

NTNS3C68NZ

Small Signal MOSFET 12 V, 758 mA, Single N-Channel SOT-883 (XDFN3) 1.0 x 0.6 x 0.4 mm Package

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

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ 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	I_D	$T_A = 25^\circ\text{C}$	758	mA
			$T_A = 85^\circ\text{C}$	547	
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$	898		
Power Dissipation (Note 1)	Steady State	P_D	$T_A = 25^\circ\text{C}$	156	mW
			$T_A = 25^\circ\text{C}$	219	
Pulsed Drain Current		$t_p = 10 \mu\text{s}$	I_{DM}	2.2	A
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150		$^\circ\text{C}$
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		$^\circ\text{C}$

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.

THERMAL RESISTANCE RATINGS

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

1. Surface Mounted on FR4 Board using the minimum recommended pad size, (or 2 mm²), 1 oz Cu.
2. Pulse Test: pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.



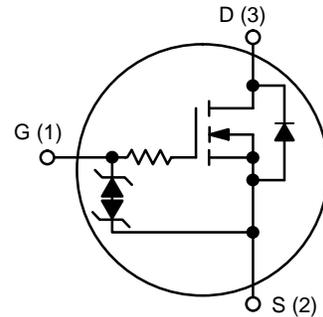
ON Semiconductor®

www.onsemi.com

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	

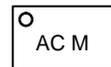
N-Channel MOSFET



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.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	12			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = 250\ \mu\text{A}, \text{ref to } 25^\circ\text{C}$		11		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 9.6\text{ V}$ $T_J = 25^\circ\text{C}$			1.0	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}$			±10	μA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	0.4		1.0	V
Negative Gate Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			1.1		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 100\text{ mA}$		0.120	0.160	Ω
		$V_{GS} = 3.7\text{ V}, I_D = 75\text{ mA}$		0.130	0.175	
		$V_{GS} = 3.3\text{ V}, I_D = 75\text{ mA}$		0.135	0.185	
		$V_{GS} = 2.5\text{ V}, I_D = 50\text{ mA}$		0.167	0.230	
		$V_{GS} = 1.8\text{ V}, I_D = 20\text{ mA}$		0.250	0.440	
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{ V}, I_D = 100\text{ mA}$		0.8		S
Source-Drain Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 100\text{ mA}$		0.68	1.1	V

CHARGES & CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = 9.6\text{ V}$		67		pF
Output Capacitance	C_{OSS}			19		
Reverse Transfer Capacitance	C_{RSS}			8.5		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 9.6\text{ V}, I_D = 100\text{ mA}$		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, V_{GS} = 4.5 V (Note 3)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 4.5\text{ V}, V_{DD} = 9.6\text{ V}, I_D = 100\text{ mA}, R_G = 2\ \Omega$		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.

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TYPICAL CHARACTERISTICS

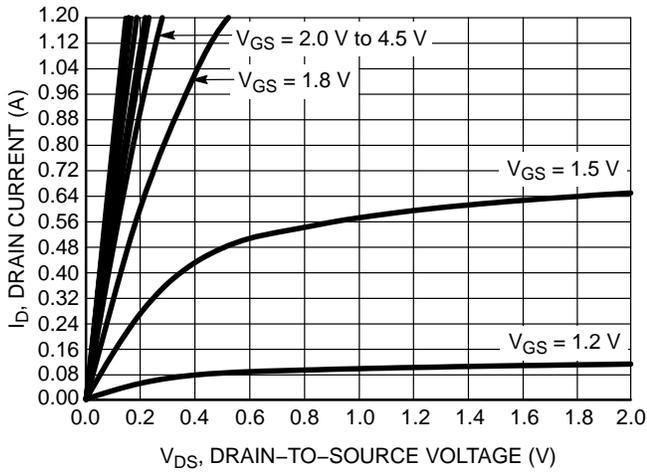


Figure 1. On-Region Characteristics

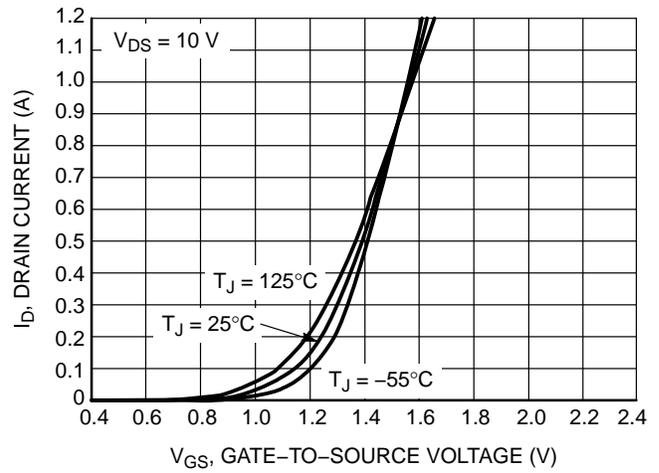


Figure 2. Transfer Characteristics

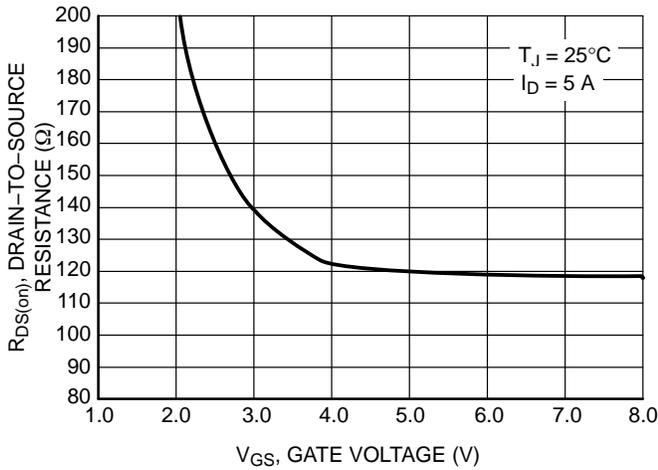


Figure 3. On-Resistance vs. Gate-to-Source Voltage

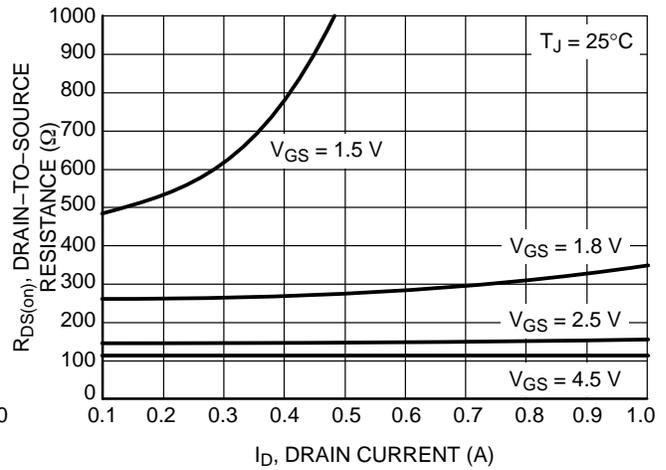


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

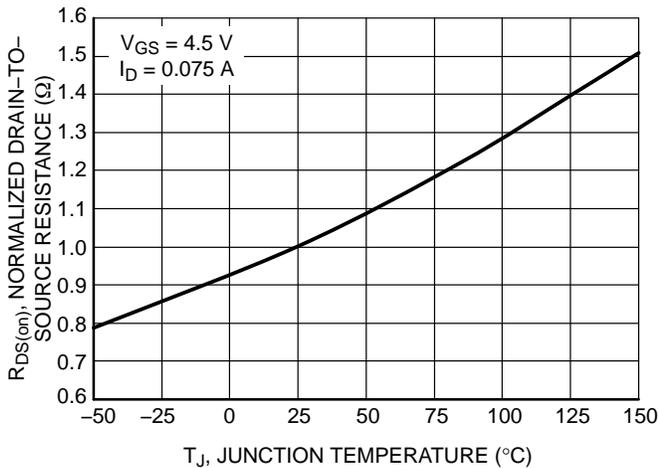


Figure 5. On-Resistance Variation with Temperature

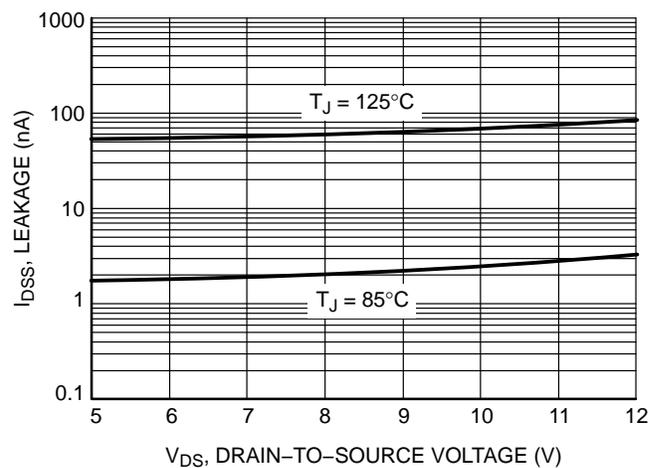


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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TYPICAL CHARACTERISTICS

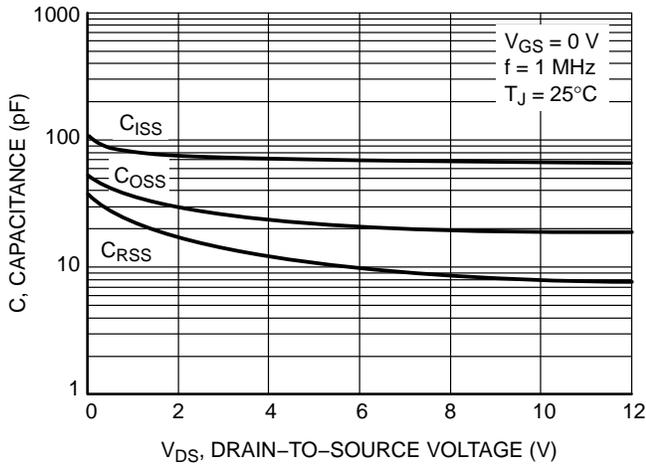


Figure 7. Capacitance Variation

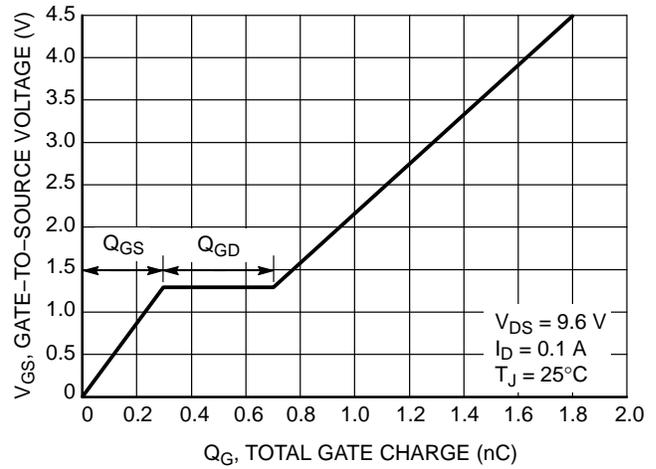


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

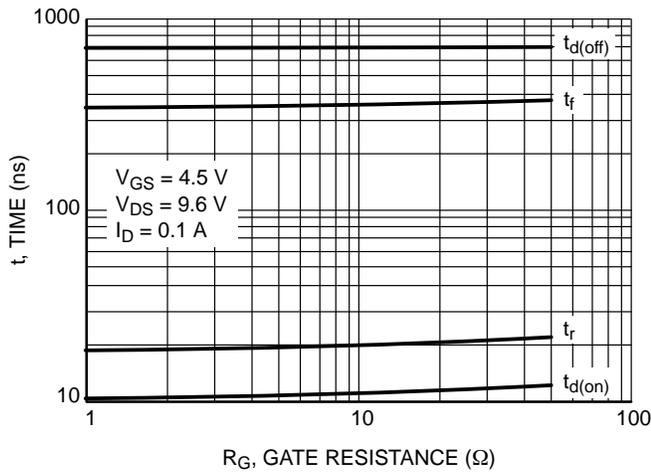


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

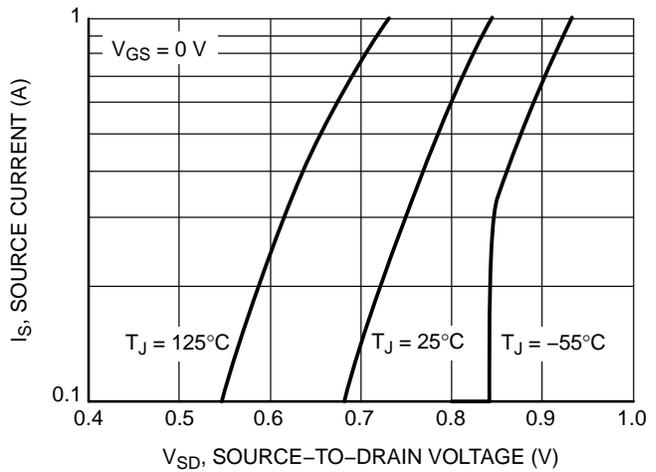


Figure 10. Diode Forward Voltage vs. Current

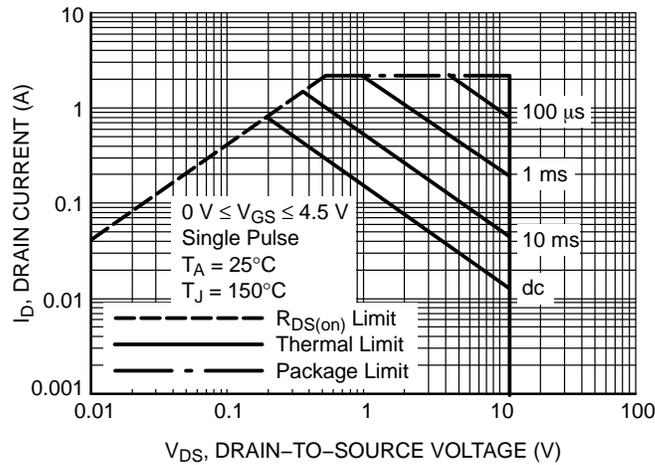


Figure 11. Maximum Rated Forward Biased Safe Operating Area

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TYPICAL CHARACTERISTICS

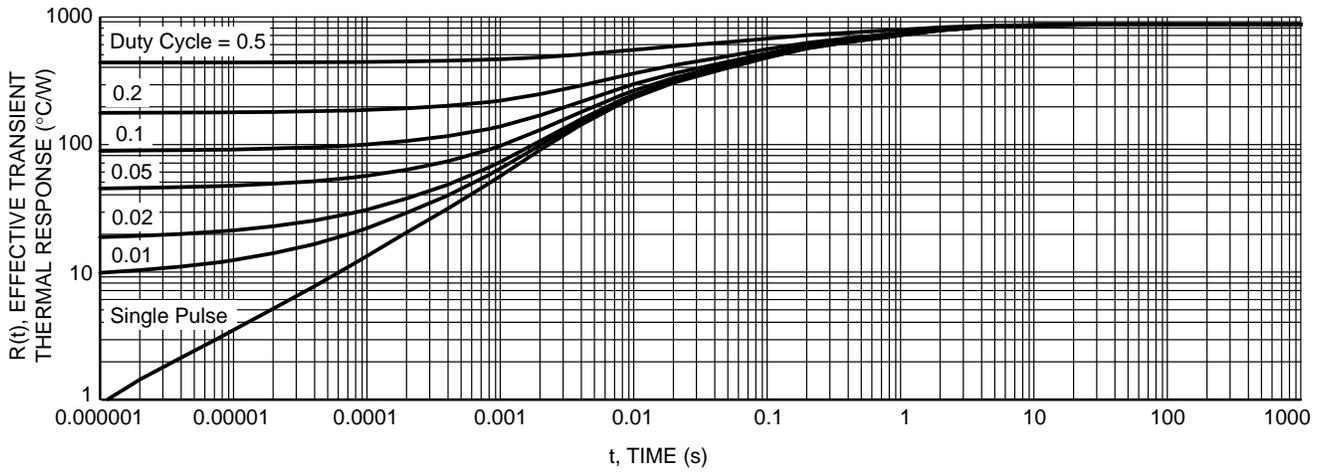
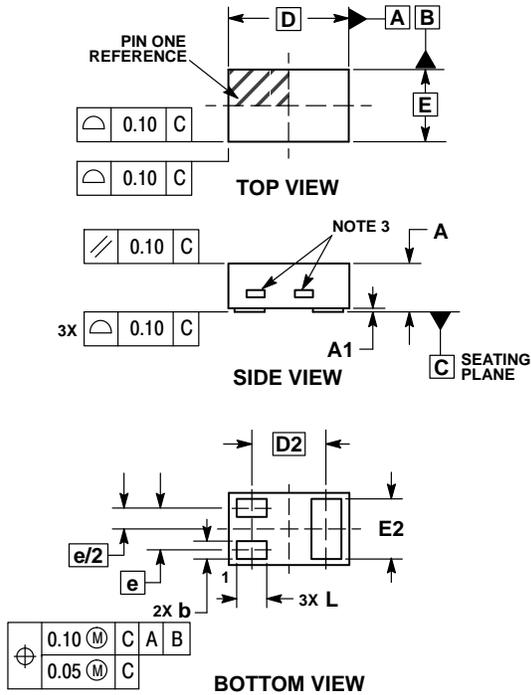


Figure 12. FET Thermal Response

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PACKAGE DIMENSIONS

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

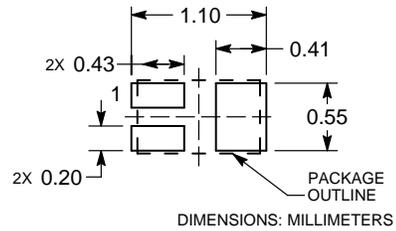


NOTES:

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*



*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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