
		T_A = 85°C		547	
	t ≤ 5 s	T_A = 25°C		898	
Power Dissipation (Note 1)	Steady State	T_A = 25°C	P_D	156	mW
	t ≤ 5 s	T_A = 25°C		219	
Pulsed Drain Current		t_p = 10 μs	I_{DM}	2.2	A
Operating Junction and Storage Temperature			T_J, T_{STG}	-55 to 150	°C
Source Current (Body Diode) (Note 2)			I_S	223	mA
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.

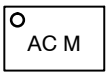
THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Units
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	800	°C/W
Junction-to-Ambient – t ≤ 5 s (Note 1)	$R_{\theta JA}$	570	

1. Surface Mounted on FR4 Board using the minimum recommended pad size, (or 2 mm^2), 1 oz Cu.

MARKING DIAGRAM

SOT−883 (XDFN3) CASE 506CB



AC = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NTNS3C68NZT5G	SOT−883 (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.

2. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.

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	12			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 250 μA, ref to 25°C		11		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 9.6 V, T_J = 25°C			1.0	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±10 V			±10	μA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250 μA	0.4		1.0	V
Negative Gate Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			1.1		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 100 mA		0.120	0.160	Ω
		V_{GS} = 3.7 V, I_D = 75 mA		0.130	0.175	
		V_{GS} = 3.3 V, I_D = 75 mA		0.135	0.185	
		V_{GS} = 2.5 V, I_D = 50 mA		0.167	0.230	
		V_{GS} = 1.8 V, I_D = 20 mA		0.250	0.440	
		V_{GS} = 1.5 V, I_D = 10 mA		0.44		
Forward Transconductance	g_{FS}	V_{DS} = 5 V, I_D = 100 mA		0.8		S
Source−Drain Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 100 mA		0.68	1.1	V
CHARGES & CAPACITANCES						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 9.6 V		67		pF
Output Capacitance	C_{OSS}			19		
Reverse Transfer Capacitance	C_{RSS}			8.5		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 9.6 V, I_D = 100 mA		1.8		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.1		
Gate−to−Source Charge	Q_{GS}			0.3		
Gate−to−Drain Charge	Q_{GD}			0.4		
SWITCHING CHARACTERISTICS, VGS = 4.5 V (Note 3)						
Turn-On Delay Time	$t_{d(ON)}$	V_{GS} = 4.5 V, V_{DD} = 9.6 V, I_D = 100 mA, R_G = 2 Ω		10.7		ns
Rise Time	t_r			19.4		
Turn-Off Delay Time	$t_{d(OFF)}$			710		
Fall Time	t_f			310		

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

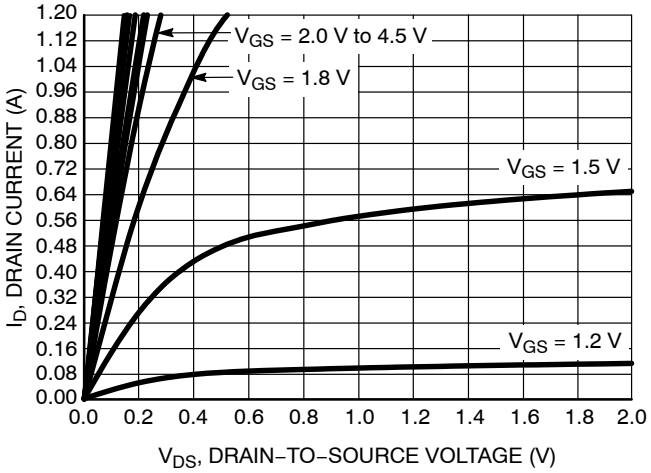


Figure 1. On−Region Characteristics

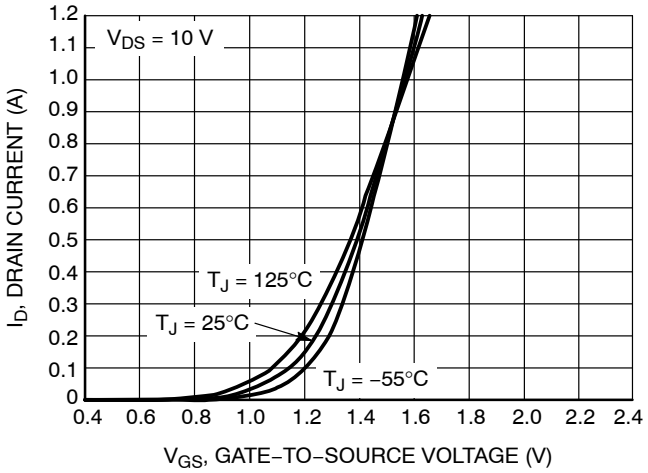


Figure 2. Transfer Characteristics

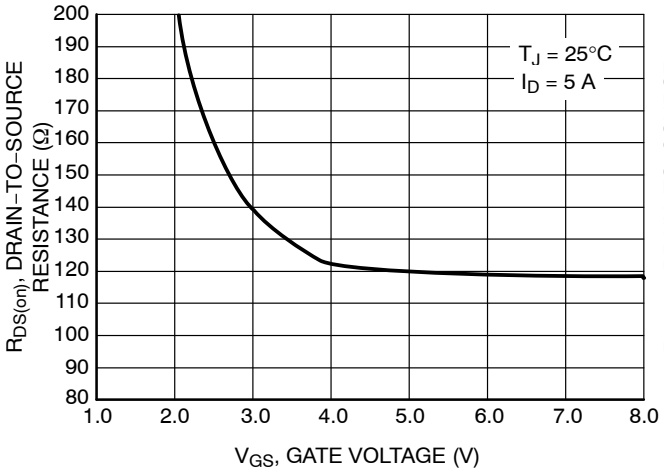


Figure 3. On−Resistance vs. Gate−to−Source Voltage

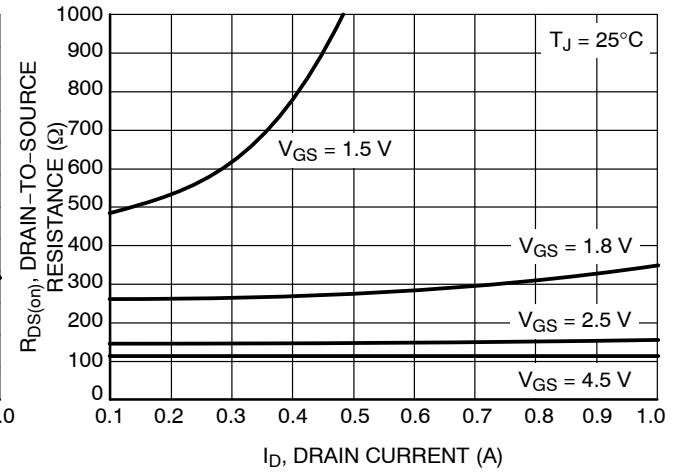


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

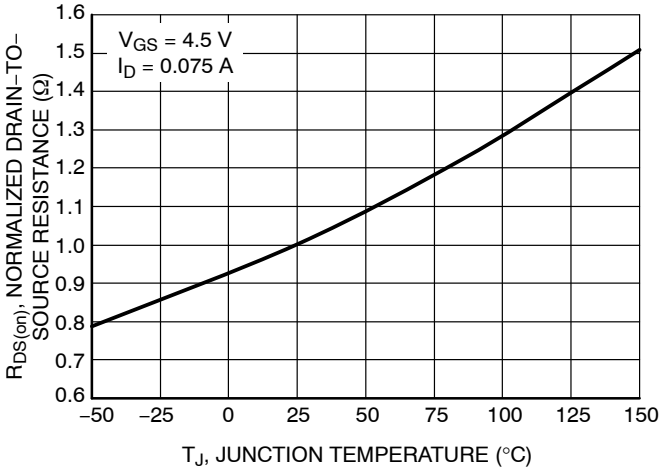


Figure 5. On−Resistance Variation with Temperature

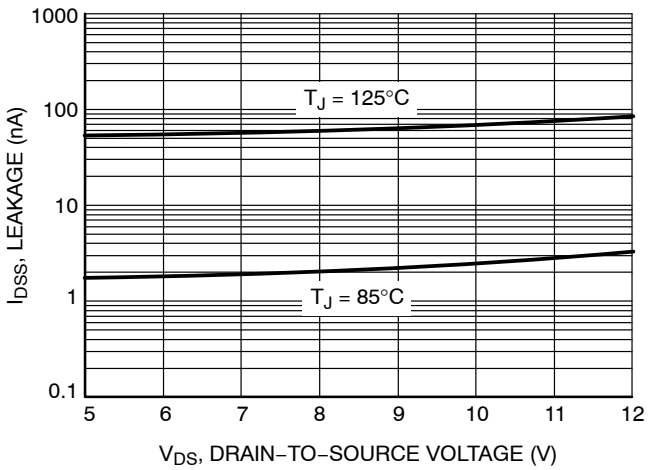


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

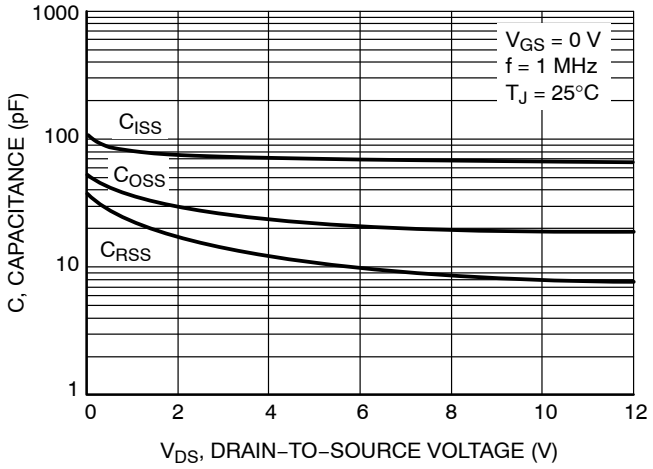


Figure 7. Capacitance Variation

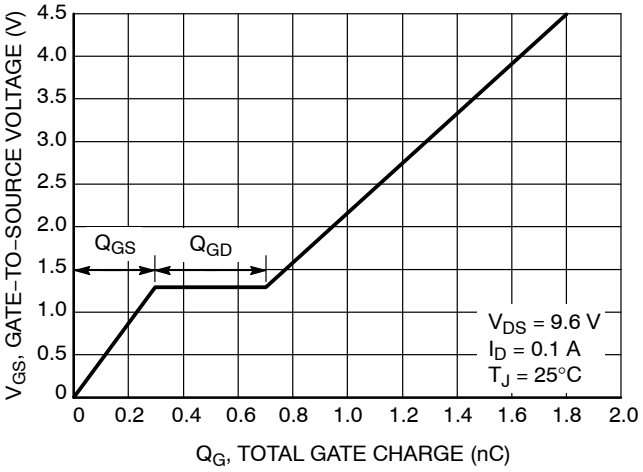


Figure 8. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

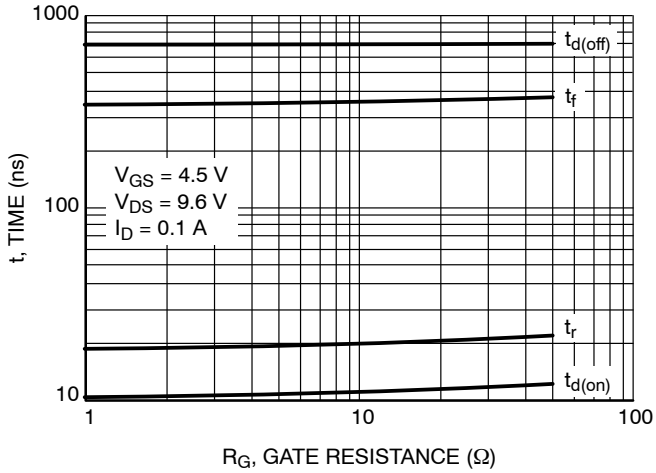


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

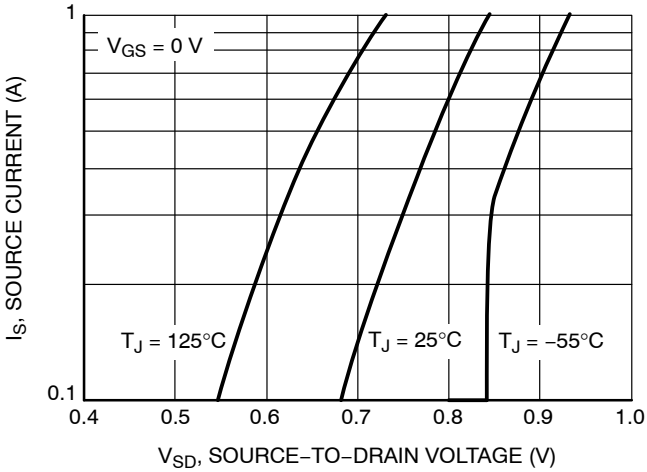


Figure 10. Diode Forward Voltage vs. Current

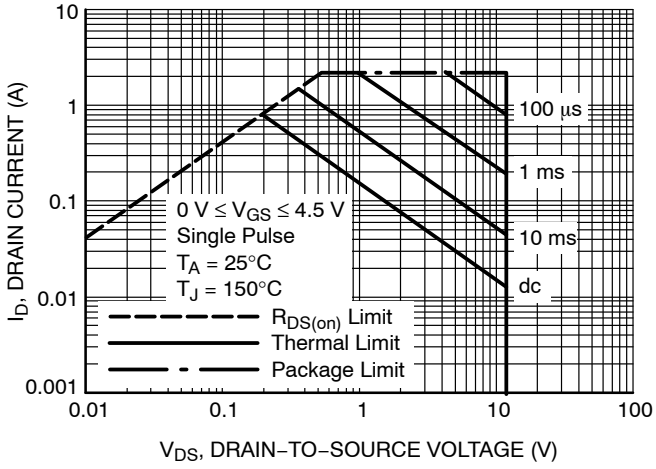


Figure 11. Maximum Rated Forward Biased Safe Operating Area

TYPICAL CHARACTERISTICS

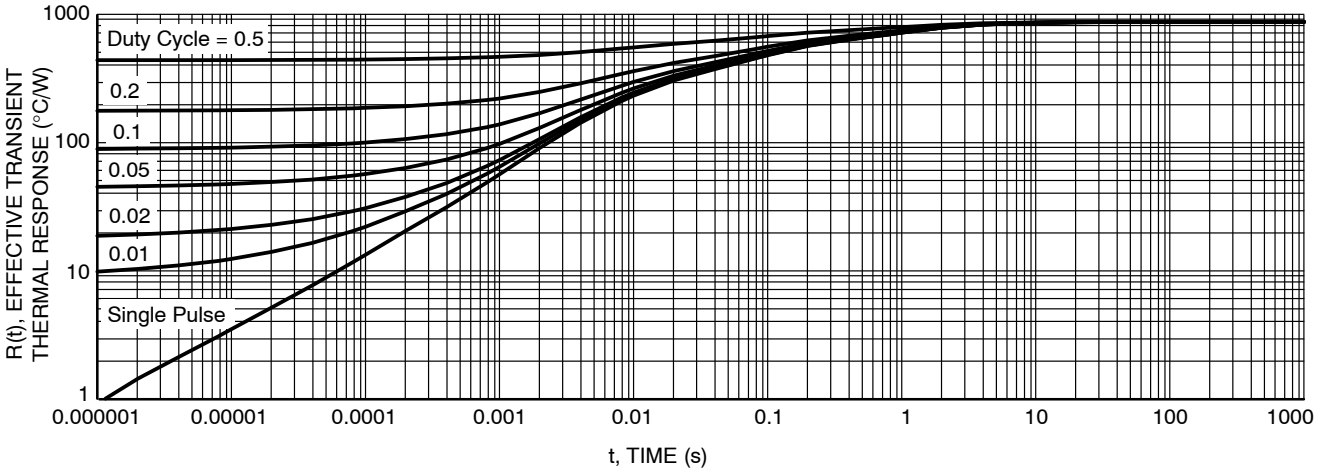
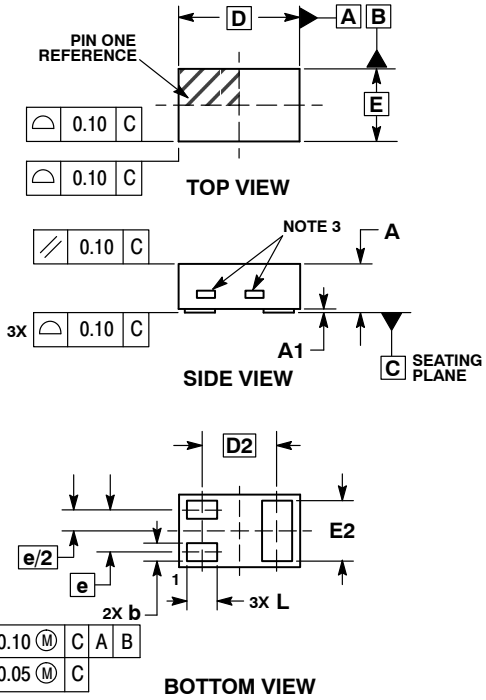


Figure 12. FET Thermal Response

NTNS3C68NZ

PACKAGE DIMENSIONS

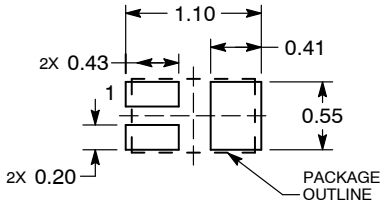
SOT−883 (XDFN3), 1.0x0.6, 0.35P
CASE 506CB
ISSUE A



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. EXPOSED COPPER ALLOWED AS SHOWN.

	MILLIMETERS	
DIM	MIN	MAX
A	0.340	0.440
A1	0.000	0.030
b	0.075	0.200
D	0.950	1.075
D2	0.620 BSC	
e	0.350 BSC	
E	0.550	0.675
E2	0.425	0.550
L	0.170	0.300

RECOMMENDED SOLDER 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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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