

N-CHANNEL ENHANCEMENT MODE MOSFET

General Description

RMP7N80 is an N-channel enhancement mode MOSFET, which uses the self-aligned planar process and improved terminal technology, reducing the conduction loss, enhancing the avalanche energy.

MAIN CHARACTERISTICS

V_{DSS}	800	V
I_D	7.0	A
$R_{DS(ON)}$	2.0	Ω
C_{rss}	12	pF

FEATURES

- Low C_{rss}
- Low gate charge
- Fast switching
- Improved ESD capability
- Improved dv/dt capability
- 100% avalanche energy test

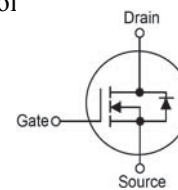
APPLICATIONS

- High efficiency switch mode power supplies
- Electronic lamp ballasts
- UPS

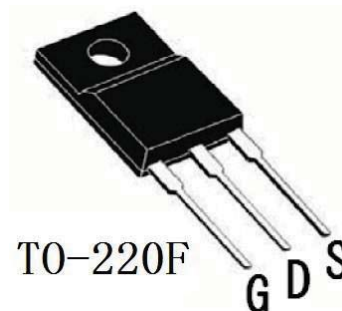
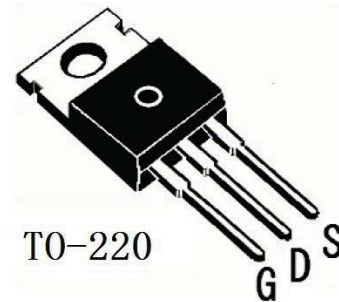
Package Marking And Ordering Information

Device	Device Package	Marking
RMP7N80TI	TO-220F	7N80
RMP7N80T2	TO-220	7N80

Symbol



Package



ABSOLUTE MAXIMUM RATINGS (Tc = 25°C)

Parameter	Symbol		Value	Unit
Drain-Source Voltage	V _{DSS}		800	V
Continues Drain Current	I _D	Tc=25°C	7*	A
		Tc=100°C	4.0*	
Plused Drain Current (note 1)	I _{DM}		28	A
Gate-to-Source Voltage	V _{GS}		± 30	V
Single Pulsed Avalanche Energy (note 2)	E _{AS}		418	mJ
Avalanche Current (note 1)	I _{AR}		7.0	A
Repetitive Avalanche Energy (note 1)	E _{AR}		18	mJ
Peak Diode Recovery (note 3)	dv/dt		4.5	V/ns
Power Dissipation	P _D Tc=25°C	TO-220	140	W
		TO-220F	49	
Power Dissipation Derating Factor	P _{D(DF)} Above 25°C	TO-220	1.12	W/°C
		TO-220F	0.39	
Operating and Storage Temperature Range	T _J , T _{STG}		150, -55~+150	°C
Maximum Temperature for Soldering	T _L		300	°C

THERMAL CHARACTERIATIC

Parameter	Symbol		Max	Unit
Thermal Resistance, Junction to Case	R _{th(j-c)}	TO-220	0.89	°C/W
		TO-220F	2.55	
Thermal Resistance, Junction to Ambient	R _{th(j-A)}	TO-220	62.5	°C/W
		TO-220F	62.5	

* Drain current limited by maximum junction temperature

Off-Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A$, $V_{GS}=0V$	800	-	-	V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	$I_D=250\mu A$, referenced to $25^\circ C$	-	0.7	-	$V/^\circ C$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=800V$, $V_{GS}=0V$, $T_C=25^\circ C$	-	-	10	μA
		$V_{DS}=640V$, $T_C=125^\circ C$	-	-	100	
Gate-body leakage current, forward	I_{GSSF}	$V_{DS}=0V$, $V_{GS}=30V$	-	-	100	nA
Gate-body leakage current, reverse	I_{GSSR}	$V_{DS}=0V$, $V_{GS}=-30V$	-	-	-100	nA

On-Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu A$	2.0	-	4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V$, $I_D=3.5A$	-	1.6	2.0	Ω
Forward Transconductance	g_{fs}	$V_{DS}=40V$, $I_D=3.5A$ (note4)	-	5.0	-	S

Dynamic Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Input capacitance	C_{iss}	$V_{DS}=25V$, $V_{GS}=0V$, $f=1.0MHz$	-	1300	1690	pF
Output capacitance	C_{oss}		-	125	160	pF
Reverse transfer capacitance	C_{rss}		-	12	15	pF

Switching Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Turn-On delay time	$t_{d(on)}$	$V_{DD}=400V, I_D=7A, R_G=25\Omega$ (note 4, 5)	-	35	80	ns
Turn-On rise time	t_r		-	100	210	ns
Turn-Off delay time	$t_{d(off)}$		-	50	110	ns
Turn-Off Fall time	t_f		-	60	130	ns
Total Gate Charge	Q_g	$V_{DS}=640V, I_D=7A, V_{GS}=10V$ (note 4, 5)	-	27	35	nC
Gate-Source charge	Q_{gs}		-	8.2	-	nC
Gate-Drain charge	Q_{gd}		-	11	-	nC

Drain-Source Diode Characteristics and Maximum Ratings						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Maximum Continuous Drain-Source Diode Forward Current		I_S	-	-	7	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}	-	-	28	A
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=7A$	-	-	1.4	V
Reverse recovery time	t_{rr}	$V_{GS}=0V, I_S=7A$ $di_F/dt=100A/\mu s$ (note 4)	-	650	-	ns
Reverse recovery charge	Q_{rr}		-	7.0	-	μC

Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: $L=16mH, I_{AS}=7A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J = 25^\circ C$
- 3: $I_{SD} \leq 7A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$
- 4: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
- 5: Essentially independent of operating temperature

RATING AND CHARACTERISTICS CURVES (RMP7N80TI/T2)

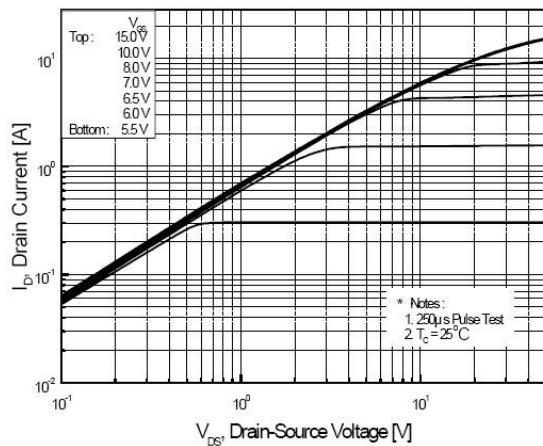


Fig. 1 On-State Characteristics

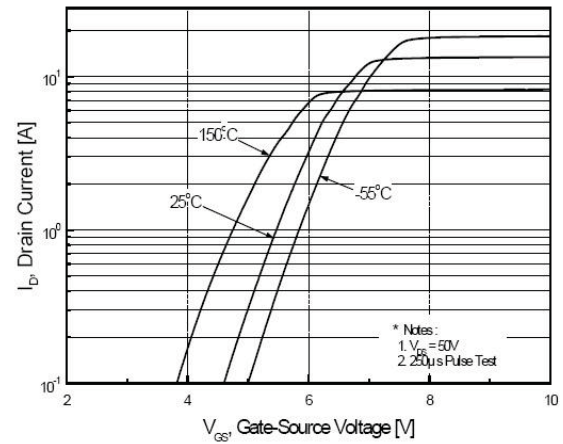


Fig. 2 Transfer Characteristics

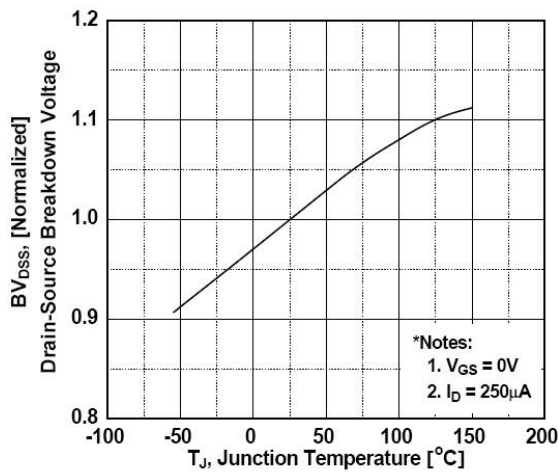


Fig. 3 Breakdown Voltage Variation vs Temperature

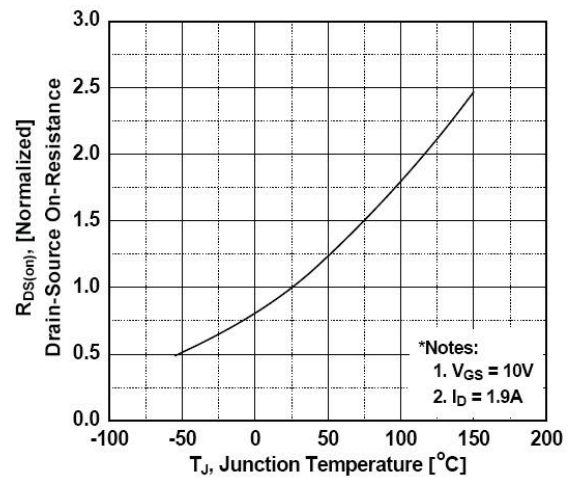


Fig. 4 On-Resistance Variation vs Temperature

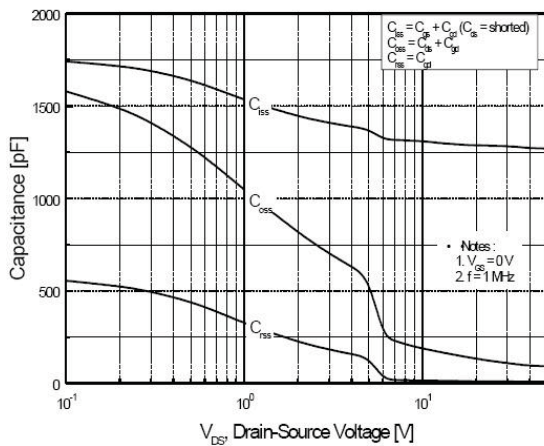


Fig. 5 Capacitance Characteristics

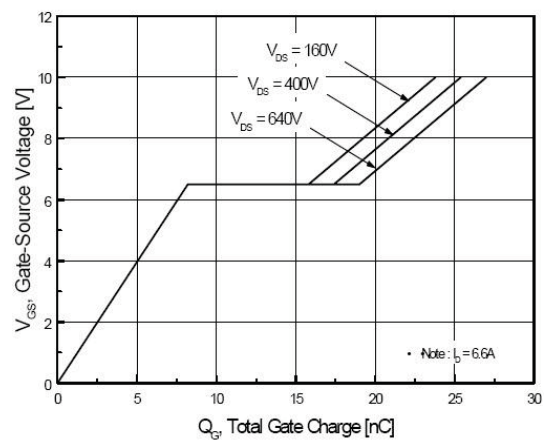


Fig. 6 Gate Charge Characteristics

RATING AND CHARACTERISTICS CURVES(RMP7N80TI/T2)

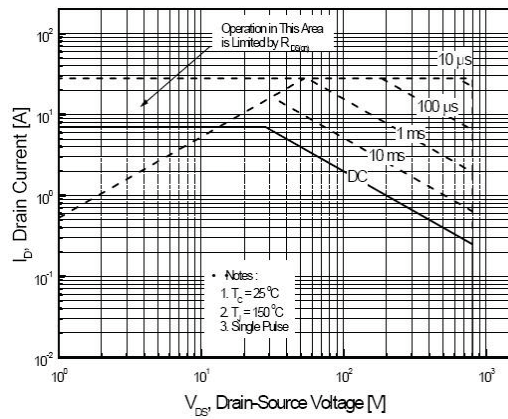


Fig. 7 Maximum Safe Operating Area

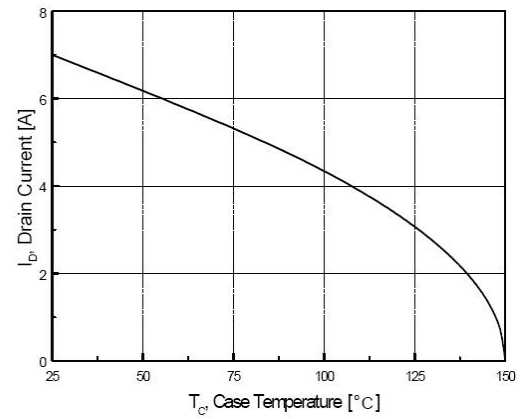


Fig. 8 Maximum Drain Current vs Case Temperature

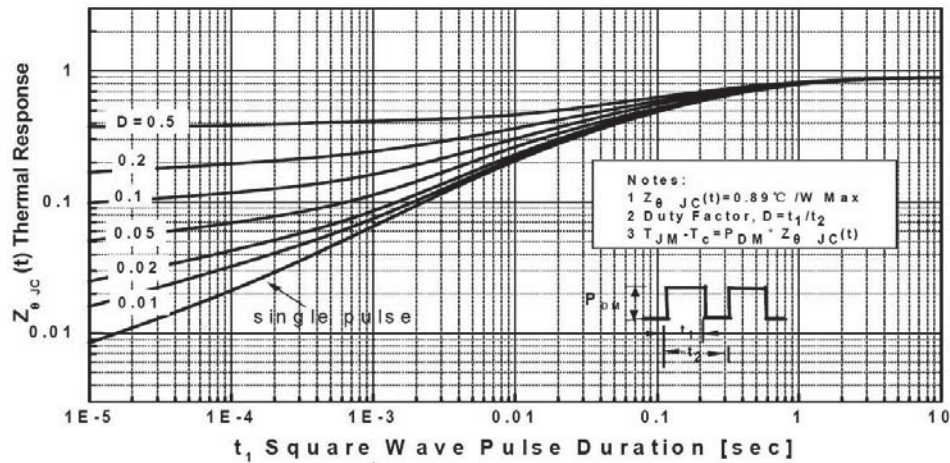


Fig. 9 Transient Thermal Response Curve(TO-220)

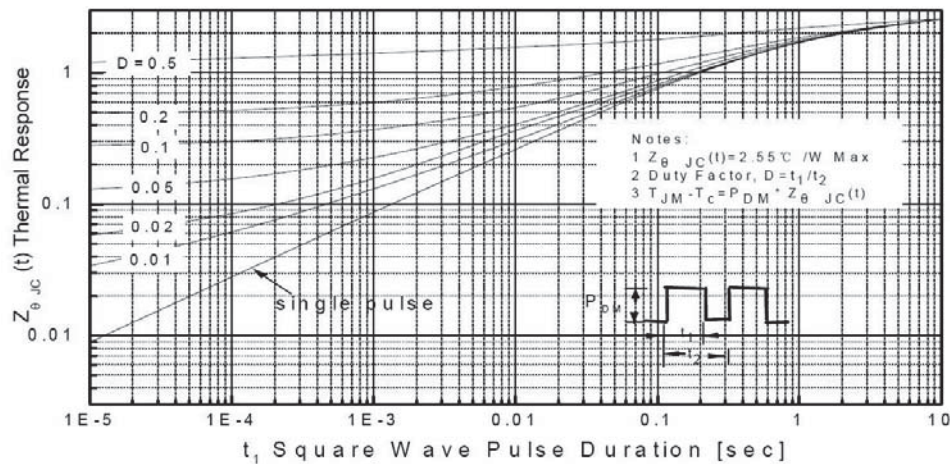


Fig. 10 Transient Thermal Response Curve(TO-220F)

TEST CIRCUITS AND WAVEFORMS

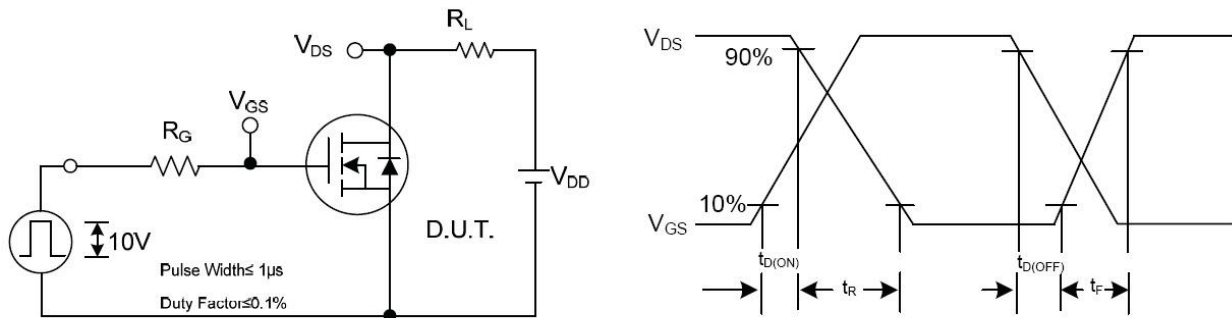


Fig.11 Resistive Switching Test Circuit & Waveforms

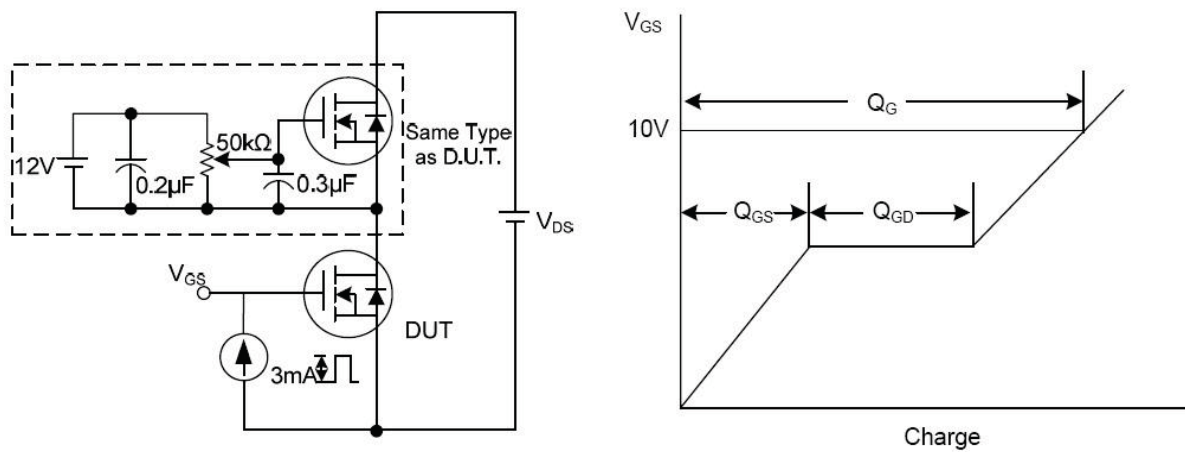


Fig.12 Gate Charge Test Circuit & Waveform

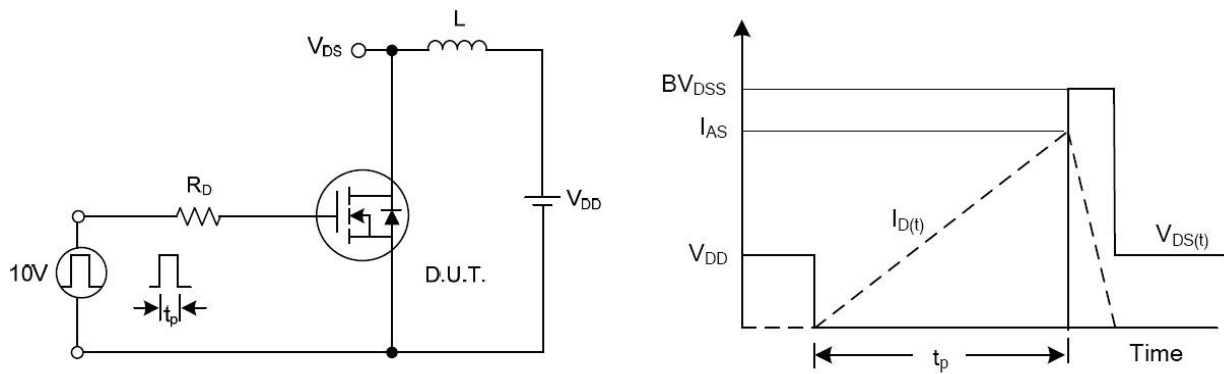
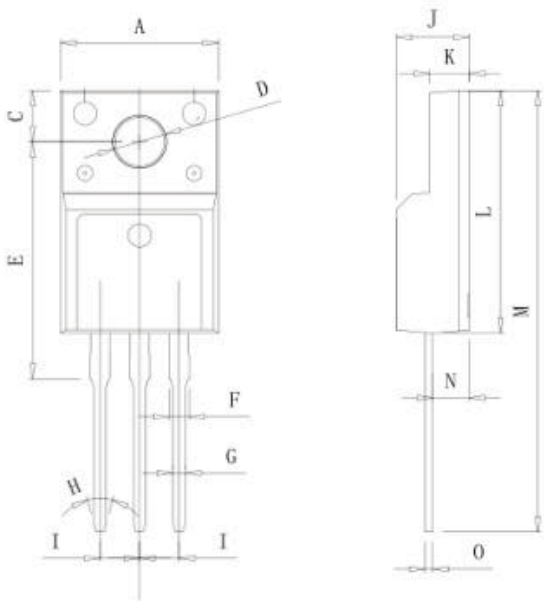


Fig.13 Unclamped Inductive Switching Test Circuit & Waveforms

TPACKAGE MECHANICAL DATA

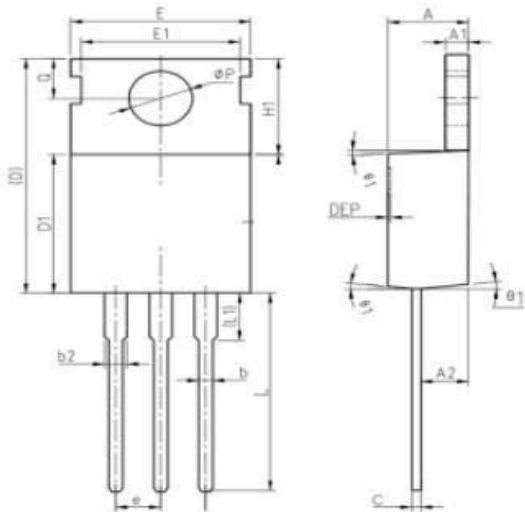
T0-220F 外形尺寸



单位: MM

SYMBOL	MILLIMETERS		SYMBOL	MILLIMETERS	
	Min	Max		Min	Max
A	9.96	10.36	K	2.34	2.74
J	4.5	4.9	O	0.4	0.6
M	28	29.6	G	0.7	0.9
E	15.4	15.6	D	2.9	3.3
L	15.5	16.1	C	3.25	3.5
N	2.2	2.9	I	2.54 TYP	
F		1.4			

T0-220A 外形尺寸



单位: MM

SYMBOL	MILLIMETERS		SYMBOL	MILLIMETERS	
	Min	Max		Min	Max
A	4.2	4.8	C	0.4	0.6
D1	8.9	9.4	b	0.7	0.9
E	9.7	10.3	A1	1.2	1.4
H1	6.3	6.9	Q	2.7	2.9
b2	1.27	1.43	A2	2.3	2.5
$\varnothing P$	3.6	3.9	e	2.54 TYP	
D	15.5	15.7			

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