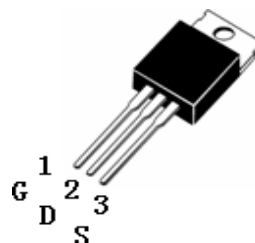


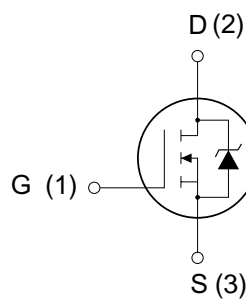
**N-CHANNEL 60V 0.007Ω 80A TO-220 POWER MOSFET**

**Descriptions**

The WNM70N80 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 WNM70N80 is Pb-free(meets ROHS & Sony 259 specifications).



**TO-220  
PIN CONNECTIONS AND  
MARKING DIAGRAM**



(Top View)

For TO-220  
XX = Specific Device Code  
Y = Voltage  
Z = Date Code

**Features**

- $V_{DS}=60V$
- $I_D=80A(V_{GS}=10V)$
- Typical  $R_{DS(on)}=0.007 \Omega$
- Exceptional dv/dt capability
- 100% Avalanche tested

**Applications**

- Solenoid and relay drivers
- DC motor control
- DC-DC converters
- Automotive environment

**Absolute Maximum ratings**

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	$V_{DS}$	60	V	
Gate-Source Voltage	$V_{GS}$	$\pm 25$		
Continuous Drain Current	$I_D$	$T_C=25^\circ C^G$	80	A
		$T_C=100^\circ C$	56	
Pulse Drain Current <sup>C</sup>	$I_{DM}$	200	A	
Single Avalanche Current <sup>H</sup>	$I_{AS}$	L=0.3mH	54	A
Single Avalanche Energy <sup>H</sup>			$E_{AS}$	437
Power Dissipation	$P_D$	$T_C=25^\circ C$	104	W
		$T_C=100^\circ C$	41	
Operating Junction Temperature Range	$T_J$	-55°C ~+150	°C	
Storage Temperature Range	$T_{STG}$			

### Thermal resistance ratings

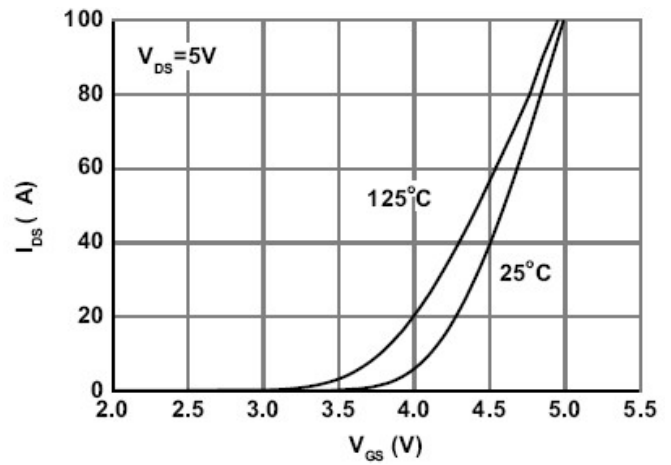
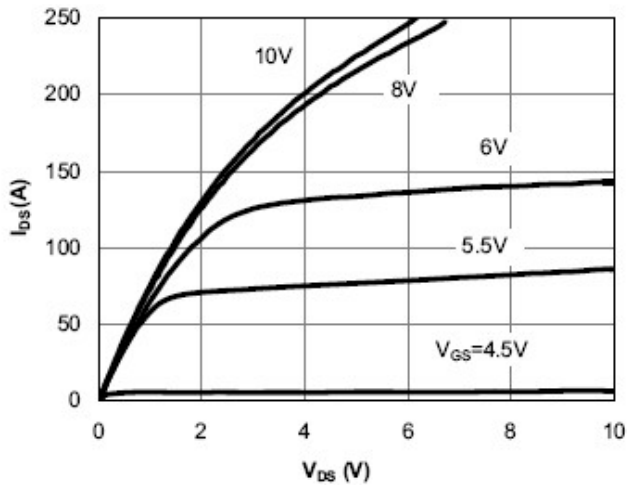
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance <sup>a</sup>	$R_{\theta JA}$	81	100	°C/W
Junction-to-Case Thermal Resistance <sup>b</sup>	$R_{\theta JC}$	1.2	1.5	

- A. The value of  $R_{\theta JA}$  is measured with the device in a still air environment with  $T_A=25^\circ\text{C}$ .
- B. The power dissipation PD is based on  $T_{J(\text{MAX})}=150^\circ\text{C}$ , 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  $T_{J(\text{MAX})}=150^\circ\text{C}$ .
- 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 <300us 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  $T_{J(\text{MAX})}=150^\circ\text{C}$ .
- G. The maximum current rating is limited by bond-wires.
- H. Start from  $I_D=39\text{A}$ ,  $T_A=25^\circ\text{C}$ ,  $V_{DD}=37.5\text{V}$ ,  $V_{GS}=15\text{V}$ ,  $L=0.3\text{mH}$ .

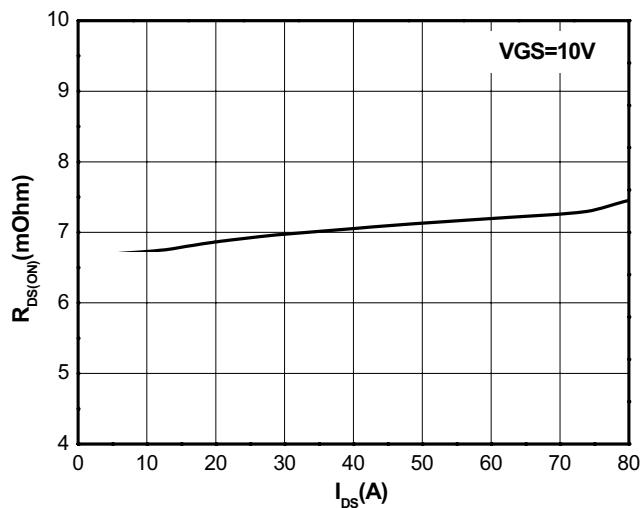
**Electronics Characteristics (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250uA	60	70		V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V			100	nA
Gate-to-source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±25V			±100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250uA	2.0	3.1	4.0	V
Drain-to-source On-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A		7.0	9.0	mΩ
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz		1900		pF
Output Capacitance	C <sub>OSS</sub>			305		
Reverse Transfer Capacitance	C <sub>RSS</sub>			235		
Total Gate Charge	Q <sub>G(TOT)</sub>	V <sub>DS</sub> = 30V, I <sub>D</sub> = 30A, V <sub>GS</sub> = 10V		123		nC
Gate-to-Source Charge	Q <sub>GS</sub>			33		
Gate-to-Drain Charge	Q <sub>GD</sub>			30		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	t <sub>d(ON)</sub>	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 30 V, I <sub>D</sub> = 30A, R <sub>GEN</sub> =6.0Ω		24.5		ns
Rise Time	t <sub>r</sub>			17.5		
Turn-Off Delay Time	t <sub>d(OFF)</sub>			185		
Fall Time	t <sub>f</sub>			58		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A		0.7	1.5	V

Typical Characteristics (Ta=25°C, unless otherwise noted)

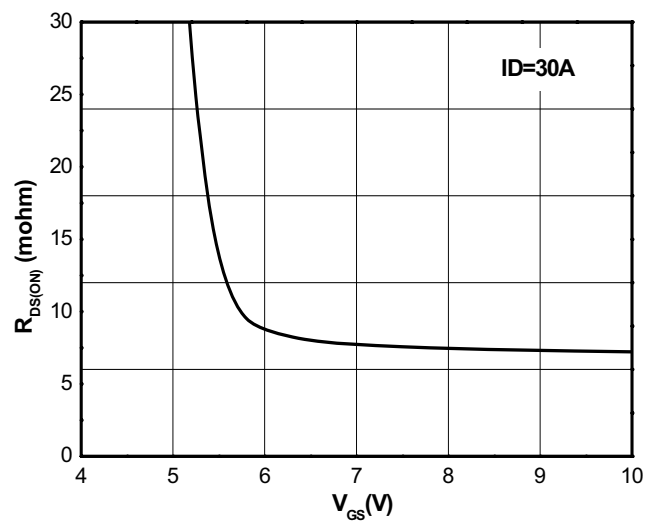


Output characteristics

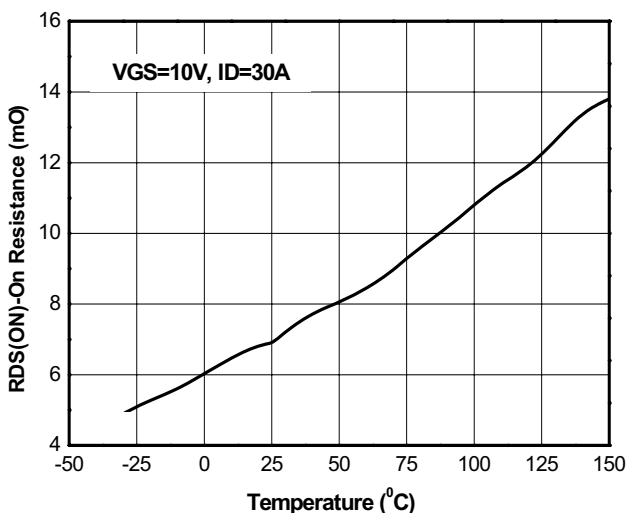


On-Resistance vs. Drain current

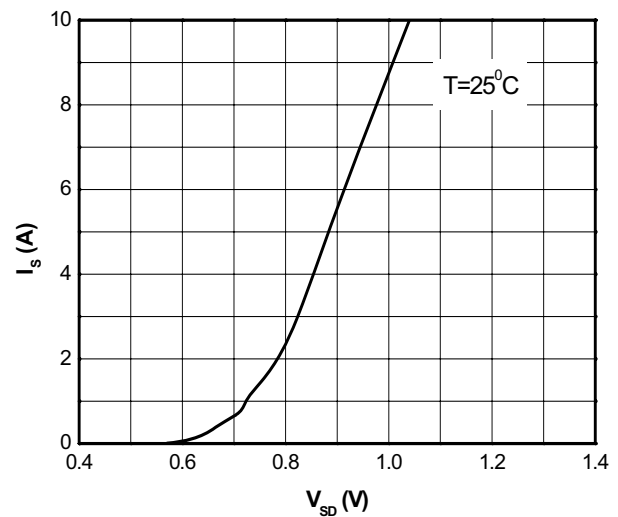
Transfer characteristics



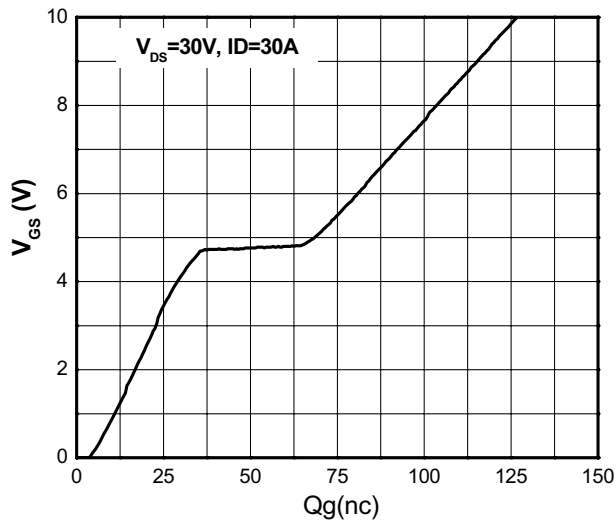
On-Resistance vs. Gate-to-Source voltage



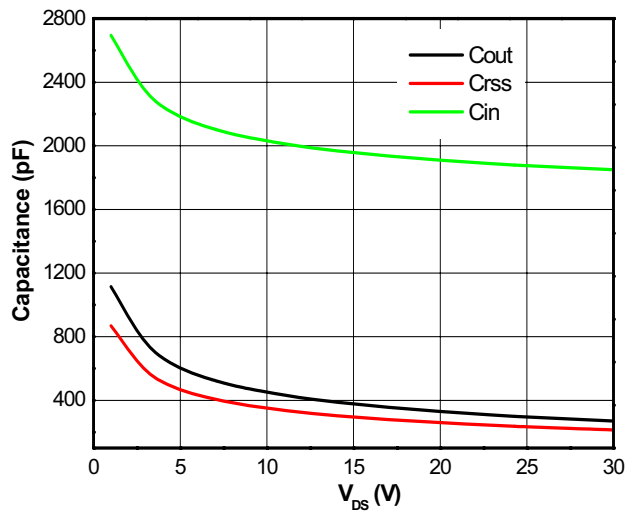
On-Resistance vs. Junction temperature



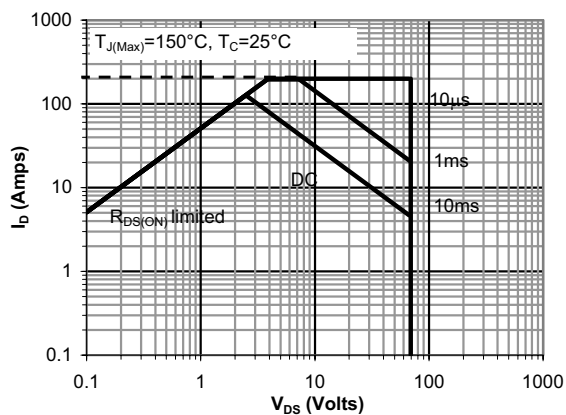
Body diode forward voltage



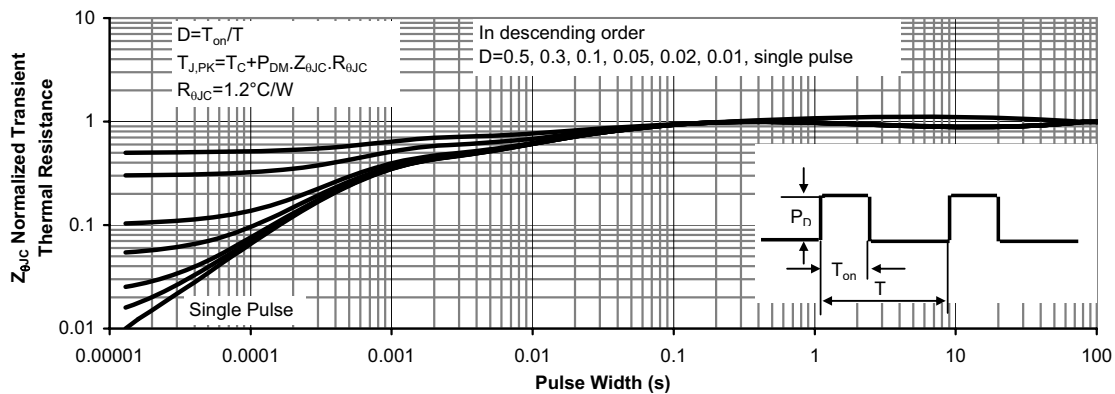
Gate charge Characteristics



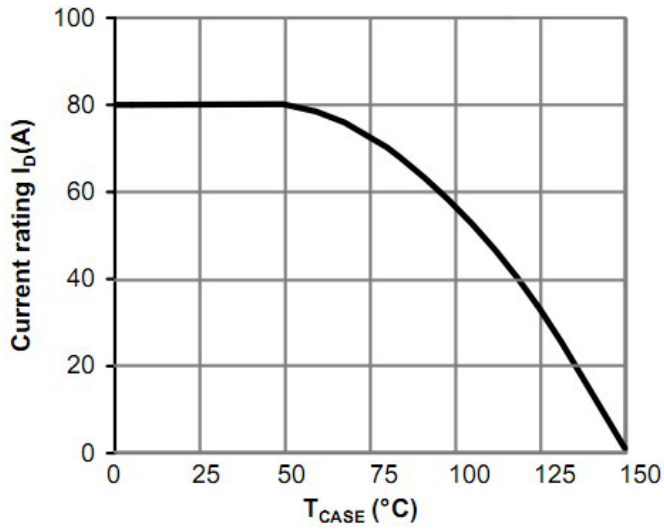
Capacitance



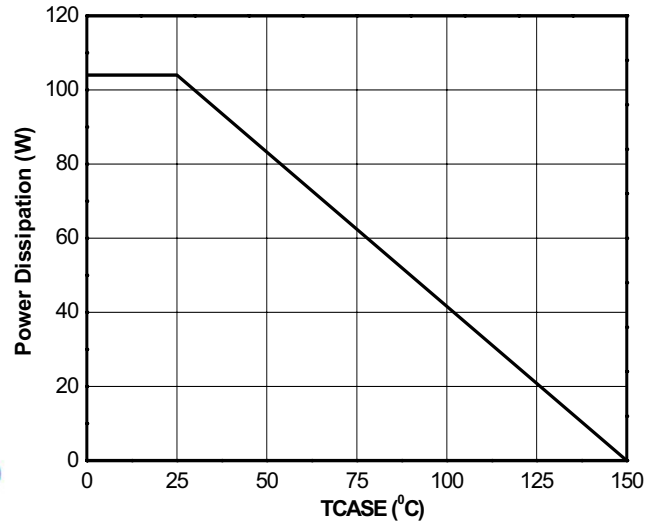
Safe operate area



Transient thermal response (Junction to case)



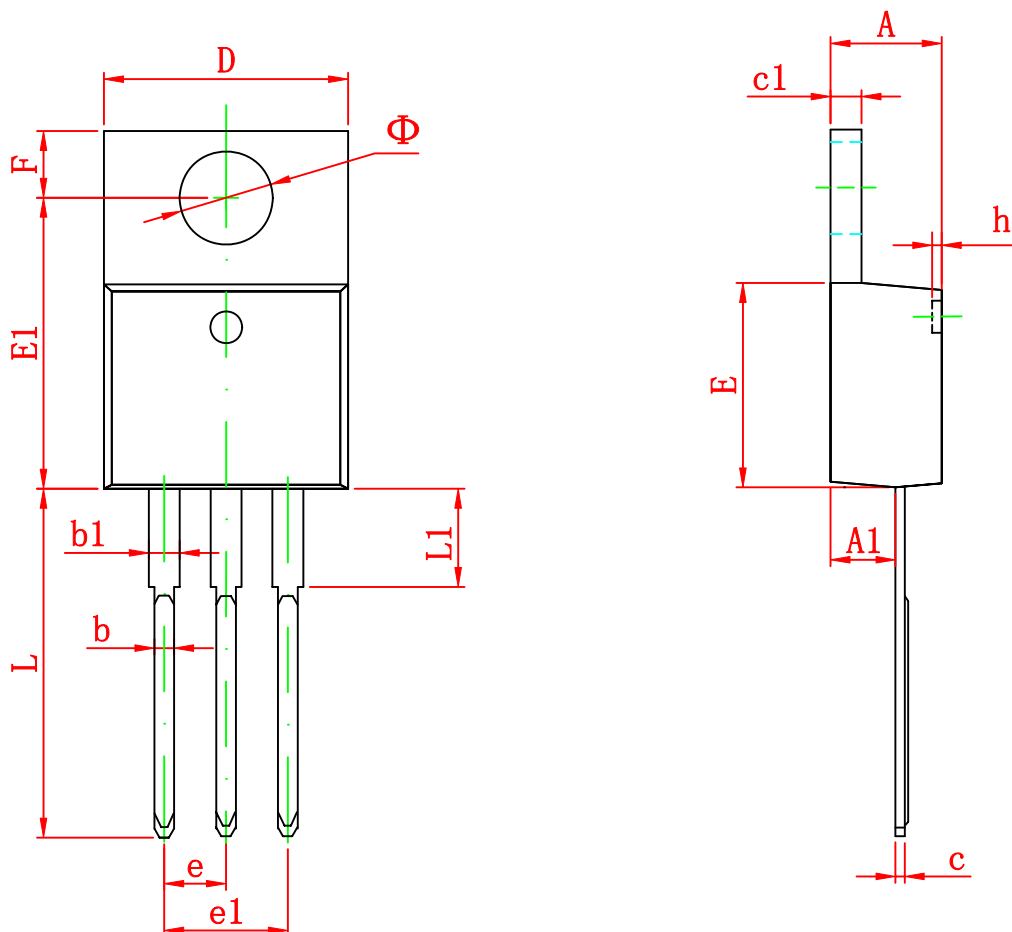
Current De-rating (Note B)



Power De-rating (Note B)

Package outline dimensions

TO-220



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
$\Phi$	3.735	3.935	0.147	0.155