

NTMD4102PR2

Product Preview

Trench Power MOSFET -20 V, P-Channel, SO-8 Dual

This P-Channel device was designed using ON Semiconductor's leading edge trench technology for low $R_{DS(on)}$ performance in the SO-8 dual package for high power and current handling capability. The low $R_{DS(on)}$ performance is particularly suited for game systems, notebook and desktop computers, and printers.

Features & Benefits

- Leading -20 V Trench for Low $R_{DS(on)}$
- SO-8 Package Provides Excellent Thermal Performance
- Surface Mount SO-8 Package Saves Board Space
- Pb Free Package for Green Manufacturing

Applications

- Load/Power Management
- Battery Switching for Multi Cell Li-Ion
- Buck-Boost Synchronous Rectification

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	-20	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Drain Current - Continuous @ $T_A = 25^\circ\text{C}$ (Note 1) - Pulsed Drain Current ($t = 10 \mu\text{s}$)	I_D I_{DM}	-6.5 -30	A
Steady State Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 1)	P_D	1.1	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$
Continuous Source Current (Body Diode)	I_S	-0.9	A
Lead Temperature for Soldering Purposes (1/8" from case for 10 seconds)	T_L	260	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Thermal Resistance	Symbol	Value	$^\circ\text{C}/\text{W}$
- Junction-to-Ambient - Steady State (Note 1)	$R_{\theta JA}$	TBD	
- Junction-to-Ambient - $t \leq 10 \text{ s}$ (Note 1)	$R_{\theta JA}$	TBD	
- Junction-to-Lead - Steady State (Note 2)	$R_{\theta JL}$	TBD	

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

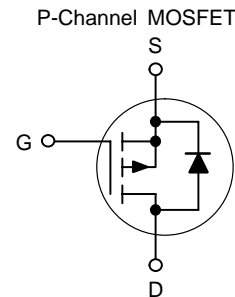
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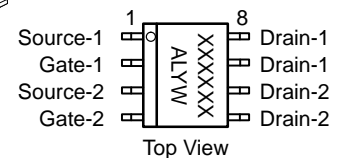
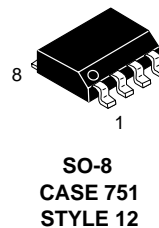
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$V_{BR(DSS)} = -20 \text{ VOLTS}$
 $R_{DS(on)} (\text{max}) = 19 \text{ m}\Omega @ -10 \text{ V}$
 $I_{D(\text{max})} (\text{Note 1}) = -8.5 \text{ A}$
 $R_{DS(on)} (\text{max}) = 30 \text{ m}\Omega @ -4.5 \text{ V}$
 $I_{D(\text{max})} (\text{Note 1}) = -6.5 \text{ A}$



MARKING DIAGRAM & PIN ASSIGNMENT



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

ORDERING INFORMATION

Device	Package	Shipping
NTMD4102PR2	SO-8	2500/Tape & Reel

NTMD4102PR2

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage (Note 3) ($V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$)	$V_{(BR)DSS}$	-20	-	-	V
Zero Gate Voltage Drain Current (Note 3) ($V_{GS} = 0\text{ V}$, $V_{DS} = -16\text{ V}$)	I_{DSS}	-	-	-1.0	μA
Gate-to-Source Leakage Current ($V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0\text{ V}$)	I_{GSS}	-	-	± 100	nA

ON CHARACTERISTICS

Gate Threshold Voltage (Note 3) ($V_{GS} = V_{DS}$, $I_D = -250\ \mu\text{A}$)	$V_{GS(th)}$	-1.0	-	-	V
Drain-to-Source On-Resistance ($V_{GS} = -10\text{ V}$, $I_D = -8.5\text{ A}$) ($V_{GS} = -4.5\text{ V}$, $I_D = -6.5\text{ A}$)	$R_{DS(on)}$	-	TBD	19 30	m Ω
Forward Transconductance ($V_{DS} = -10\text{ V}$, $I_D = -8.4\text{ A}$)	g_{FS}	-	TBD	-	S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	$(V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = -10\text{ V})$	C_{iss}	-	TBD	-	pF
Output Capacitance		C_{oss}	-	TBD	-	
Reverse Transfer Capacitance		C_{rss}	-	TBD	-	
Total Gate Charge	$(V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -8.4\text{ A})$	$Q_{G(tot)}$	-	TBD	TBD	nC
Threshold Gate Charge	$(V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -8.4\text{ A})$	$Q_{G(th)}$	-	TBD	TBD	nC
Gate-to-Source Gate Charge	$(V_{DS} = -10\text{ V}, I_D = -8.4\text{ A})$	Q_{GS}	-	TBD	-	nC
Gate-to-Drain "Miller" Charge	$(V_{DS} = -10\text{ V}, I_D = -8.4\text{ A})$	Q_{GD}	-	TBD	-	nC
Output Charge	$(V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V})$	Q_{OSS}	-	TBD	-	nC
Gate Resistance		R_G	-	TBD	-	Ω

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	$(V_{GS} = -4.5\text{ V}, V_{DS} = -10\text{ V}, I_D = -1.0\text{ A}, R_G = 6.0\ \Omega)$	$t_{d(on)}$	-	TBD	-	ns
Rise Time		t_r	-	TBD	-	
Turn-Off Delay Time		$t_{d(off)}$	-	TBD	-	
Fall Time		t_f	-	TBD	-	

DRAIN-SOURCE DIODE CHARACTERISTICS

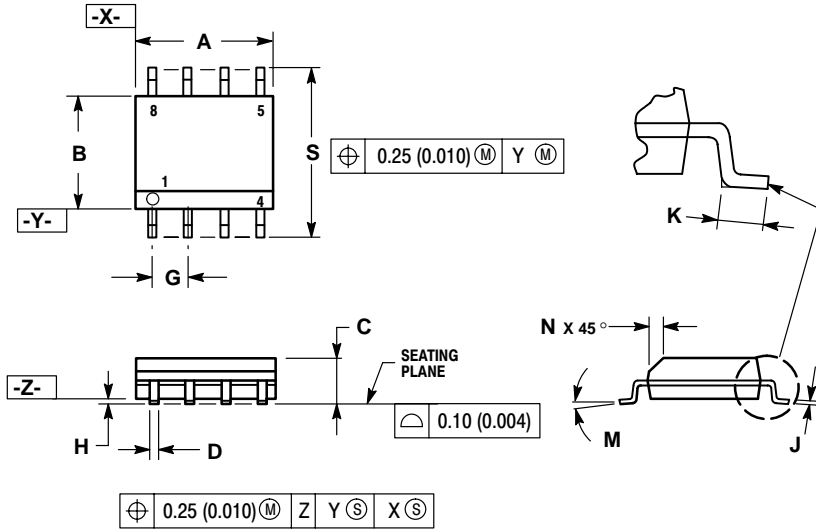
Forward Diode Voltage	$(V_{GS} = 0\text{ V}, I_{SD} = -1.7\text{ A})$	V_{SD}	-	TBD	TBD	V
Reverse Recovery Time	$(V_{GS} = 0\text{ V}, V_{DS} = -10\text{ V}, di_{SD}/dt = 100\text{ A}/\mu\text{s}, I_{SD} = -1.7\text{ A})$	t_{rr}	-	TBD	TBD	ns
Charge Time		t_a	-	TBD	-	ns
Discharge Time		t_b	-	TBD	-	ns
Reverse Recovery Charge		Q_{rr}	-	TBD	-	nC

3. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Switching characteristics are independent of operating junction temperature.

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PACKAGE DIMENSIONS

SOIC-8 NB
CASE 751-07
ISSUE AA




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

STYLE 12:

- PIN 1. SOURCE
2. SOURCE
3. SOURCE
4. GATE
5. DRAIN
6. DRAIN
7. DRAIN
8. DRAIN

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