

NTMS4872NR2G Datasheet



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DiGi Electronics Part Number NTMS4872NR2G-DG

Manufacturer onsemi

Manufacturer Product Number NTMS4872NR2G

Description MOSFET N-CH 30V 6A/10.2A 8SOIC

Detailed Description N-Channel 30 V 6A (Ta), 10.2A (Tc) 820mW (Ta) Sur

face Mount 8-SOIC



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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
NTMS4872NR2G	onsemi
Series:	Product Status:
-	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
30 V	6A (Ta), 10.2A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
4.5V, 10V	13.5mOhm @ 10.2A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
2.5V @ 250μA	15 nC @ 4.5 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	1700 pF @ 15 V
FET Feature:	Power Dissipation (Max):
	820mW (Ta)
Operating Temperature:	Mounting Type:
-55°C ~ 150°C (TJ)	Surface Mount
Supplier Device Package:	Package / Case:
8-SOIC	8-SOIC (0.154", 3.90mm Width)
Base Product Number:	
NTMS48	

Environmental & Export classification

Moisture Sensitivity Level (MSL):	REACH Status:
1 (Unlimited)	REACH Unaffected
ECCN:	HTSUS:
EAR99	8541.21.0095

Power MOSFET

30 V, 10.2 A, N-Channel, SO-8

Features

- Low R_{DS(on)} to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses
- SOIC-8 Surface Mount Package Saves Board Space
- This is a Pb-Free Device

Applications

- Disk Drives
- DC-DC Converters
- Printers

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

Param	Symbol	Value	Unit		
Drain-to-Source Voltage			V_{DSS}	30	٧
Gate-to-Source Voltage	Gate-to-Source Voltage			±20	V
Continuous Drain		T _A = 25°C	I _D	8.0	Α
Current R _{θJA} (Note 1)		T _A = 70°C		6.4	
Power Dissipation $R_{\theta JA}$ (Note 1)		T _A = 25°C	P _D	1.49	W
Continuous Drain		T _A = 25°C	I _D	6.0	Α
Current R _{θJA} (Note 2)	Steady State	T _A = 70°C		4.8	1
Power Dissipation $R_{\theta JA}$ (Note 2)		T _A = 25°C	P _D	0.82	W
Continuous Drain		T _C = 25°C	I _D	10.2	Α
Current $R_{\theta JC}$, $t \le 10 s$ (Note 1)		T _C = 70°C		8.2	
Power Dissipation $R_{\theta JC}$, $t \le 10 \text{ s(Note 1)}$		T _C = 25°C	P _D	2.4	W
Pulsed Drain Current	T _A = 25°0	C, t _p = 10 μs	I _{DM}	56	Α
Operating Junction and Storage Temperature			T _J , T _{stg}	–55 to 150	°C
Source Current (Body Diode)			IS	2.4	Α
Single Pulse Drain-to-Source Avalanche Energy ($T_J = 25^{\circ}C$, $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_L = 7.0$ A _{pk} , $L = 1.0$ mH, $R_G = 25$ Ω)			E _{AS}	24.5	mJ
Lead Temperature for So (1/8" from case for 10 s)	ldering Pur	poses	TL	260	°C

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Ambient - Steady State (Note 1)	$R_{\theta JA}$	84	°C/W
Junction-to-Ambient – $t \le 10 \text{ s (Note 1)}$	$R_{\theta JA}$	52	
Junction-to-Foot (Drain)	$R_{\theta JF}$	22.5	
Junction-to-Ambient - Steady State (Note 2)	$R_{\theta,IA}$	153	

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

- 1. Surfacemounted on FR4 board using 1 sq-in pad, 2 oz Cu.
- 2. Surfacemounted on FR4 board using the minimum recommended pad size.

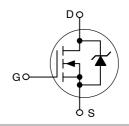


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V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX
30 V	13.5 mΩ @ 10 V	10.2 A
	16.5 mΩ @ 4.5 V	10.2 A

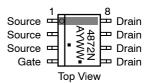
N-Channel



1 SO-8 CASE 751

STYLE 12

MARKING DIAGRAM/ PIN ASSIGNMENT



4872N = Device Code A = Assembly Location

Y = Year WW = Work Week • Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping [†]
NTMS4872NR2G	SO-8 (Pb-Free)	2500/Tape & Reel

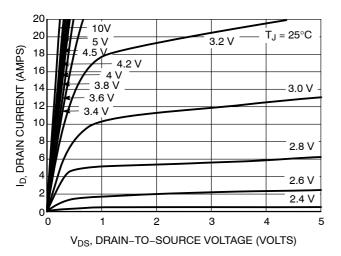
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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

Parameter	Symbol	Test Condition	on	Min	Тур	Max	Unit
OFF CHARACTERISTICS							
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J				13		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}		T _J = 25°C			1.0	μΑ
		V _{GS} = 0 V, V _{DS} = 24 V	T _J = 100°C			10	1
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)}	$V_{GS} = V_{DS}, I_D = 2$	250 μΑ	1.45		2.5	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J				5.8		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D =	10.2 A		9.4	13.5	mΩ
		V _{GS} = 4.5 V, I _D =	9.3 A		13.5	16.5	1
Forward Transconductance	9FS	V _{DS} = 1.5 V, I _D =	10.2 A		21		S
CHARGES, CAPACITANCES AND GA	ATE RESISTAN	ICE	•		-	-	
Input Capacitance	C _{iss}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 15 V			1136	1700	pF
Output Capacitance	C _{oss}				240	370	1
Reverse Transfer Capacitance	C _{rss}				130	200	1
Total Gate Charge	Q _{G(TOT)}				10	15	nC
Threshold Gate Charge	Q _{G(TH)}	1			1.3]
Gate-to-Source Charge	Q_{GS}	$V_{GS} = 4.5 \text{ V}, V_{DS} = 15 \text{ V}$	/, I _D = 10.2 A		3.4	5.0	1
Gate-to-Drain Charge	Q_{GD}		•		3.8	5.5	1
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 15 V	′, I _D = 10.2 A		20	30	nC
SWITCHING CHARACTERISTICS (No	ote 4)						
Turn-On Delay Time	t _{d(on)}				10	15	ns
Rise Time	t _r	V _{GS} = 10 V, V _{DS} =	= 15 V,		22	35	
Turn-Off Delay Time	t _{d(off)}	$V_{GS} = 10 \text{ V}, V_{DS} = 10.2 \text{ A}, R_G = 10.2 \text{ A}$	6.0 Ω		23	35	
Fall Time	t _f		•		5.7	9.0	1
DRAIN-SOURCE DIODE CHARACTE	RISTICS						
Forward Diode Voltage	V_{SD}	V 0V 1 0 4 A	T _J = 25°C		0.76	1.0	V
		$V_{GS} = 0 \text{ V}, I_{S} = 2.4 \text{ A}$	T _J = 125°C		0.6		1
Reverse Recovery Time	t _{RR}				17.5	27	ns
Charge Time	t _a	$V_{GS} = 0 \text{ V, } d_{IS}/d_{t} = 0$	I00 A/μs,		8.5	13	1
Discharge Time	t _b	$V_{GS} = 0$ V, $d_{IS}/d_{t} = 100$ A/ μs , $I_{S} = 10.2$ A			9.0	14	1
Reverse Recovery Charge	Q_{RR}				6.5	10	nC
PACKAGE PARASITIC VALUES							
Source Inductance	L _S				0.66		nΗ
Drain Inductance	L _D	T 0500			0.20		nΗ
Gate Inductance	L _G	T _A = 25°C			1.5		nΗ
Gate Resistance	R_{G}		•		1.5	2.3	Ω

Pulse Test: pulse width = 300 μs, duty cycle ≤ 2%.
 Switching characteristics are independent of operating junction temperatures.

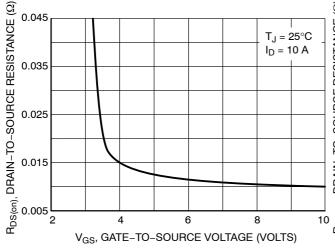
TYPICAL PERFORMANCE CURVES



40 35 V_{DS} ≥ 10 V 30 30 25 20 15 10 T_J = 100°C T_J = -55°C 0 1 2 3 4 8 V_{GS}, GATE-TO-SOURCE VOLTAGE (VOLTS)

Figure 1. On-Region Characteristics

Figure 2. Transfer Characteristics



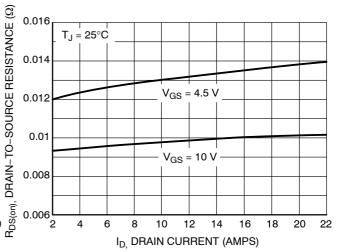
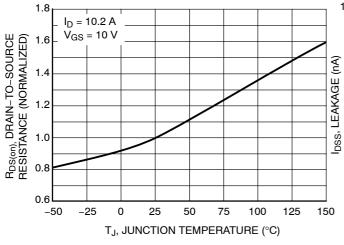


Figure 3. On-Resistance vs. Gate-to-Source Voltage

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



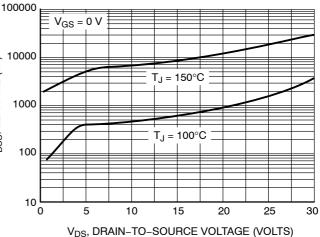


Figure 5. On–Resistance Variation with Temperature

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

TYPICAL PERFORMANCE CURVES

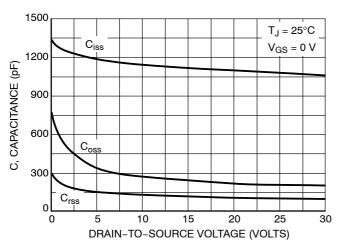


Figure 7. Capacitance Variation

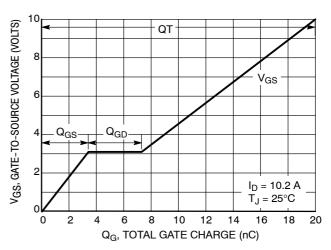


Figure 8. Gate-To-Source and Drain-To-Source Voltage vs. Total Charge

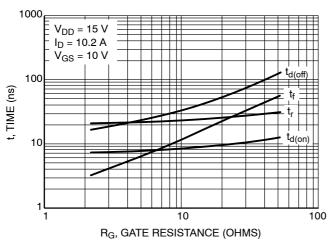


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

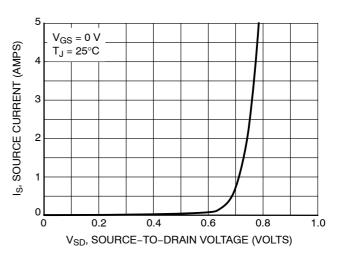


Figure 10. Diode Forward Voltage vs. Current

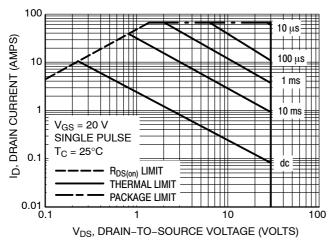


Figure 11. Maximum Rated Forward Biased Safe Operating Area

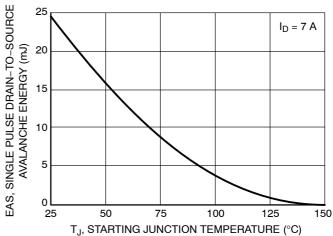


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature



MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS



SOIC-8 NB CASE 751-07 **ISSUE AK**

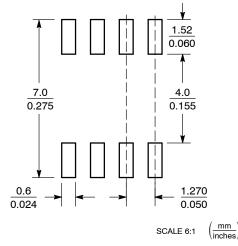
DATE 16 FEB 2011



- NOTES:
 1. DIMENSIONING AND TOLERANCING PER
- ANSI Y14.5M, 1982.
 CONTROLLING DIMENSION: MILLIMETER.
- DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
- MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE
- 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.
- 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

	MILLIMETERS		INC	HES
DIM	MIN	MAX	MIN	MAX
Α	4.80	5.00	0.189	0.197
В	3.80	4.00	0.150	0.157
С	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27	1.27 BSC		0 BSC
Н	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
М	0 °	8 °	0 °	8 °
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

SOLDERING FOOTPRINT*



^{*}For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

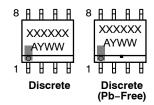
GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code = Assembly Location = Wafer Lot = Year

= Work Week

= Pb-Free Package



XXXXXX = Specific Device Code = Assembly Location Α

ww = Work Week

= Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

STYLES ON PAGE 2

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DATE 16 FEB 2011

STYLE 1: PIN 1. EMITTER 2. COLLECTOR 3. COLLECTOR 4. EMITTER 5. EMITTER 6. BASE 7. BASE 8. EMITTER	STYLE 2: PIN 1. COLLECTOR, DIE, #1 2. COLLECTOR, #1 3. COLLECTOR, #2 4. COLLECTOR, #2 5. BASE, #2 6. EMITTER, #2 7. BASE, #1 8. EMITTER, #1	STYLE 3: PIN 1. DRAIN, DIE #1 2. DRAIN, #1 3. DRAIN, #2 4. DRAIN, #2 5. GATE, #2 6. SOURCE, #2 7. GATE, #1 8. SOURCE, #1	STYLE 4: PIN 1. ANODE 2. ANODE 3. ANODE 4. ANODE 5. ANODE 6. ANODE 7. ANODE 8. COMMON CATHODE
STYLE 5: PIN 1. DRAIN 2. DRAIN 3. DRAIN 4. DRAIN 5. GATE 6. GATE 7. SOURCE 8. SOURCE	PIN 1. SOURCE 2. DRAIN 3. DRAIN 4. SOURCE 5. SOURCE 6. GATE 7. GATE 8. SOURCE	PIN 1. INPUT 2. EXTERNAL BYPASS 3. THIRD STAGE SOURCE 4. GROUND 5. DRAIN 6. GATE 3 7. SECOND STAGE Vd 8. FIRST STAGE Vd	PIN 1. COLLECTOR, DIE #1 2. BASE, #1
STYLE 9: PIN 1. EMITTER, COMMON 2. COLLECTOR, DIE #1 3. COLLECTOR, DIE #2 4. EMITTER, COMMON 5. EMITTER, COMMON 6. BASE, DIE #2 7. BASE, DIE #1 8. EMITTER, COMMON	STYLE 10: PIN 1. GROUND 2. BIAS 1 3. OUTPUT 4. GROUND 5. GROUND 6. BIAS 2 7. INPUT 8. GROUND	STYLE 11: PIN 1. SOURCE 1 2. GATE 1 3. SOURCE 2 4. GATE 2 5. DRAIN 2 6. DRAIN 2 7. DRAIN 1	STYLE 12: PIN 1. SOURCE 2. SOURCE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN 7. DRAIN 9. DRAIN
STYLE 13: PIN 1. N.C. 2. SOURCE 3. SOURCE 4. GATE 5. DRAIN 6. DRAIN 7. DRAIN 8. DRAIN	STYLE 14: PIN 1. N-SOURCE 2. N-GATE 3. P-SOURCE 4. P-GATE 5. P-DRAIN 6. P-DRAIN 7. N-DRAIN 8. N-DRAIN	STYLE 15: PIN 1. ANODE 1 2. ANODE 1 3. ANODE 1 4. ANODE 1 5. CATHODE, COMMON 6. CATHODE, COMMON 7. CATHODE, COMMON 8. CATHODE, COMMON	STYLE 16: PIN 1. EMITTER, DIE #1 2. BASE, DIE #1 3. EMITTER, DIE #2 4. BASE, DIE #2 5. COLLECTOR, DIE #2 6. COLLECTOR, DIE #2 7. COLLECTOR, DIE #1 8. COLLECTOR, DIE #1
STYLE 17: PIN 1. VCC 2. V2OUT 3. V1OUT 4. TXE 5. RXE 6. VEE 7. GND 8. ACC	STYLE 18: PIN 1. ANODE 2. ANODE 3. SOURCE 4. GATE 5. DRAIN	STYLE 19: PIN 1. SOURCE 1 2. GATE 1 3. SOURCE 2 4. GATE 2 5. DRAIN 2 6. MIRROR 2	STYLE 20: PIN 1. SOURCE (N) 2. GATE (N) 3. SOURCE (P) 4. GATE (P) 5. DRAIN 6. DRAIN
3. V10UT 4. TXE 5. RXE 6. VEE 7. GND 8. ACC STYLE 21: PIN 1. CATHODE 1 2. CATHODE 2 3. CATHODE 3 4. CATHODE 4 5. CATHODE 5 6. COMMON ANODE 7. COMMON ANODE 8. CATHODE 6	STYLE 22:	7. DRAIN 1 8. MIRROR 1 STYLE 23: PIN 1. LINE 1 IN 2. COMMON ANODE/GND 3. COMMON ANODE/GND 4. LINE 2 IN 5. LINE 2 OUT 6. COMMON ANODE/GND 7. COMMON ANODE/GND 8. LINE 1 OUT	STYLE 24: PIN 1. BASE 2. EMITTER 3. COLLECTOR/ANODE 4. COLLECTOR/ANODE 5. CATHODE 6. CATHODE 7. COLLECTOR/ANODE 8. COLLECTOR/ANODE
STYLE 25: PIN 1. VIN 2. N/C 3. REXT 4. GND 5. IOUT 6. IOUT 7. IOUT 8. IOUT	STYLE 26: PIN 1. GND 2. dv/dt 3. ENABLE 4. ILIMIT 5. SOURCE 6. SOURCE 7. SOURCE 8. VCC	STYLE 27: PIN 1. ILIMIT 2. OVLO 3. UVLO 4. INPUT+ 5. SOURCE 6. SOURCE 7. SOURCE 8. DRAIN	STYLE 28: PIN 1. SW_TO_GND 2. DASIC_OFF 3. DASIC_SW_DET 4. GND 5. V_MON 6. VBULK 7. VBULK 8. VIN
STYLE 29: PIN 1. BASE, DIE #1 2. EMITTER, #1 3. BASE, #2 4. EMITTER, #2 5. COLLECTOR, #2 6. COLLECTOR, #2 7. COLLECTOR, #1 8. COLLECTOR, #1	STYLE 30: PIN 1. DRAIN 1 2. DRAIN 1 3. GATE 2 4. SOURCE 2 5. SOURCE 1/DRAIN 2 6. SOURCE 1/DRAIN 2 7. SOURCE 1/DRAIN 2 8. GATE 1		

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