

NTNS4C69N

MOSFET – Single, N-Channel, Small Signal, SOT-883 (XDFN3), 1.0 x 0.6 x 0.4 mm 30 V, 1000 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

- High Side Switch
- High Speed Interfacing
- Level Shift and Translate
- Optimized for DC-DC Converter 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}	30	V	
Gate-to-Source Voltage		V_{GS}	± 12	V	
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	I_D	1000	mA
				$T_A = 85^\circ\text{C}$	
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$	1050		
Power Dissipation (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	P_D	178	mW
				$T_A = 25^\circ\text{C}$	
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$	187		
Pulsed Drain Current		$t_p = 10 \mu\text{s}$	I_{DM}	2.6	mA
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150		$^\circ\text{C}$
Source Current (Body Diode) (Note 2)		I_S	187		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.

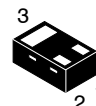
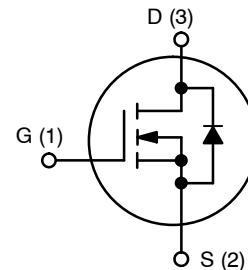
THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Units
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	703	$^\circ\text{C}/\text{W}$
Junction-to-Ambient – $t \leq 5$ s (Note 1)	$R_{\theta JA}$	670	

MOSFET

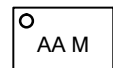
$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
30 V	0.155 Ω @ 4.5 V	1000 mA
	0.168 Ω @ 3.7 V	
	0.180 Ω @ 3.3 V	
	0.220 Ω @ 2.5 V	
	0.450 Ω @ 1.8 V	

N-Channel MOSFET



SOT-883
(XDFN3)
CASE 506CB

MARKING DIAGRAM



AA = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NTNS4C69NCG	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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1. Surface Mounted on FR4 Board using the minimum recommended pad size, (or 2 mm²), 1 oz Cu.
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
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J	I _D = 250 μA, ref to 25°C		17		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 24 V			1.0	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = 12 V			100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 10 μA	0.65		1.1	V
Negative Gate Threshold Temperature Coefficient	V _{GS(TH)} /T _J			-3.0		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 300 mA		0.127	0.155	Ω
		V _{GS} = 3.7 V, I _D = 250 mA		0.135	0.168	
		V _{GS} = 3.3 V, I _D = 200 mA		0.140	0.180	
		V _{GS} = 2.5 V, I _D = 150 mA		0.170	0.220	
		V _{GS} = 1.8 V, I _D = 100 mA		0.300	0.450	
Forward Transconductance	g _{FS}	V _{DS} = 5 V, I _D = 200 mA		2.0		S
Source-Drain Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 100 mA		0.7	1.0	V

CHARGES & CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1 MHz, V _{DS} = 15 V		75		pF
Output Capacitance	C _{OSS}			34		
Reverse Transfer Capacitance	C _{RSS}			3.0		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V, V _{DS} = 15 V, I _D = 200 mA		0.9		nC
Threshold Gate Charge	Q _{G(TH)}			0.1		
Gate-to-Source Charge	Q _{GS}			0.2		
Gate-to-Drain Charge	Q _{GD}			0.1		

SWITCHING CHARACTERISTICS, V_{GS} = 4.5 V (Note 3)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 4.5 V, V _{DD} = 15 V, I _D = 200 mA, R _G = 2 Ω		4.5		ns
Rise Time	t _r			3.5		
Turn-Off Delay Time	t _{d(OFF)}			9.0		
Fall Time	t _f			7.0		

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

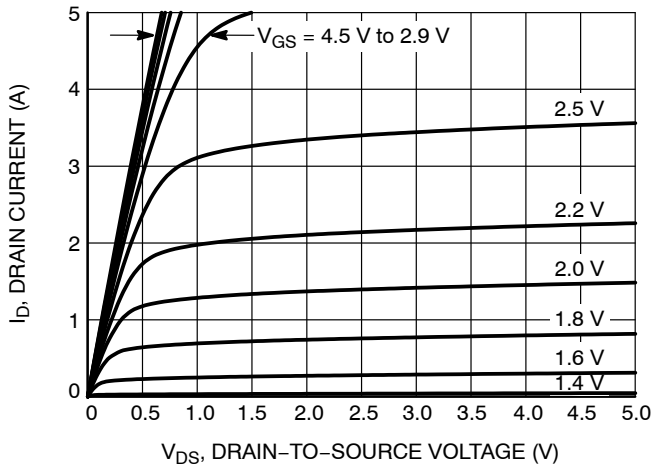


Figure 1. On-Region Characteristics

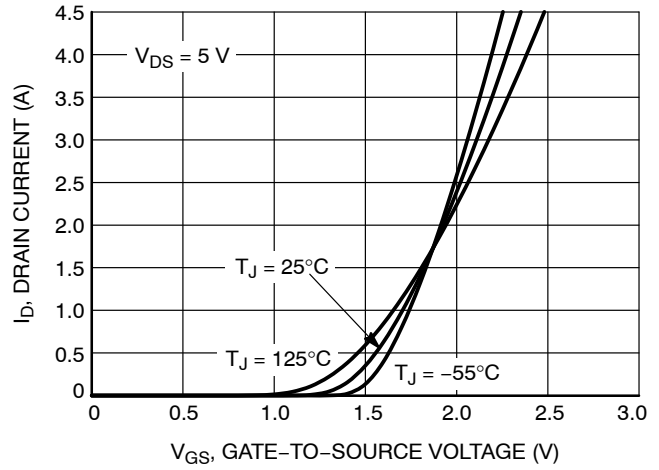


Figure 2. Transfer Characteristics

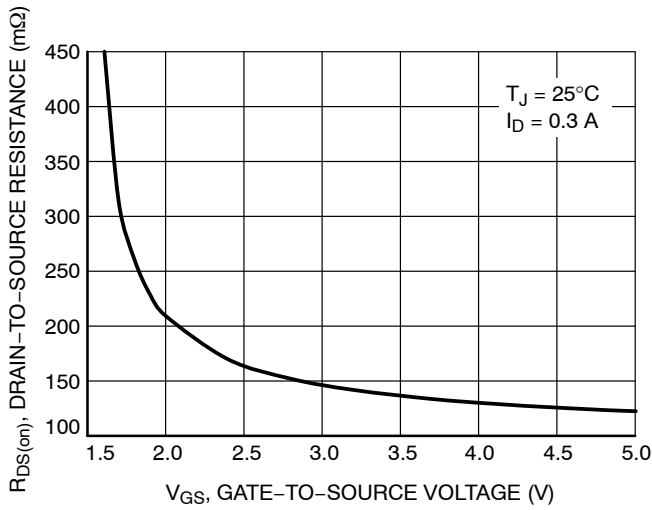


Figure 3. On-Resistance vs. Gate-to-Source Voltage

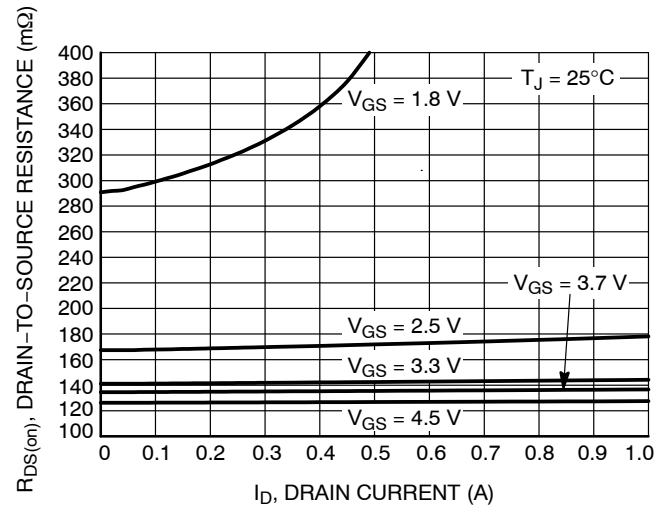


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

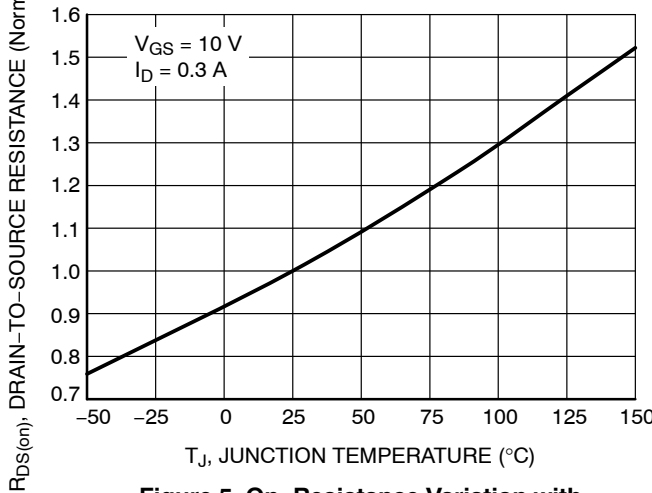


Figure 5. On-Resistance Variation with Temperature

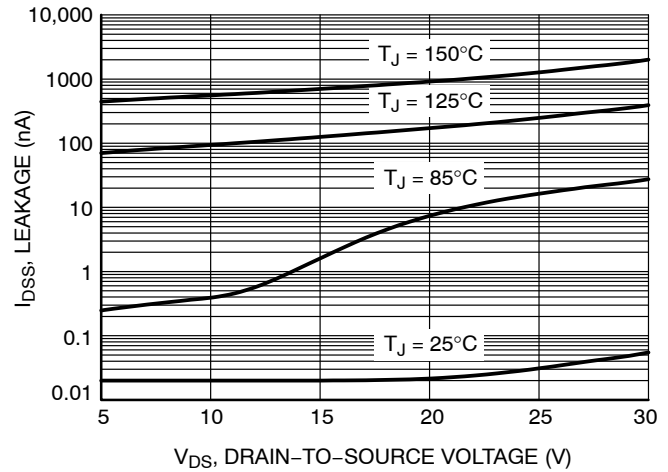


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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TYPICAL CHARACTERISTICS

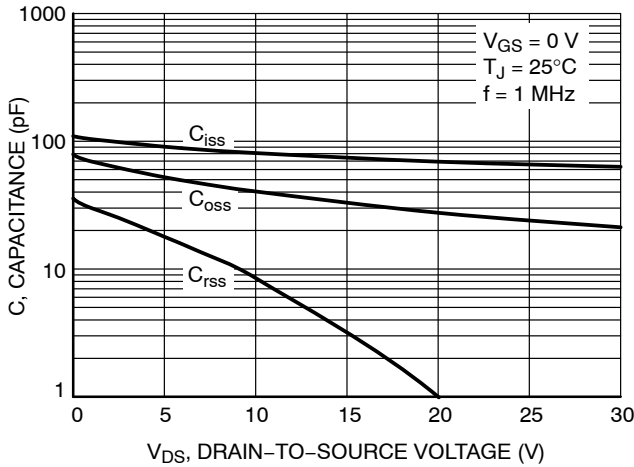


Figure 7. Capacitance Variation

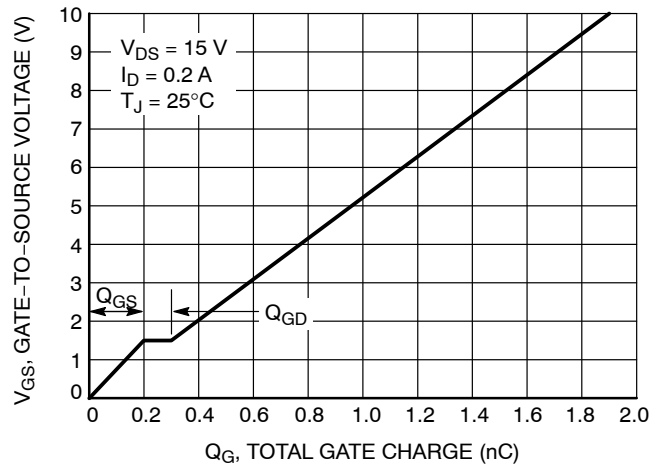


Figure 8. Gate-to-Source vs. Total Charge

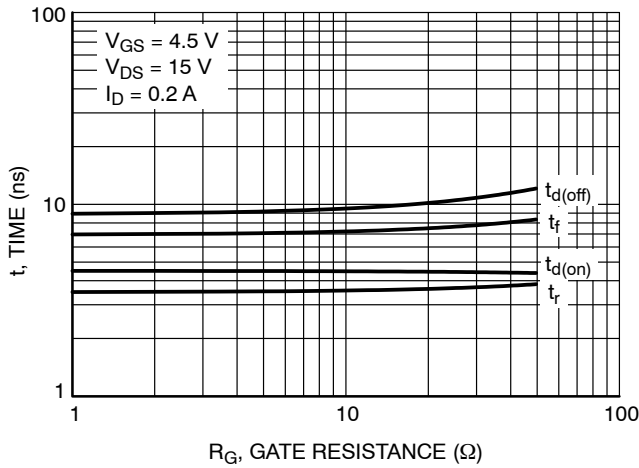


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

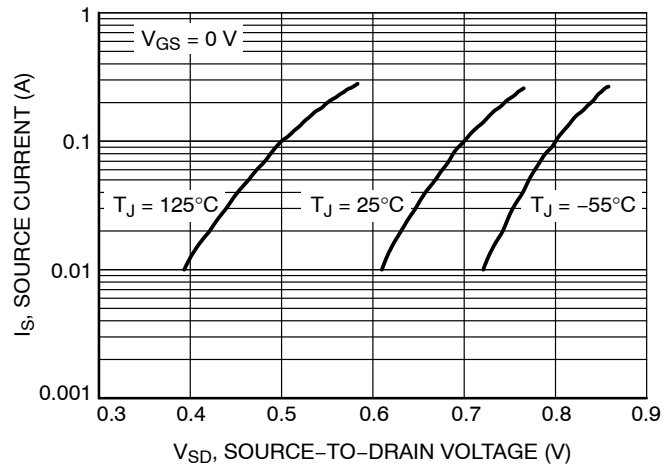


Figure 10. Diode Forward Voltage vs. Current

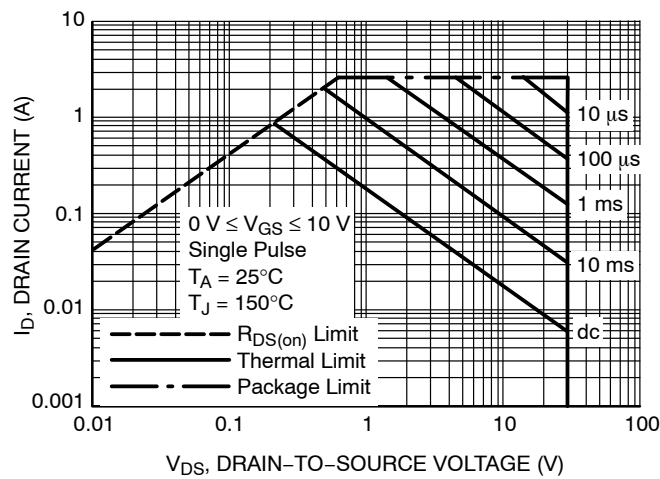


Figure 11. Safe Operating Area

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TYPICAL CHARACTERISTICS

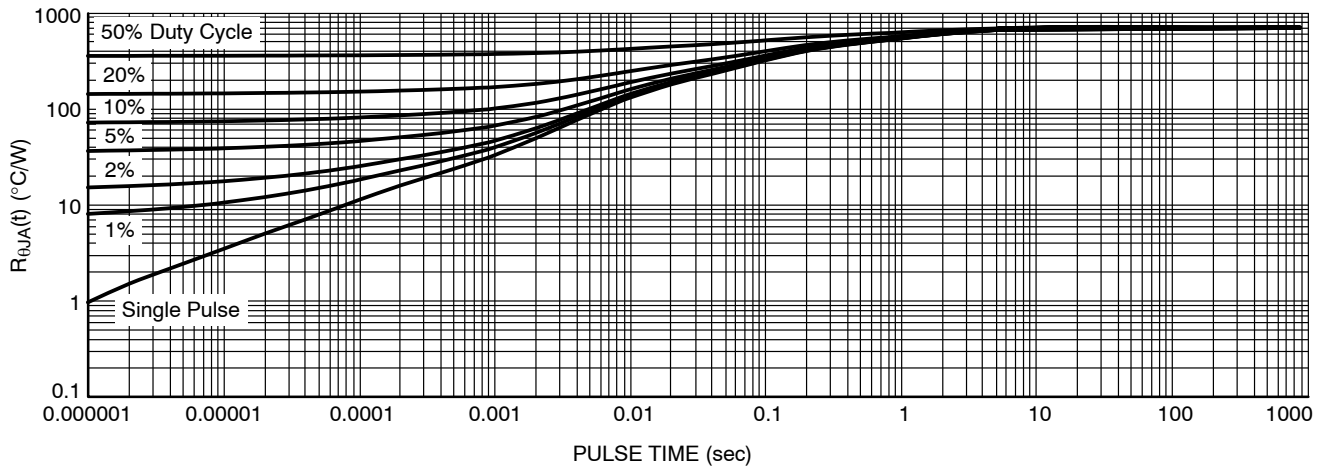
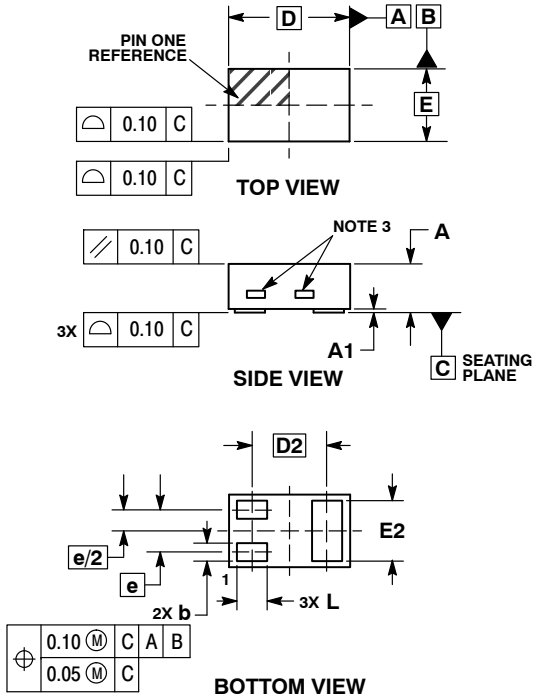


Figure 12. Thermal Characteristics

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PACKAGE DIMENSIONS

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

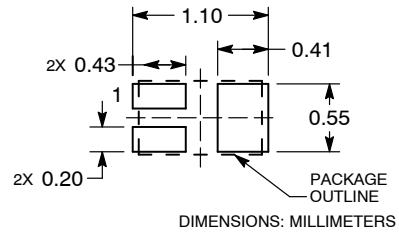


NOTES:

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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