

## WNM75N80

### N-CHANNEL 75V - 0.009Ω - 80A TO-220 POWER MOSFET

#### Description

The WNM75N80 uses advanced trench technology. And design to provide excellent  $R_{DS(ON)}$  with low Gate charge. This device is suitable for use in PWM, load switching and general purpose applications. Standard Product WNM75N80 is Pb-free (meets ROHS & Sony 259 specifications).

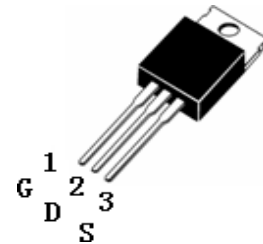
#### Features

- $V_{DS} = 75V$
- $I_D = 80 A$  ( $V_{GS} = 10V$ )
- TYPICAL  $R_{DS(on)} = 0.009\Omega$
- EXCEPTIONAL  $dv/dt$  CAPABILITY
- 100% AVALANCHE TESTED

#### Application

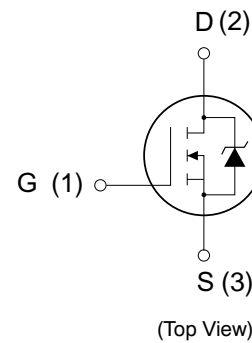
- SOLENOID AND RELAY DRIVERS
- DC MOTOR CONTROL
- DC-DC CONVERTERS
- AUTOMOTIVE ENVIRONMENT

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TO-220

**PIN CONNECTIONS AND MARKING DIAGRAM**



For TO-220

XX = Specific Device Code

Y = Voltage

Z = Date Code

#### Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V <sub>DS</sub>	Drain-Source Voltage		75	V
V <sub>GS</sub>	Gate-Source Voltage		±25	V
I <sub>D</sub>	Continuous Drain Current	T <sub>C</sub> =25℃ <sup>G</sup>	80	A
		T <sub>C</sub> =100℃	70	
I <sub>DM</sub>	Pulse Drain Current <sup>C</sup>		200	A
I <sub>AS</sub>	Single Avalanche Current <sup>C</sup>		60	A
E <sub>AS</sub>	Single avalanche energy <sup>C</sup>	L=0.3mH	540	mJ
P <sub>D</sub>	Power Dissipation <sup>B</sup>	T <sub>C</sub> =25℃	320	W
		T <sub>C</sub> =100℃	165	
T <sub>J</sub>	Operating Junction Temperature Range		-55 to 175	℃
T <sub>STG</sub>	Storage Temperature Range			

## Typical Applications

Thermal Characteristic				
Symbol	Parameter	Typ.	Max.	Unit.
$R_{\theta JA}$	Maximum Junction to Ambient <sup>A</sup>	45	60	°C/W
$R_{\theta JC}$	Maximum Junction to case <sup>B</sup>	0.45	0.56	°C/W

## Electrical Characteristics (T<sub>case</sub>=25°C unless otherwise specified)

### OFF

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Units
$BV_{DS}$	Drain-Source Voltage	$I_D=250\mu A$ , $V_{GS}=0V$	75			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=60V$ , $V_{GS}=0V$			1	$\mu A$
		$T_C=125^\circ C$			5	$\mu A$
$I_{GSS}$	Gate-body Leakage Current	$V_{DS}=0V$ , $V_{GS}=\pm 25V$			1	$\mu A$

### ON

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Units
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu A$	2	2.8	4	V
$R_{DS(on)}$	Static Drain-Source On resistance	$V_{GS}=10V$ , $I_D=30A$		9	11	m $\Omega$
$I_{D(on)}$	On State Drain Current	$V_{GS}=10V$ , $V_{DS}=5V$	200			A

## Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Units
$g_{FS}$	Transconductance	$V_{DS}=5V$ , $I_D=80A$		90		S
$C_{iss}$	Input Capacitance	$V_{DS}=30V$ , $V_{GS}=0V$ , $f=1MHz$		6700		pF
$C_{oss}$	Output Capacitance			400		pF
$C_{rss}$	Reverse Transfer Capacitance			100		pF
$R_g$	Gate Resistance	$V_{DS}=0V$ , $V_{GS}=0V$ , $f=1MHz$		3		$\Omega$

## Switching

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Units
$Q_g$	Total Gate Charge	$V_{GS}=10V$ , $I_D=30A$ , $V_{DS}=30V$		85		nC
$Q_{gs}$	Gate Source Charge			22		nC
$Q_{gd}$	Gate Drain Charge			18		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10V$ , $I_D=30A$ , $R_L=1\Omega$ , $R_{GEN}=3\Omega$		17		ns
$t_r$	Turn-On Rise Time			17		ns
$t_{D(off)}$	Turn-Off Delay Time			67		ns
$t_f$	Turn-Off Fall Time			15		ns

## Source Drain Diode

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Units
$V_{SD}$	Diode Forward Voltage	$I_S=1A, V_{GS}=0V$		0.7	1	V
$I_S$	Maximum Body-diode Continuous Current <sup>G</sup>				80	A
$t_{rr}$	Body-diode Reverse Recovery Time	$I_F=30A, di/dt=100A/\mu s$		127		ns
$Q_{rr}$	Body-diode Reverse Recovery Charge			88		nC

A: The value of  $R_{\theta JA}$  is measured with the device in a still air environment with  $T_A=25^{\circ}C$ .

B: The power dissipation  $P_D$  is based on  $T_{J(MAX)}=175^{\circ}C$ , using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heat-sink is used.

C: Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=175^{\circ}C$ .

D: The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to case  $R_{\theta JC}$  and case to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using  $<300 \mu s$  pulses, duty cycle 0.5% max.

F: These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heat-sink, assuming a maximum junction temperature of  $T_{J(MAX)}=175^{\circ}C$ .

G: The maximum current rating is limited by bond-wires.

H: Start from  $I_D=35A, V_{DD}=37.5V$ .

## Typical Performance Characteristics

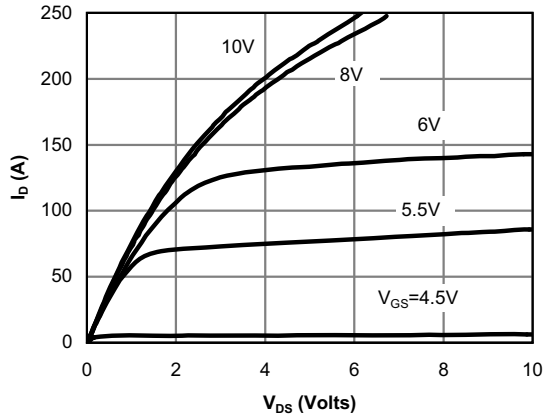


Figure 1: On-Region Characteristics

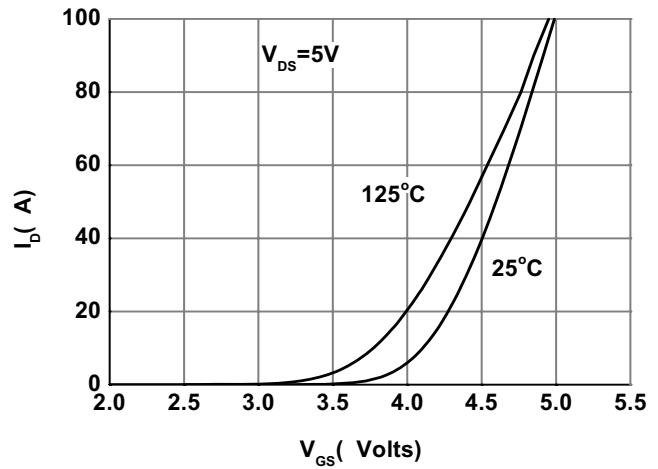


Figure 2: Transfer Characteristics

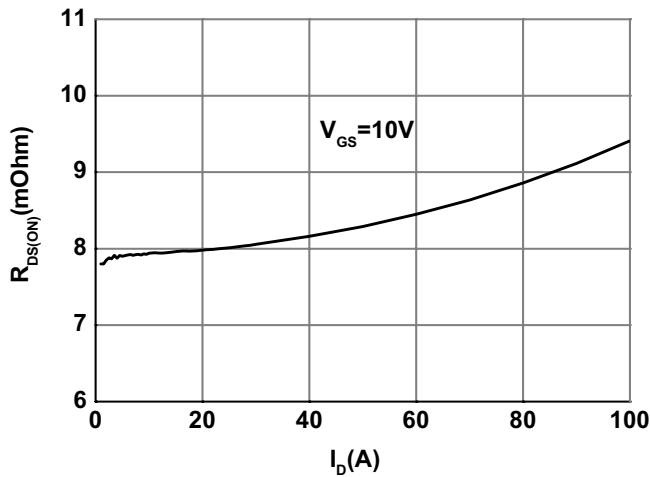


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

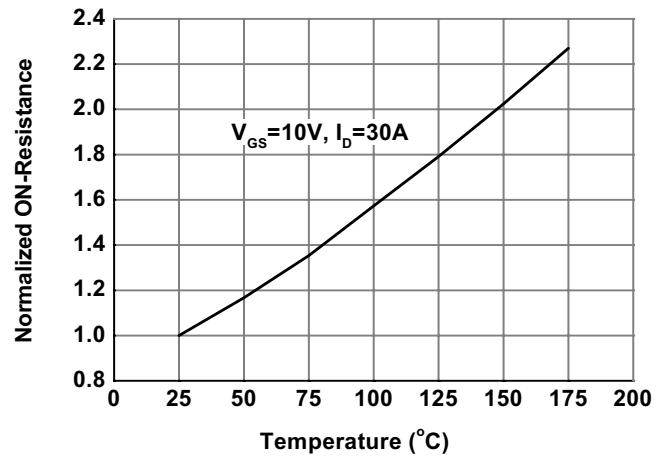


Figure 4: On-Resistance vs. Junction Temperature

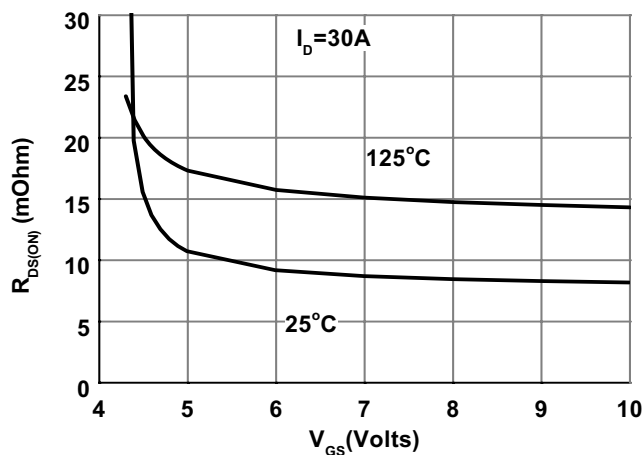


Figure 5: On-Resistance vs. Gate-Source Voltage

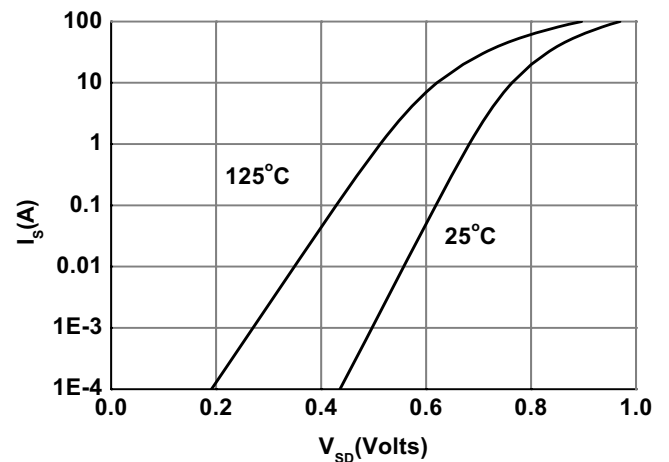


Figure 6: Body Diode Characteristics

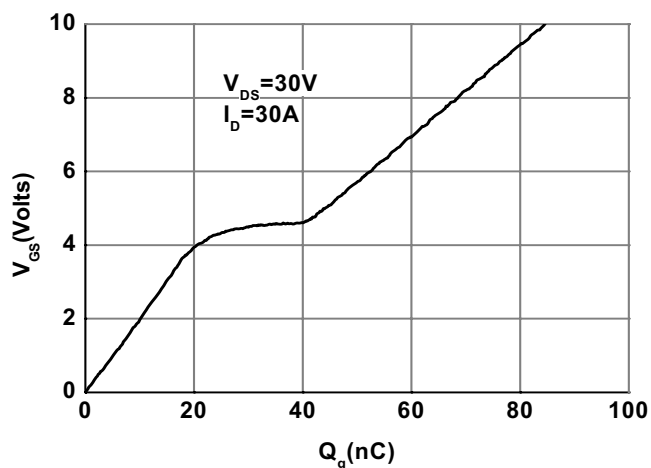


Figure 7: Gate Charge Characteristics

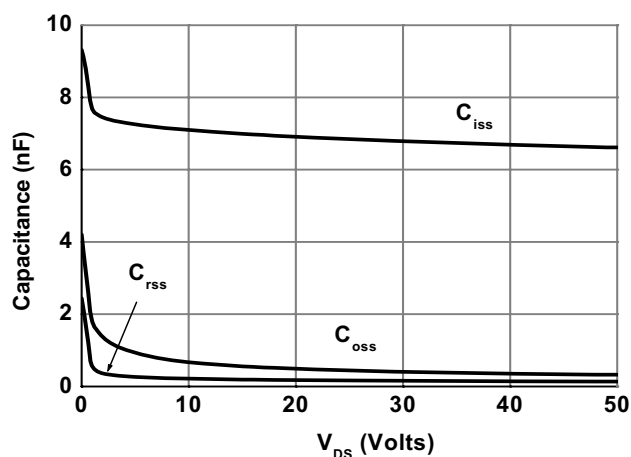


Figure 8: Capacitance Characteristics

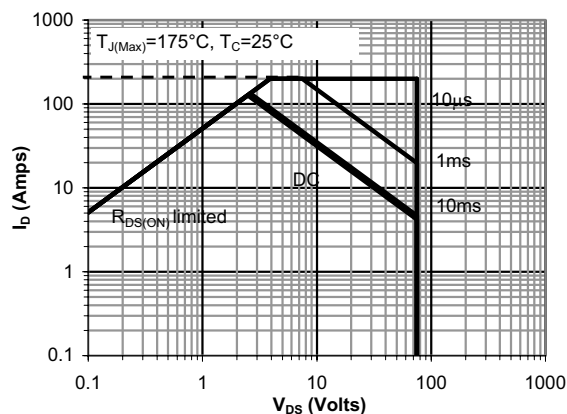


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

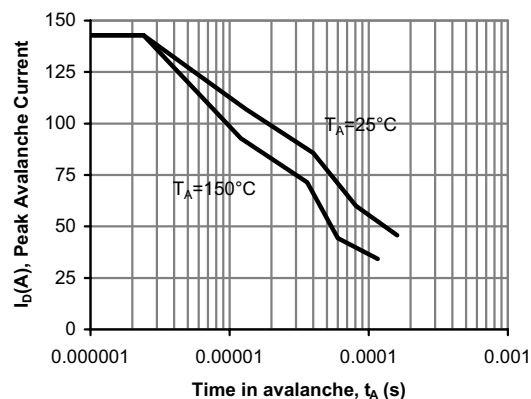


Figure 10: Single Pulse Avalanche capability

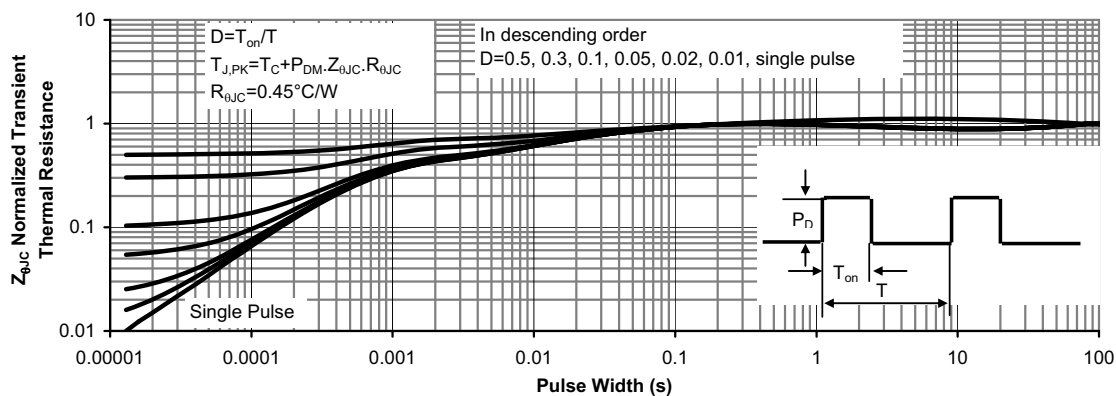


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

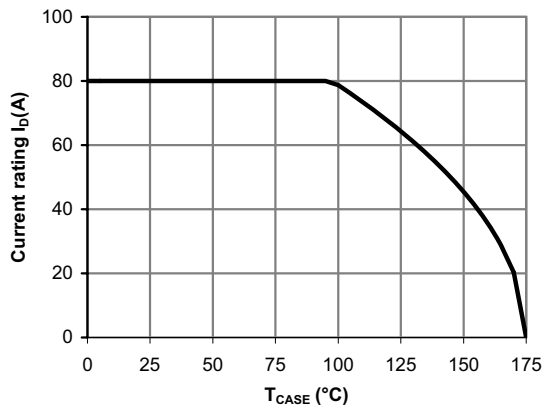


Figure 12: Current De-rating (Note B)

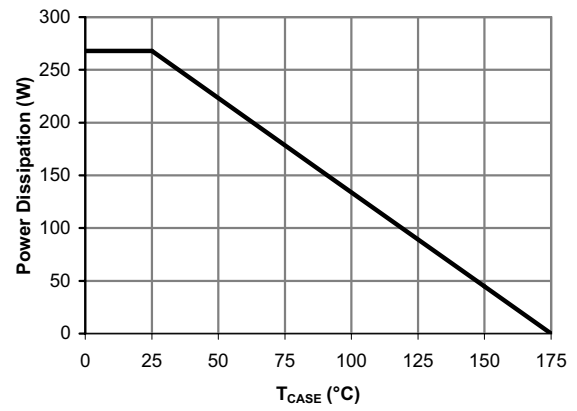
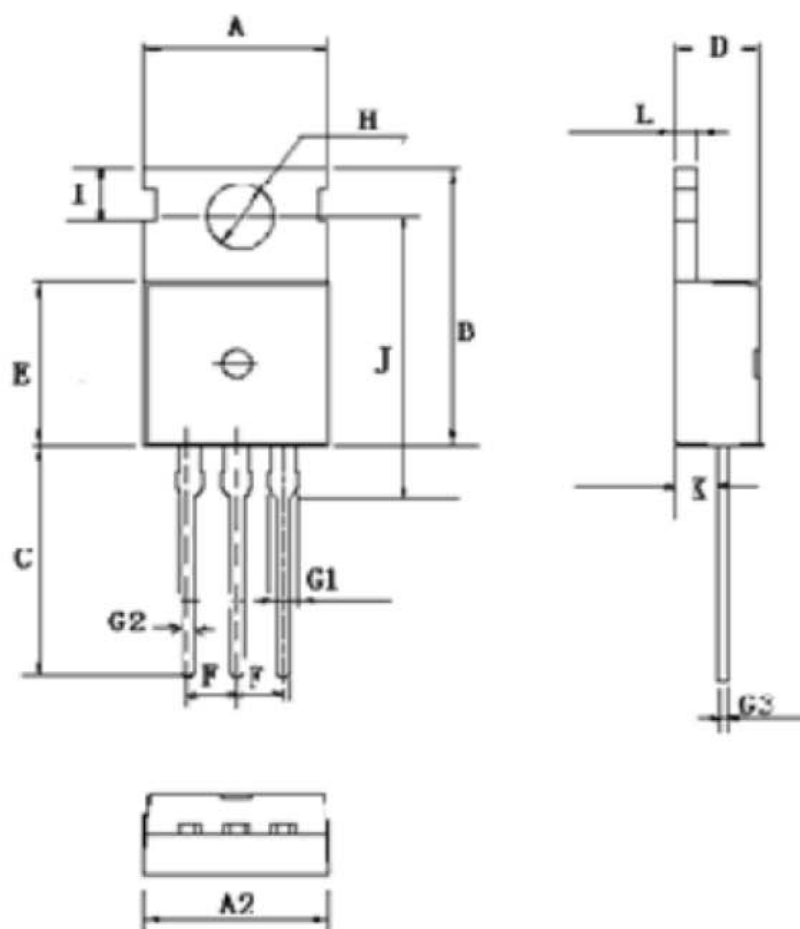


Figure 13: Power De-rating (Note B)



TO-220 3L

图形对应符号	产品外形尺寸
A(mm)	9.66~10.28
A2(mm)	9.80~10.20
B(mm)	15.6~15.8
C(mm)	12.70~14.27
D(mm)	4.30~4.70
E(mm)	8.59~9.40
F(mm)	2.54 (nom)
G1(mm)	1.42~1.62
G2(mm)	0.70~0.95
G3(mm)	0.45~0.60
H(mm) dia.	3.50~3.70
I(mm)	2.7~2.9
J(mm)	15.70~16.25
K(mm)	2.20~2.90
L(mm)	1.15~1.40
M(mm)	0.5