

N-CHANNEL ENHANCEMENT MODE MOSFET

General Description

RMP2N60 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}	600	V
I_D	2	A
$R_{DS(ON)}$	3.5	Ω
C_{rss}	6.0	pF

FEATURES

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

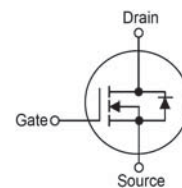
APPLICATIONS

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

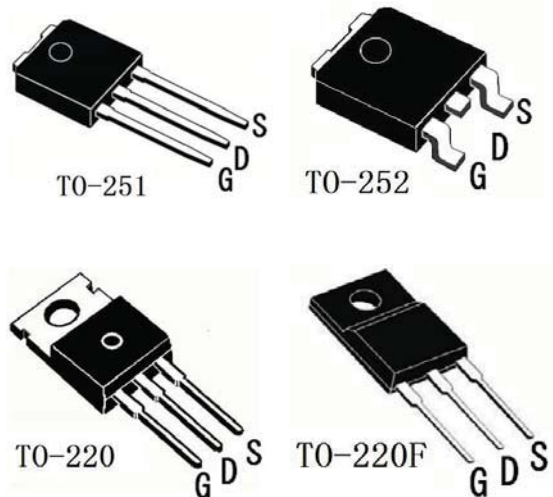
Package Marking And Ordering Information

Device	Device Package	Marking
RMP2N60IP	TO-251	2N60
RMP2N60LD	TO-252	2N60
RMP2N60TI	TO-220F	2N60
RMP2N60T2	TO-220	2N60

Symbol



Package



ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Parameter	Symbol		Value	Unit
Drain-Source Voltage	V _{DSS}		600	V
Continues Drain Current	I _D	Tc=25°C	2*	A
		Tc=100°C	1.3*	
Plused Drain Current (note 1)	I _{DM}		8	A
Gate-to-Source Voltage	V _{GS}		±30	V
Single Pulsed Avalanche Energy (note 2)	E _{AS}		120	mJ
Avalanche Current (note 1)	I _{AR}		2.0	A
Repetitive Avalanche Energy (note 1)	E _{AR}		10	mJ
Peak Diode Recovery (note 3)	dv/dt		4.5	V/ns
Power Dissipation	P _D Tc=25°C	TO-251/TO-252	44	W
		TO-220	54	
		TO-220F	23	
Power Dissipation Derating Factor	P _{D(DF)} Above 25°C	TO-251/TO-252	0.39	W/°C
		TO-220	0.8	
		TO-220F	0.26	
Operating and Storage Temperature Range	T _J , T _{STG}		150, -55~+150	°C
Maximum Temperature for Soldering	T _L		300	°C

THERMAL CHARACTERIASTIC

Parameter	Symbol		Max	Unit
Thermal Resistance, Junction to Case	R _{th(j-c)}	TO-251/TO-252	2.87	°C/W
		TO-220	2.32	
		TO-220F	5.5	
Thermal Resistance, Junction to Ambient	R _{th(j-A)}	TO-251/TO-252	110	°C/W
		TO-220	62.5	
		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}	$I_D=250\mu A$, $V_{GS}=0V$	600	-	-	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}	$V_{DS}=600V$, $V_{GS}=0V$, $T_C=25^\circ C$	-	-	1	μA
		$V_{DS}=480V$, $T_C=125^\circ C$	-	-	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	$R_{DS(ON)}$	$V_{GS}=10V$, $I_D=1.0A$	-	3.5	4.5	Ω
Forward Transconductance	g_{fs}	$V_{DS}=40V$, $I_D=1.0A$ (note4)	-	2.0	-	S

Dynamic Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Input capacitance	C_{iss}	$V_{DS}=25V$, $V_{GS}=0V$, $f=1.0MHz$	-	380	480	pF
Output capacitance	C_{oss}		-	40	52	pF
Reverse transfer capacitance	C_{rss}		-	6.0	8.0	pF

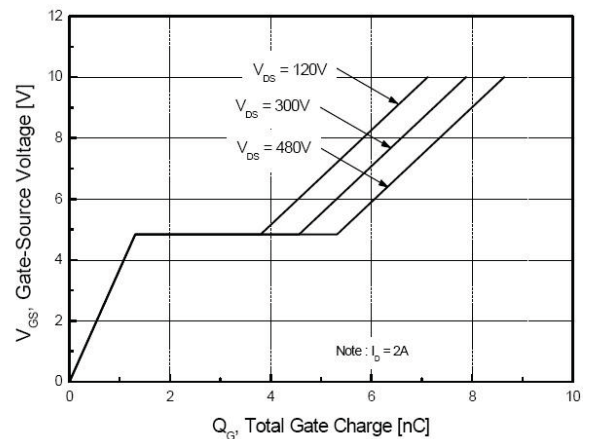
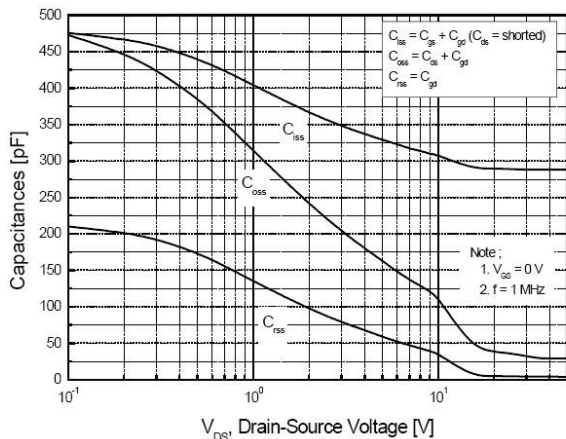
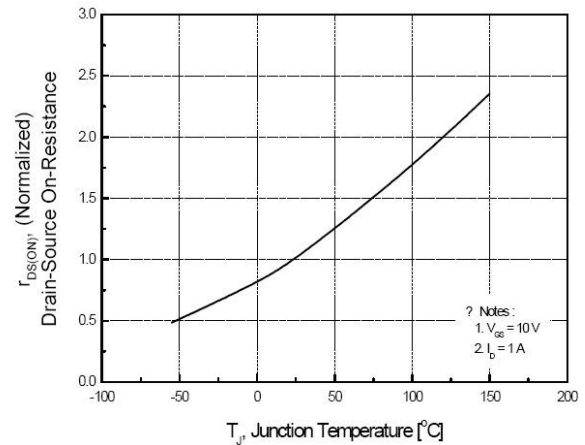
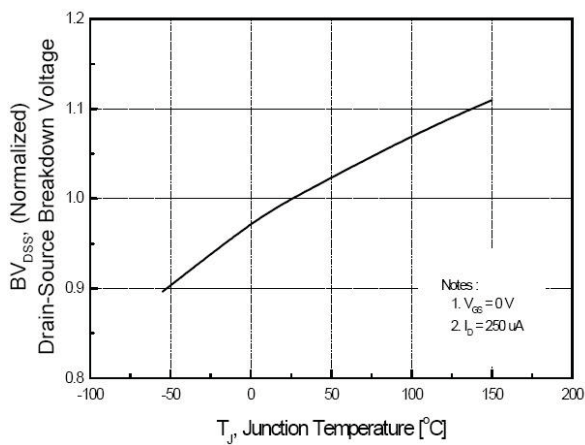
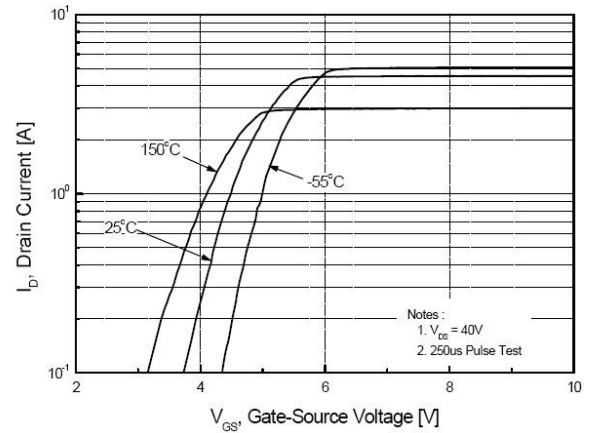
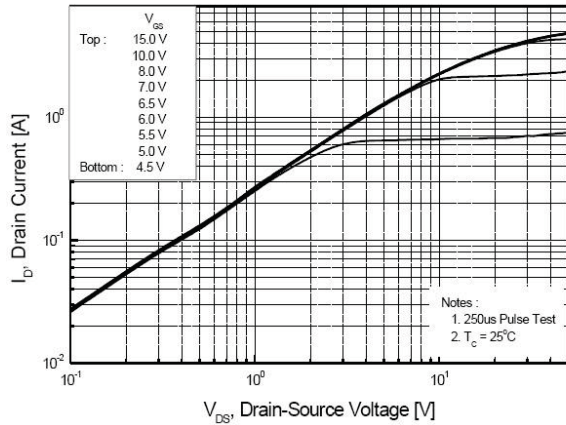
Switching Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Turn-On delay time	$t_{d(on)}$	$V_{DD}=300V, I_D=2A, R_G=25\Omega$ (note 4, 5)	-	16	40	ns
Turn-On rise time	t_r		-	50	110	ns
Turn-Off delay time	$t_{d(off)}$		-	40	80	ns
Turn-Off Fall time	t_f		-	45	95	ns
Total Gate Charge	Q_g	$V_{DS}=480V, I_D=2A, V_{GS}=10V$ (note 4, 5)	-	10	14	nC
Gate-Source charge	Q_{gs}		-	2.1	-	nC
Gate-Drain charge	Q_{gd}		-	5.5	-	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	-	-	2	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}	-	-	8	A
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=2A$	-	-	1.4	V
Reverse recovery time	t_{rr}	$V_{GS}=0V, I_S=2A$ $dI_F/dt=100A/\mu s$ (note 4)	-	260	-	ns
Reverse recovery charge	Q_{rr}		-	1.2	-	μC

Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: $L=55mH, I_{AS}=2A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^\circ C$
- 3: $I_{SD} \leq 2A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$, 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 (RMP2N60IP THRU RMP2N60T2)



RATING AND CHARACTERISTICS CURVES (RMP2N60IP THRU RMP2N60T2)

Fig. 5 Capacitance Characteristics

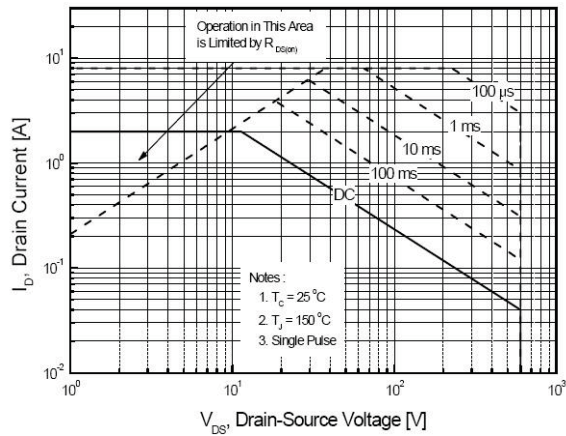


Fig. 7 Maximum Safe Operating Area

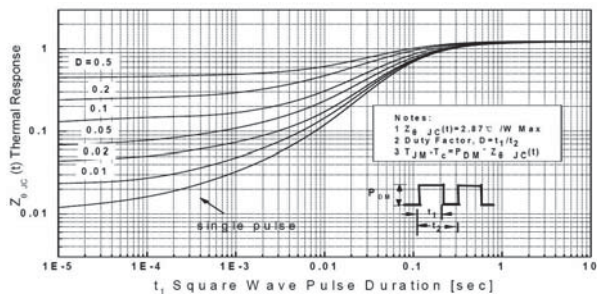


Fig. 9 Transient Thermal Response Curve (TO-251/TO-252)

Fig. 6 Gate Charge Characteristics

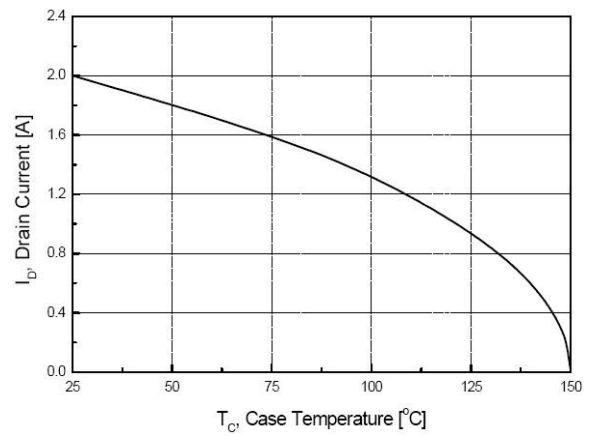


Fig. 8 Maximum Drain Current vs Case Temperature

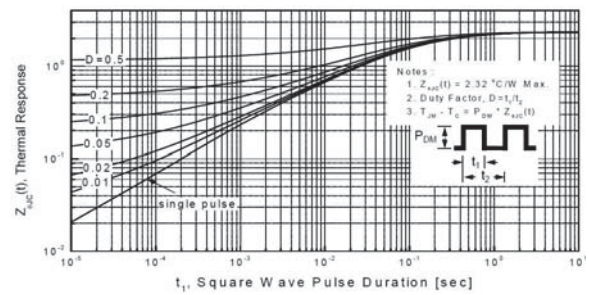


Fig. 10 Transient Thermal Response Curve (TO-220)

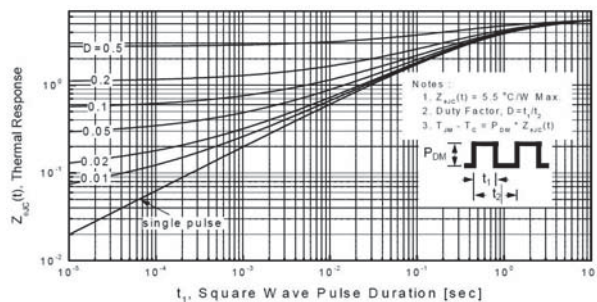


Fig. 11 Transient Thermal Response Curve (TO-220F)

TEST CIRCUITS AND WAVEFORMS

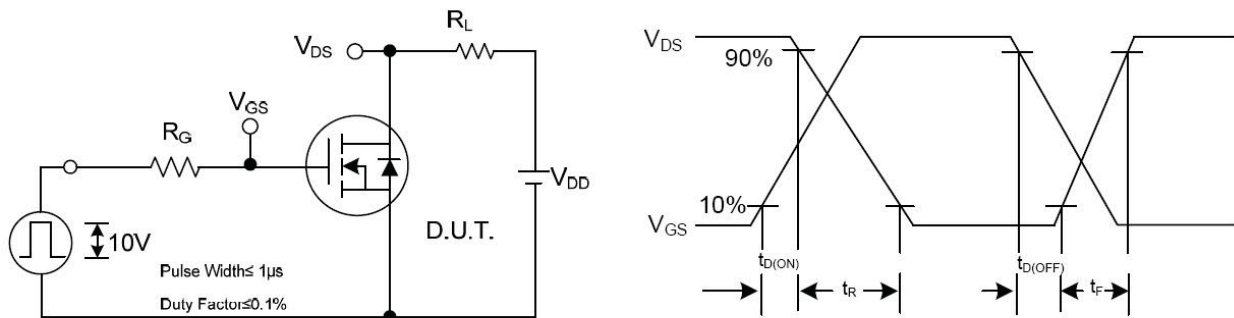


Fig.13 Resistive Switching Test Circuit & Waveforms

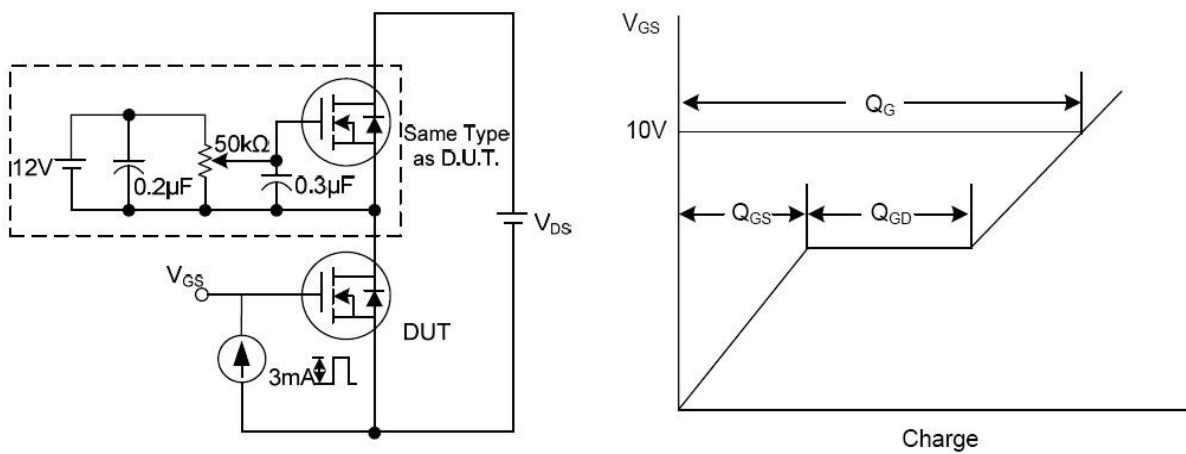


Fig.14 Gate Charge Test Circuit & Waveform

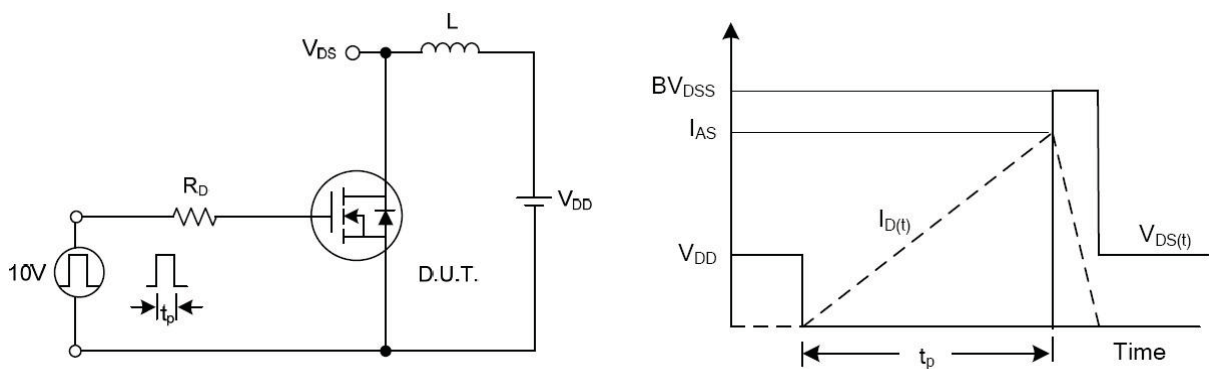
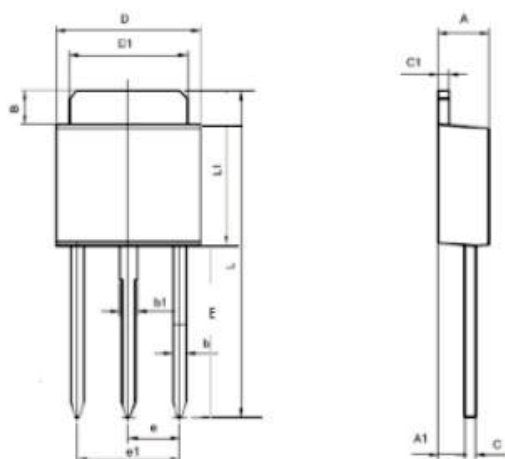


Fig.15 Unclamped Inductive Switching Test Circuit & Waveforms

TPACKAGE MECHANICAL DATA

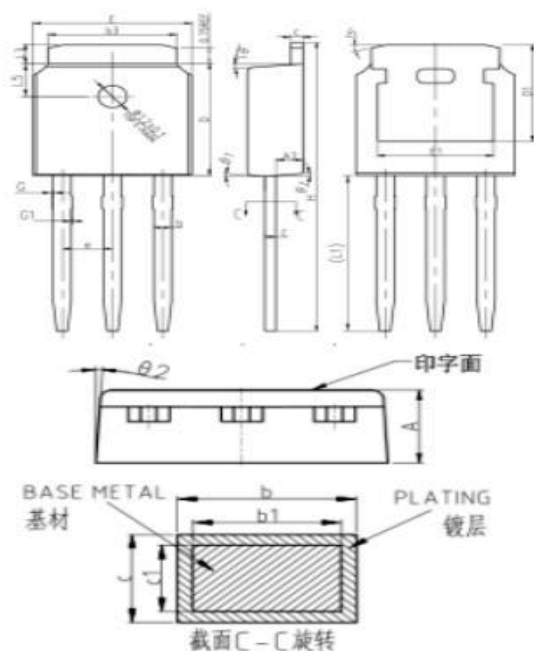
T0-251 (1) 外形尺寸



单位: MM

SYMBOL	MILLIMETERS		SYMBOL	MILLIMETERS	
	Min	Max		Min	Max
A	2.2	2.4	E	7.9	8.3
B	1.2	1.6	L	14.25	15.25
C	0.40	0.6	b1	0.7	0.9
D	6.3	6.7	c1	0.4	0.6
L1	5.2	5.7	D1	5.2	5.4
b	0.5	0.7	e	2.30 TYP	
e1	4.5	4.7	A1	1.050	1.35

T0-251 (3) 外形尺寸

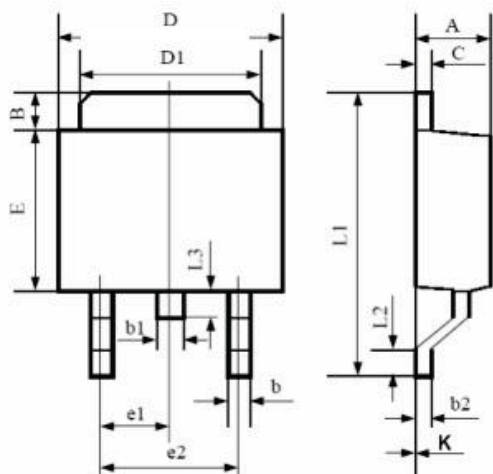


COMMON DIMENSIONS

SYMBOL	MM		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A2	0.97	1.07	1.17
b	0.72	0.78	0.85
b1	0.71	0.76	0.81
b3	5.23	5.33	5.46
c	0.47	0.53	0.58
c1	0.46	0.51	0.56
D	6.00	6.10	6.20
D1	5.30REF		
E	6.50	6.60	6.70
E1	4.70	4.83	4.92
e	2.286BSC		
H	16.10	16.40	16.60
L1	9.20	9.40	9.60
L3	0.90	1.02	1.25
L5	1.70	1.80	1.90
θ1	5°	7°	9°
θ2	5°	7°	9°

T0-252 (1) 外形尺寸

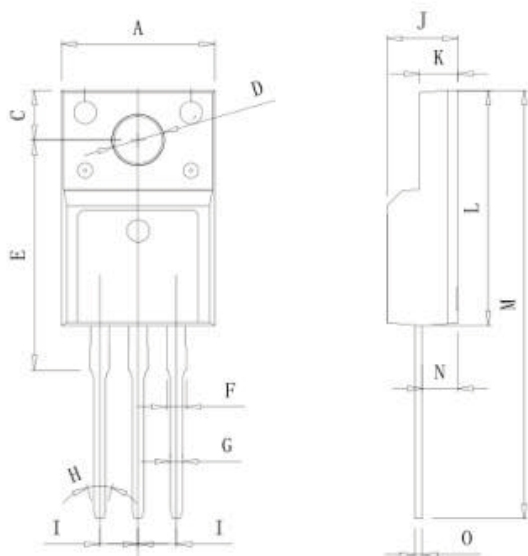
单位: MM



SYMBOL	MILLIMETERS		SYMBOL	MILLIMETERS	
	Min	Max		Min	Max
A	2.2	2.4	E	5.4	5.6
B	1.0	1.4	e1	2.25	2.35
b	0.5	0.7	e2	4.5	4.7
b1	0.7	0.9	L1	9.20	9.80
b2	0.40	0.6	L2	0.95	1.45
C	0.40	0.60	L3	0.95	1.1
D	6.3	6.7	K	-0.1	0
D1	5.2	5.4			

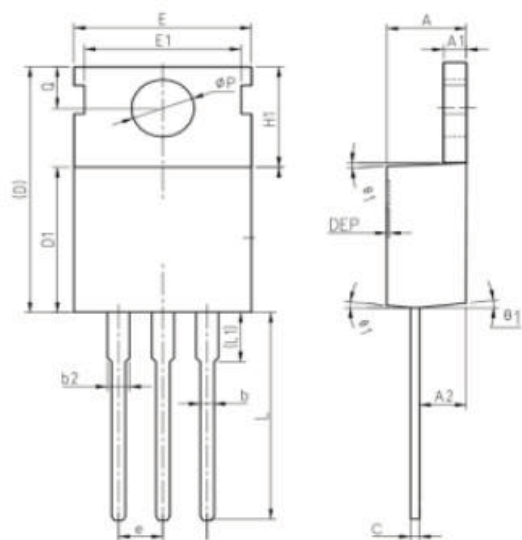
T0-220F 外形尺寸

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
ϕP	3.6	3.9	e	2.54 TYP	
D	15.5	15.7			

DISCLAIMER NOTICE

Rectron Inc reserves the right to make changes without notice to any product specification herein, to make corrections, modifications, enhancements or other changes. Rectron Inc or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies. Data sheet specifications and its information contained are intended to provide a product description only. "Typical" parameters which may be included on RECTRON data sheets and/ or specifications can and do vary in different applications and actual performance may vary over time. Rectron Inc does not assume any liability arising out of the application or use of any product or circuit.

Rectron products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of Rectron Inc. Customers using or selling Rectron components for use in such applications do so at their own risk and shall agree to fully indemnify Rectron Inc and its subsidiaries harmless against all claims, damages and expenditures.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Rectron:](#)

[RMP2N60T2](#) [RMP2N60TI](#) [RMP2N60IP](#) [RMP2N60LD-T](#)