

NTMS4700N

Power MOSFET

30 V, 14.5 A, Single N-Channel, SO-8

Features

- Ultra Low $R_{DS(on)}$ (at 4.5 V_{GS}), Low Gate Resistance and Low Q_G
- Optimized for High Side Control Applications
- High Speed Switching Capability

Applications

- Notebook Computer Vcore Applications
- Network Applications
- DC-DC Converters

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

Rating		Symbol	Value	Unit
Drain-to-Source Voltage		V _{DSS}	30	V
Gate-to-Source Voltage – Continuous		V _{GS}	±20	V
Continuous Drain Current (Note 1)	Steady State	T _A = 25°C	I _D 11.5	A
		T _A = 70°C	9.2	
	t ≤ 10 s	T _A = 25°C	14.5	
Power Dissipation (Note 1)	Steady State	T _A = 25°C	P _D 1.56	W
			2.5	
	t ≤ 10 s			
Continuous Drain Current (Note 2)	Steady State	T _A = 25°C	I _D 8.6	A
		T _A = 70°C	6.8	
		T _A = 25°C	P _D 0.86	
Power Dissipation (Note 2)				W
Pulsed Drain Current	tp = 10 μs	I _{DM}	40	A
Operating and Storage Temperature		T _J , T _{stg}	-55 to 150	°C
Source Current (Body Diode)		I _S	2.5	A
Single Pulse Drain-to-Source Avalanche Energy (V _{DD} = 25 V, V _{GS} = 10 V, I _{PK} = 7.5 A, L = 10 mH, R _G = 25 Ω)		E _{AS}	280	mJ
Lead Temperature for Soldering Purposes (1/8 in from case for 10 s)		T _L	260	°C

THERMAL RESISTANCE RATINGS

Rating	Symbol	Value	Unit
Junction-to-Lead – Steady State	R _{θJL}	16	°C/W
Junction-to-Ambient – Steady State (Note 1)	R _{θJA}	80	
Junction-to-Ambient – t ≤ 10 s (Note 1)	R _{θJA}	50	
Junction-to-Ambient – Steady State (Note 2)	R _{θJA}	145	

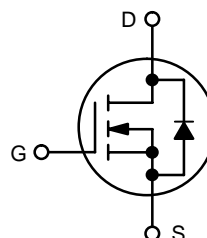
1. Surface-mounted on FR4 board using 1 in sq. pad size (Cu area 1.127 in sq. [1 oz] including traces).
2. Surface-mounted on FR4 board using minimum recommended pad size (Cu area 0.412 in sq.).



ON Semiconductor®

<http://onsemi.com>

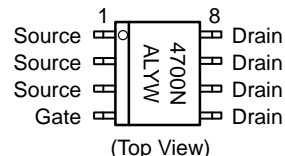
V _{(BR)DSS}	R _{DS(on)} TYP	I _D MAX
30 V	6.0 mΩ @ 10 V	14.5 A
	7.3 mΩ @ 4.5 V	



MARKING DIAGRAM/ PIN ASSIGNMENT



SO-8
CASE 751
STYLE 12



4700N = Specific Device Code
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week

ORDERING INFORMATION

Device	Package	Shipping†
NTMS4700NR2	SO-8	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.

NTMS4700N

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

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
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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			18		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 24 V	T _J = 25°C		1.0	μA
			T _J = 125°C		50	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250 μA	1.0		3.0	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J			5.0		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 10 A		7.3	10	mΩ
		V _{GS} = 10 V, I _D = 13 A		6.0	7.2	
Forward Transconductance	g _{FS}	V _{DS} = 15 V, I _D = 10 A		25		S

CHARGES, CAPACITANCES AND GATE RESISTANCE

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 24 V		1600		pF
Output Capacitance	C _{OSS}			700		
Reverse Transfer Capacitance	C _{RSS}			200		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V, V _{DS} = 15 V, I _D = 10 A		16		nC
Threshold Gate Charge	Q _{G(TH)}			3.0		
Gate-to-Source Charge	Q _{GS}			5.0		
Gate-to-Drain Charge	Q _{GD}			7.0		
Gate Resistance	R _G			0.8		Ω

SWITCHING CHARACTERISTICS, V_{GS} = 4.5 V (Note 4)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 4.5 V, V _{DD} = 15 V, I _D = 10 A, R _G = 3.0 Ω		15		ns
Rise Time	t _r			55		
Turn-Off Delay Time	t _{d(OFF)}			20		
Fall Time	t _f			13		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 2.5 A	T _J = 25°C		0.75	1.0	V
			T _J = 125°C		0.55		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _{SD} /dt = 100 A/μs, I _S = 10 A			40		ns
Charge Time	t _a				18		
Discharge Time	t _b				22		
Reverse Recovery Charge	Q _{RR}				36		nC

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

4. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES

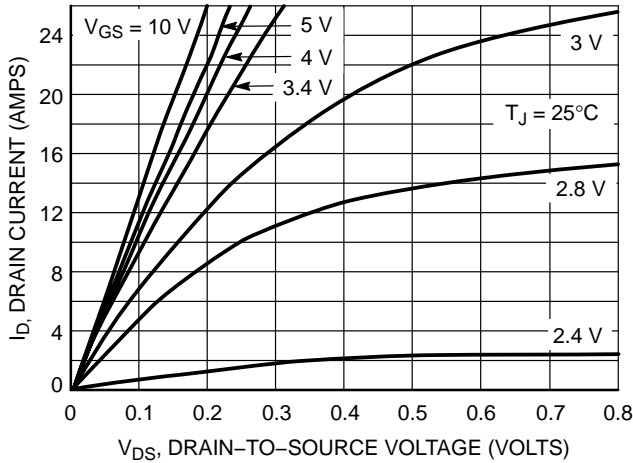


Figure 1. On-Region Characteristics

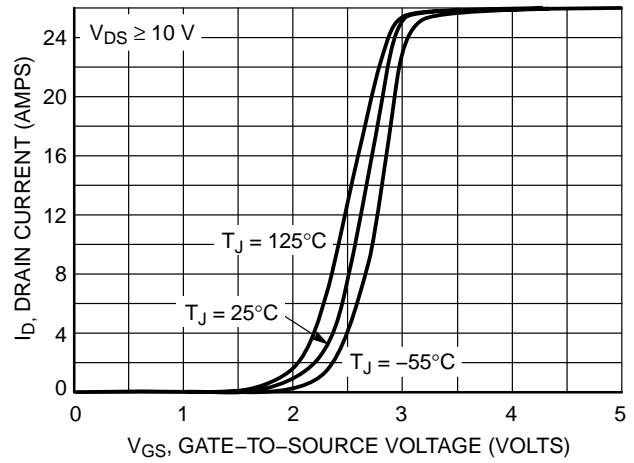


Figure 2. Transfer Characteristics

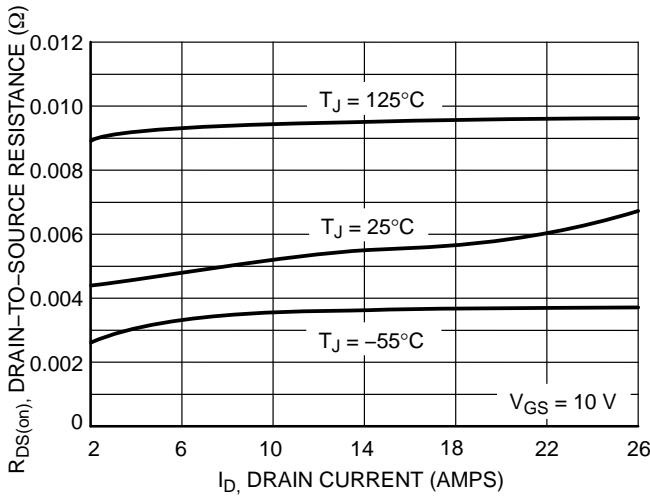


Figure 3. On-Resistance vs. Drain Current and Temperature

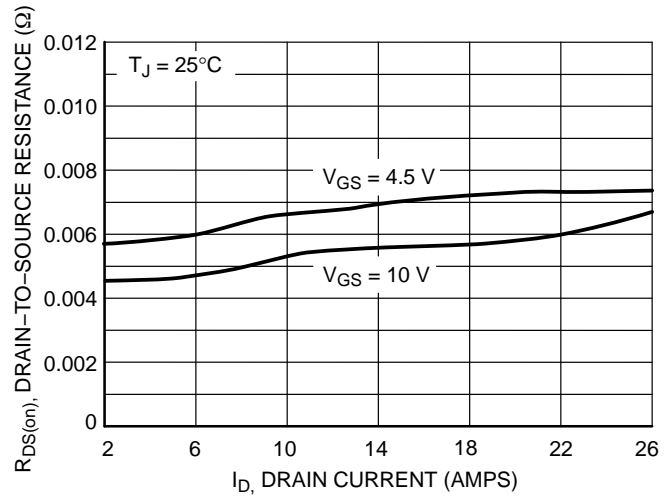


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

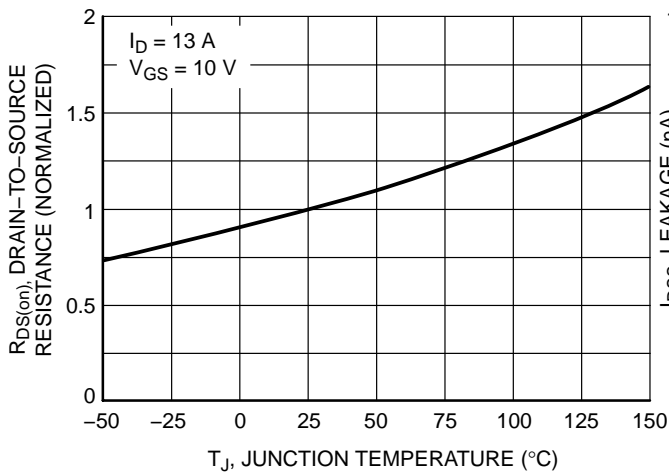


Figure 5. On-Resistance Variation with Temperature

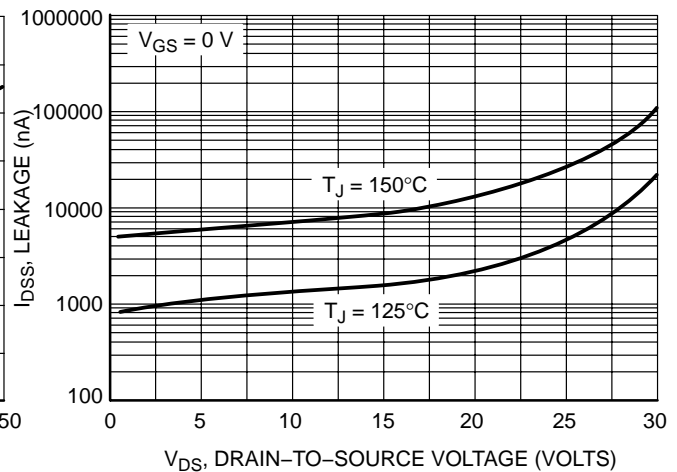
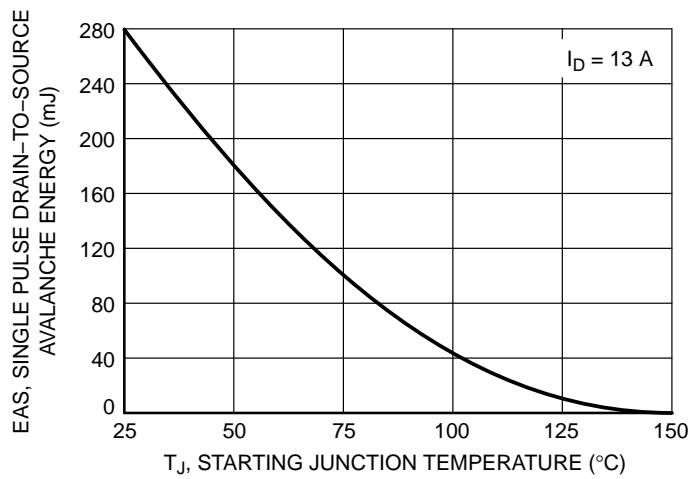
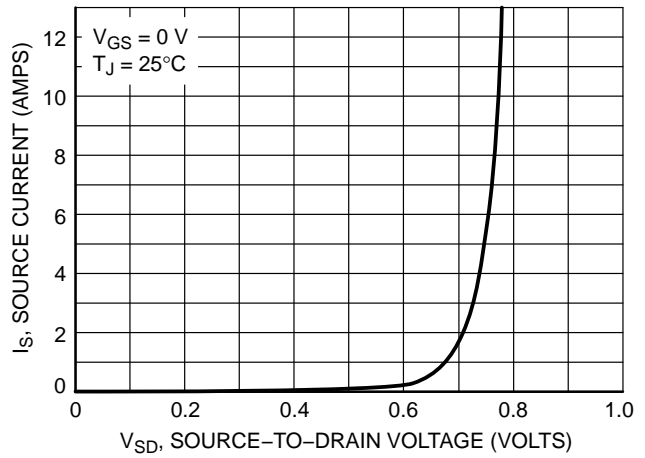
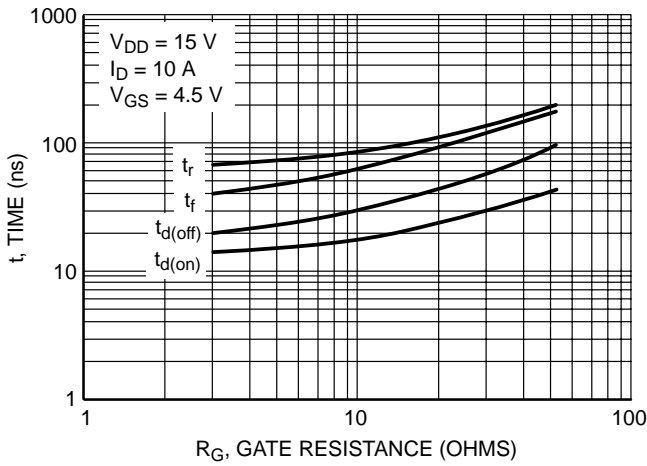
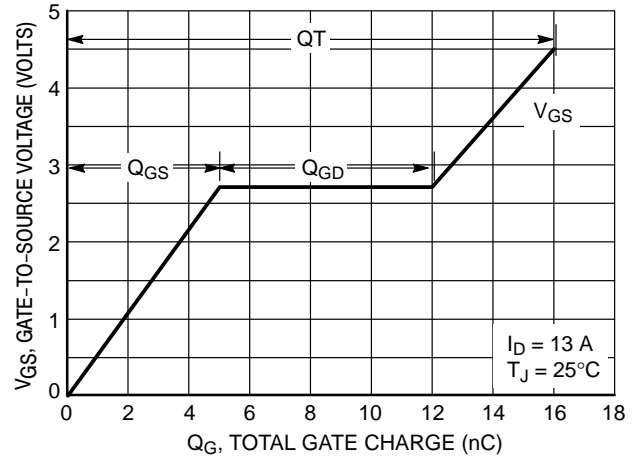
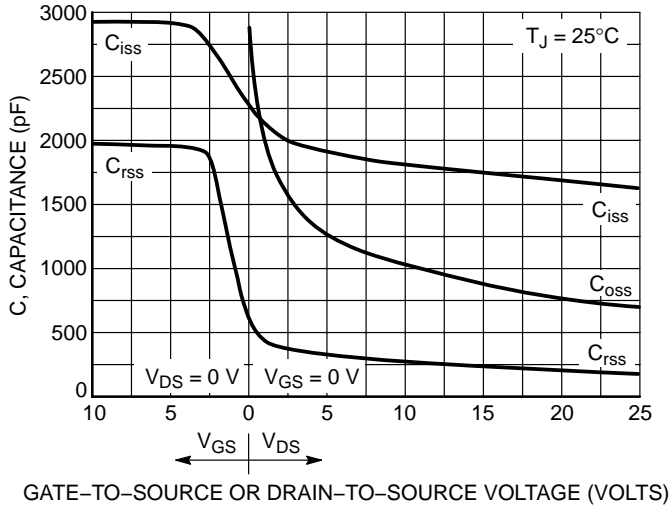


Figure 6. Drain-to-Source Leakage Current vs. Voltage

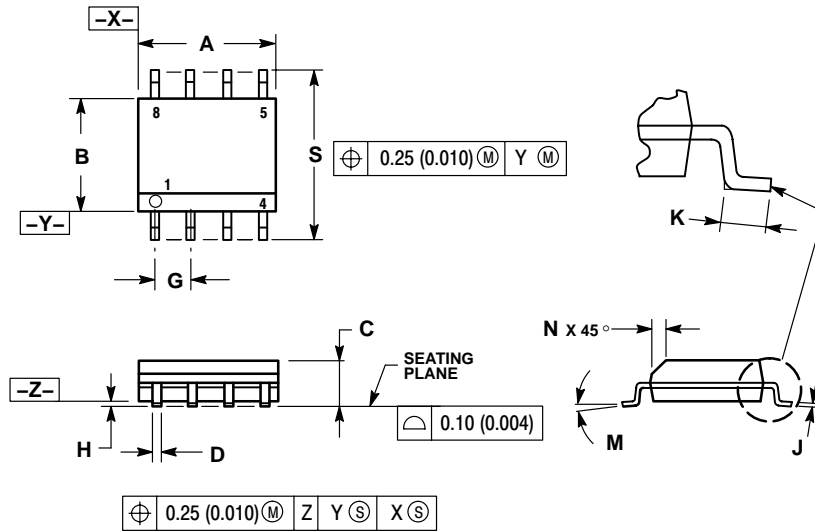
TYPICAL PERFORMANCE CURVES



NTMS4700N

PACKAGE DIMENSIONS

SO-8 CASE 751-07 ISSUE AB

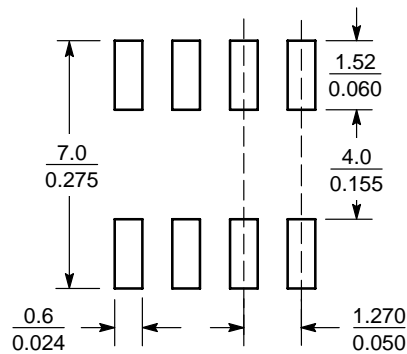


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

SOLDERING FOOTPRINT*



SCALE 6:1 (mm/inches)

STYLE 12:

- PIN 1. SOURCE
- SOURCE
- SOURCE
- GATE
- DRAIN
- DRAIN
- DRAIN
- DRAIN

*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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