

N-CHANNEL ENHANCEMENT MODE MOSFET

General Description

RMP8N70 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}	700	V
I_D	8	A
$R_{DS(ON)}$	1.3	Ω
C_{rss}	13	pF

FEATURES

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

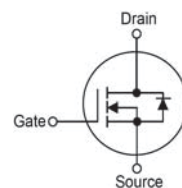
APPLICATIONS

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

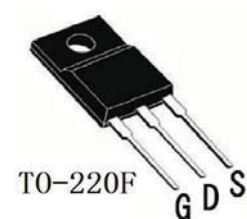
Package Marking And Ordering Information

Device	Device Package	Marking
RMP8N70TI	TO-220F	8N70
RMP8N70T2	TO-220	8N70

Symbol



Package



MAXIMUM RATINGS (Tc=25°C)

Parameter	Symbol		Value	Unit
Drain-Source Voltage	V_{DSS}		700	V
Continues Drain Current	I_D	Tc=25°C	8*	A
		Tc=100°C	4.5*	
Pulsed Drain Current (note 1)	I_{DM}		30	A
Gate-to-Source Voltage	V_{GS}		± 30	V
Single Pulsed Avalanche Energy (note 2)	E_{AS}		345	mJ
Avalanche Current (note 1)	I_{AR}		8.0	A
Repetitive Avalanche Energy (note 1)	E_{AR}		12	mJ
Peak Diode Recovery (note 3)	dv/dt		4.5	V/ns
Power Dissipation	P_D Tc=25°C	TO-220	147	W
		TO-220F	48	
Power Dissipation Derating Factor	$P_{D(DF)}$ Above 25°C	TO-220	1.18	W/°C
		TO-220F	0.38	
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	0.85	°C/W
		TO-220F	2.6	
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

ELECTRICAL CHARACTERISTICS

Off-Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A$, $V_{GS}=0V$	700	-	-	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}	$V_{DS}=700V$, $V_{GS}=0V$, $T_C=25^\circ C$	-	-	1	μA
		$V_{DS}=560V$, $T_C=125^\circ C$	-	-	10	
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	$R_{DS(on)}$	$V_{GS}=10V$, $I_D=4.0A$	-	1.3	1.6	Ω
Forward Transconductance	g_{fs}	$V_{DS}=40V$, $I_D=4.0A$ (note4)	-	7.0	-	S

Dynamic Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Input capacitance	C_{iss}	$V_{DS}=25V$, $V_{GS}=0V$, $f=1.0MHz$	-	1050	1980	pF
Output capacitance	C_{oss}		-	107	212	pF
Reverse transfer capacitance	C_{rss}		-	13	22	pF

Switching Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Turn-On delay time	$t_{d(on)}$	$V_{DD}=350V, I_D=8A, R_G=25\Omega$ (note 4, 5)	-	35	75	ns
Turn-On rise time	t_r		-	80	170	ns
Turn-Off delay time	$t_{d(off)}$		-	130	265	ns
Turn-Off Fall time	t_f		-	85	180	ns
Total Gate Charge	Q_g	$V_{DS}=560V, I_D=8A, V_{GS}=10V$ (note 4, 5)	-	45	60	nC
Gate-Source charge	Q_{gs}		-	7.6	-	nC
Gate-Drain charge	Q_{gd}		-	12	-	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	-	-	8	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}	-	-	30	A
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=8A$	-	-	1.4	V
Reverse recovery time	t_{rr}	$V_{GS}=0V, I_S=8A$ $di_f/dt=100A/\mu s$ (note 4)	-	380	-	ns
Reverse recovery charge	Q_{rr}		-	3.0	-	μC

Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: $L=10mH, I_{AS}=8A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J = 25^\circ C$
- 3: $I_{SD} \leq 8A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$, 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 (RMP8N70TI/T2)

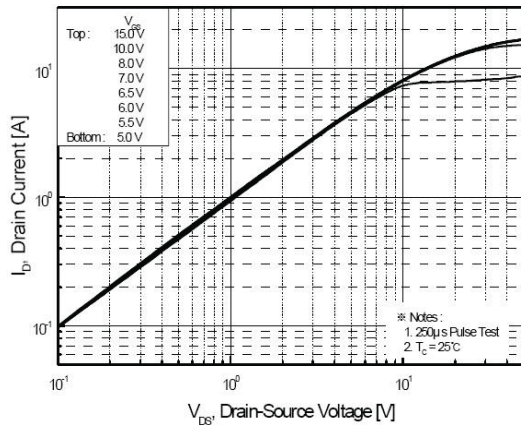


Fig. 1 On-State Characteristics

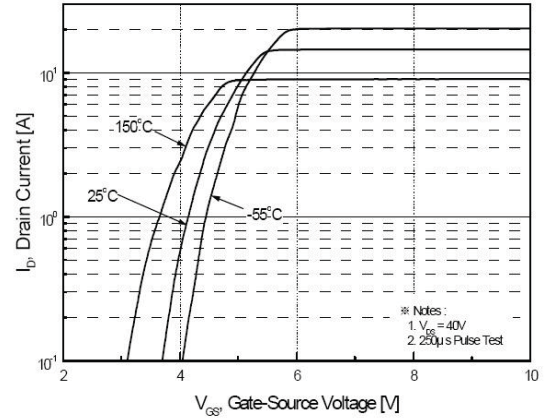


Fig. 2 Transfer Characteristics

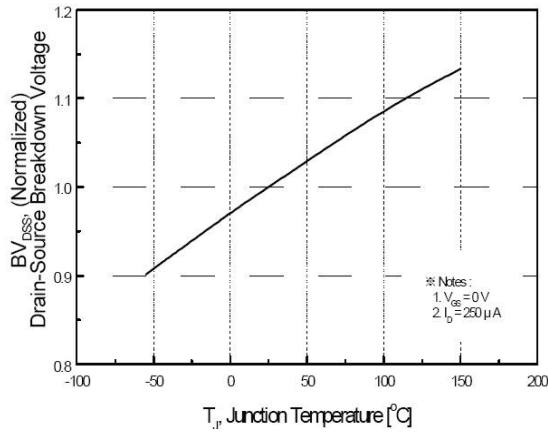


Fig. 3 Breakdown Voltage Variation vs Temperature

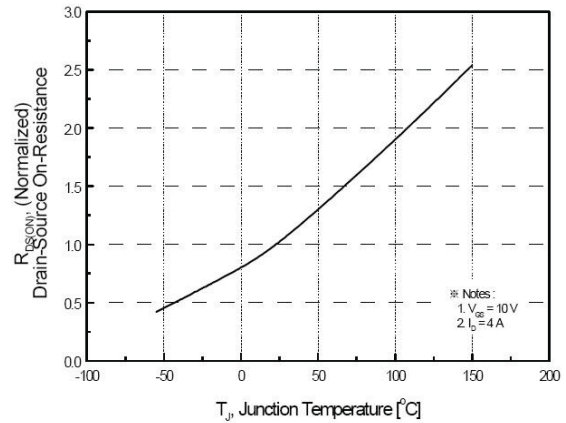


Fig. 4 On-Resistance Variation vs Temperature

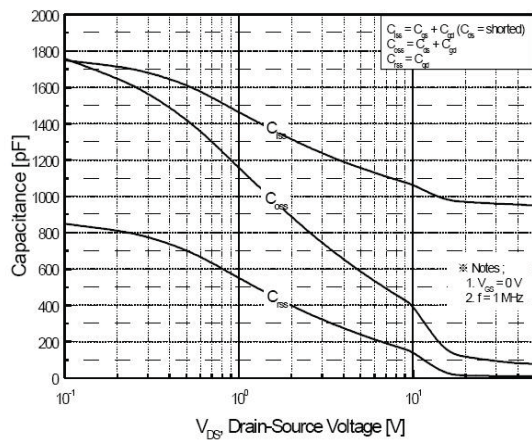


Fig. 5 Capacitance Characteristics

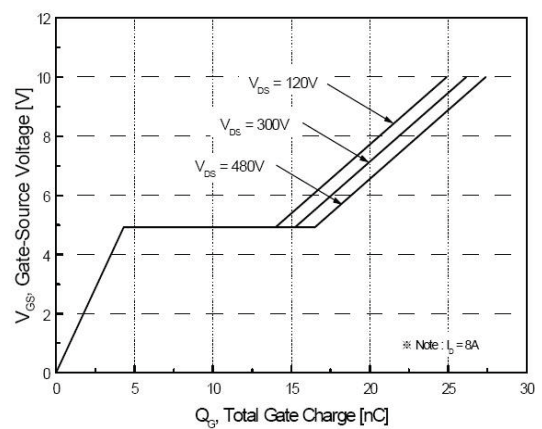


Fig. 6 Gate Charge Characteristics

RATING AND CHARACTERISTICS CURVES (RMP8N70TI/T2)

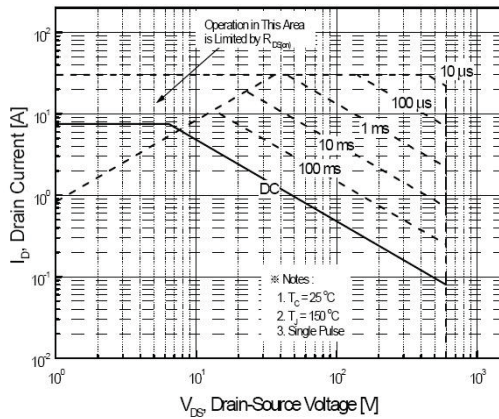


Fig. 7 Maximum Safe Operating Area

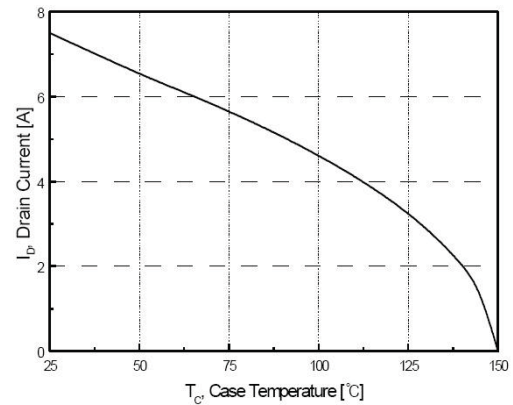


Fig. 8 Maximum Drain Current vs Case Temperature

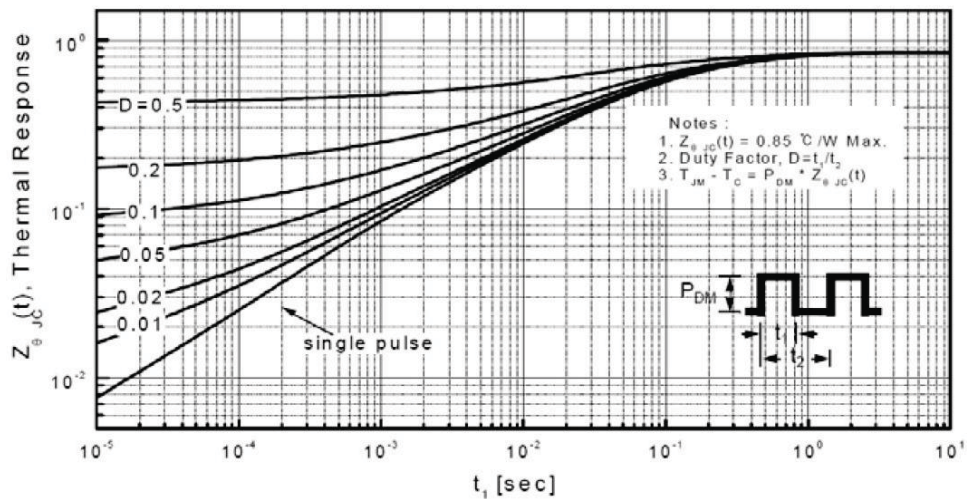


Fig. 9 Transient Thermal Response Curve(TO-220/TO-262)

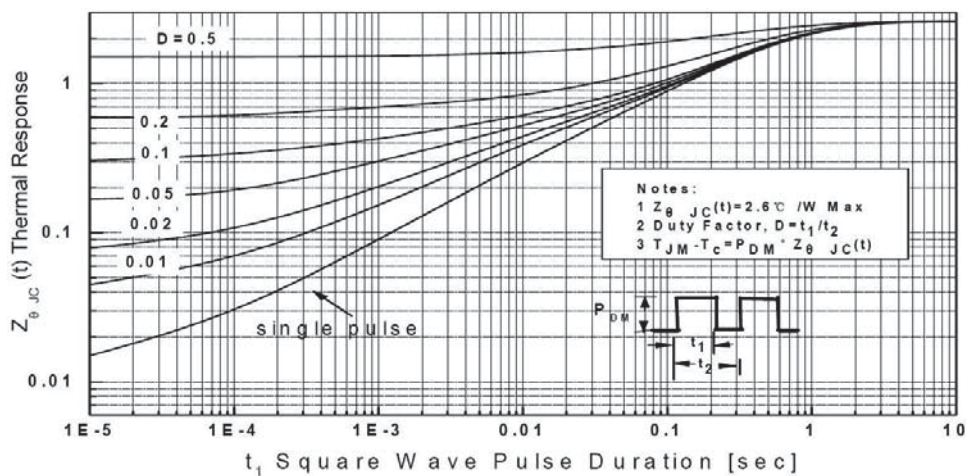


Fig. 10 Transient Thermal Response Curve(TO-220F)

TEST CIRCUITS AND WAVEFORMS

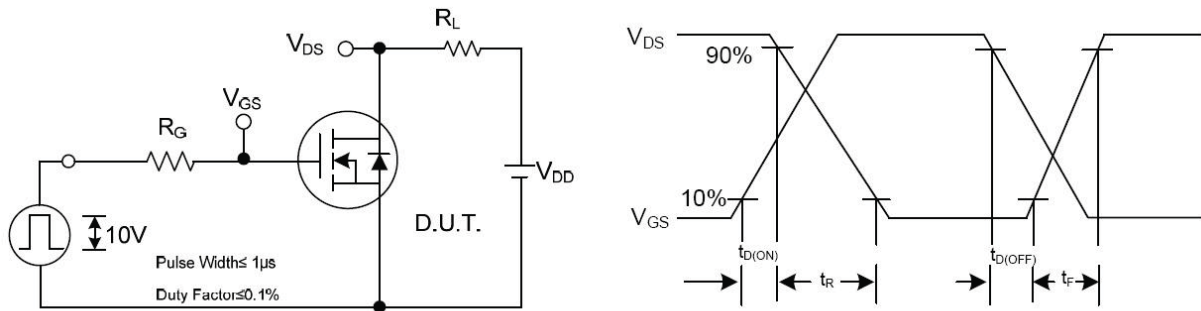


Fig.11 Resistive Switching Test Circuit & Waveforms

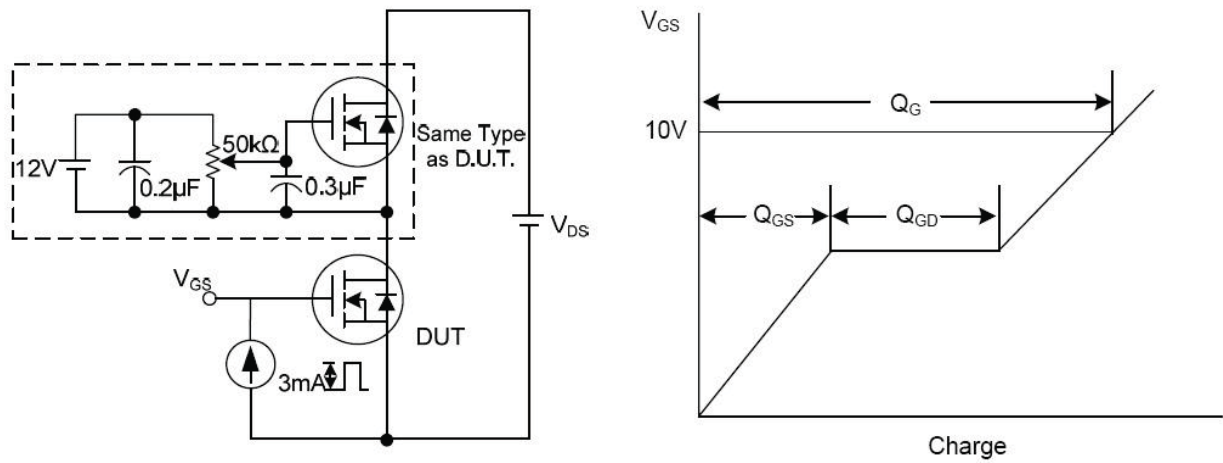


Fig.12 Gate Charge Test Circuit & Waveform

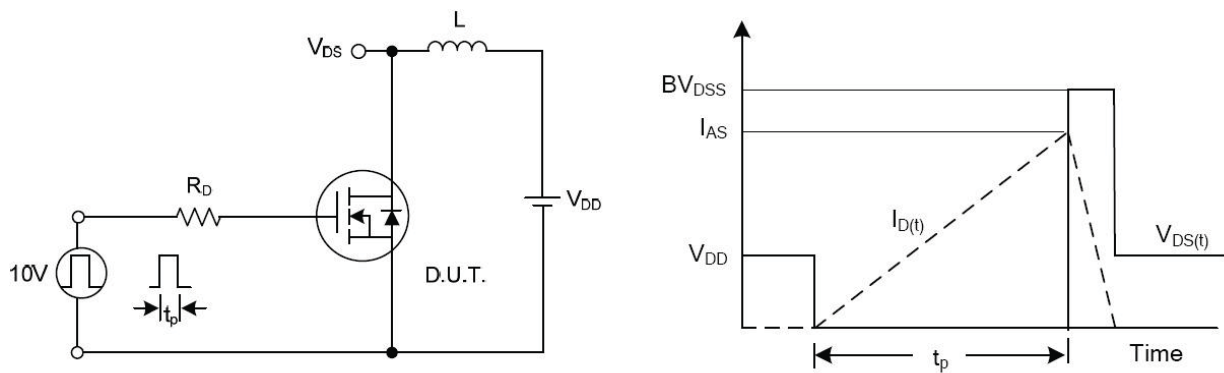


Fig.13 Unclamped Inductive Switching Test Circuit & Waveforms

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