DESCRIPTION

The AM60R380 is available in TO-220, TO-220F, TO-251 and TO-252 packages.

BVDSS	RDSON	ID
650V	0.32Ω	11A

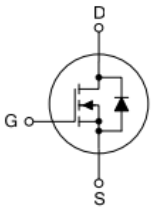
Application:

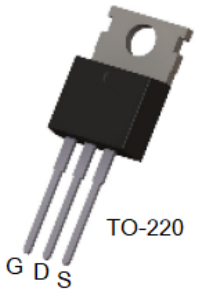
High frequency switching mode power supply

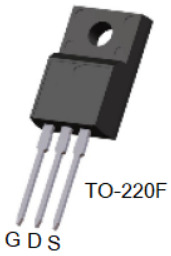
FEATURE

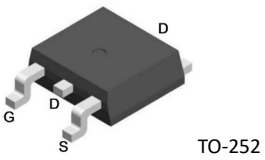
- Fast Switching
- Improved dv/dt capability

PIN DESCRIPTION









ORDERING INFORMATION

Package Type	Part Number	
TO-220 SPQ: 50pcs/Tube	T3	AM60R380T3U
		AM60R380T3VU
TO-220F SPQ: 50pcs/Tube	T3F	AM60R380T3FU
		AM60R380T3FVU
TO-251 SPQ: 75 pcs/Tube	TD	AM60R380TD3U
		AM60R380TD3VU
TO-252 SPQ: 2,500pcs/Reel	D	AM60R380DR
		AM60R380DVR
Note	U: Tube R: Tape & Reel V: Halogen free Package	
AiT provides all RoHS products		

Pin#		Symbol	Function
TO-220 TO-220F TO-251	TO-252		
1	1	G	Gate
2	2,4	D	Drain
3	3	S	Source

ABSOLUTE MAXIMUM RATINGS

T_C = 25°C, unless otherwise specified.

V_{DSS}, Drain-to-Source Voltage		600V
I_D, Continuous Drain Current		11A
I_D, Continuous Drain Current T_C = 100 °C		6.93A
I_{DM}, Pulsed Drain Current (1)		33A
V_{GS}, Gate-to-Source Voltage		±30V
E_{AS}, Single Pulse Avalanche Energy (2)		250mJ
dv/dt, Peak Diode Recovery dv/dt (3)		15V/ns
P_D, Power Dissipation	TO-220, TO-251, TO-252	100W
	TO-220F	31W
P_D, Derating Factor above 25°C	TO-220, TO-251, TO-252	0.8W/℃
	TO-220F	0.25W/℃
T_J, Operating Junction Temperature Range		150℃
T_{STG}, Storage Temperature Range		-55℃~+150℃
T_L, Maximum Temperature for Soldering		300℃
$R_{\theta JA}$, Junction-to-Ambient	TO-220, TO-251, TO-252	62.5℃/W
	TO-220F	80℃/W
$R_{\theta JC}$, Junction-to-Case	TO-220, TO-251, TO-252	1.25℃/W
	TO-220F	4℃/W

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

(1) Pulse width limited by maximum junction temperature

(2) L=20mH, V_{Ds}=50V, Start T_J=25℃

(3) I_{SD} =11A,di/dt ≤100A/us, V_{DD}≤B_{VDS}, Start T_J=25℃

ELECTRICAL CHARACTERISTICS

T_C = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
OFF Characteristics						
Drain to Source Breakdown Voltage	V_{DSS}	V_{GS}=0V, I_D=250μA	600	-	-	V
BV_{DSS} Temperature Coefficient	ΔBV_{DSS} / ΔT_J	I_D=250μA Reference 25℃	-	0.7	-	V/℃
Drain to Source Leakage Current	I_{DSS}	V_{DS}=600V, V_{GS}=0V, T_J=25℃	-	-	10	μA
		V_{DS}=480V, V_{GS}=0V, T_J=125℃	-	-	500	
Gate to Source Forward Leakage	$I_{GSS(F)}$	V_{GS}=+30V	-	-	100	nA
Gate to Source Reverse Leakage	$I_{GSS(R)}$	V_{GS}=-30V	-	-	-100	nA
ON Characteristics						
Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=3.8A (4)	-	0.32	0.38	Ω
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}= V_{GS}, I_D=250μA(4)	3.0	-	5.0	V
Dynamic Characteristics						
Gate resistance	R_g	f=1.0MHz	-	10	-	Ω
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	780	-	pF
Output Capacitance	C_{oss}		-	550	-	
Reverse Transfer Capacitance	C_{rss}		-	26	-	
Switching Characteristics						
Turn-on Delay Time	$t_{d\ (ON)}$	I_D=4.8A, V_{DD}=400V, V_{GS}=10V, R_G=5Ω	-	11	-	ns
Rise Time	t_r		-	9	-	
Turn-Off Delay Time	$t_{d\ (OFF)}$		-	38	-	
Fall Time	t_f		-	8	-	
Total Gate Charge	Q_g	I_D=4.8A, V_{DD}=480V, V_{GS}=10V	-	21.1	-	nC
Gate to Source Charge	Q_{gs}		-	4.3	-	
Gate to Drain (“Miller”) Charge	Q_{gd}		-	7.9	-	
Source-Drain Diode Characteristics						
Continuous Source Current (Body Diode)	I_S	T_c=25℃	-	-	11	A
Maximum Pulsed Current (Body Diode)	I_{SM}		-	-	33	A
Diode Forward Voltage	V_{SD}	I_S=4.8A , V_{GS}=0V *	-	-	0.9	V
Reverse Recovery Time	T_{rr}	I_S=11A, Tj=25℃ dIF/dt =100A/μs V_{GS}=0V	-	80	-	ns
Reverse Recovery Charge	Q_{rr}		-	260	-	nC
Reverse Recovery Current	I_{rrm}		-	6.5	-	A

* Pulse width tp≤300μs, δ≤2%

TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Safe Operating Area (TO-220)

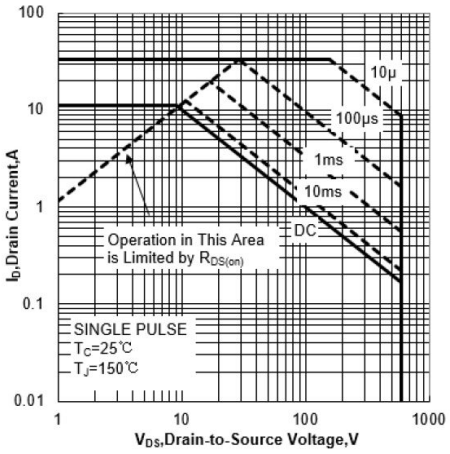


Fig 2. Safe Operating Area (TO-220F)

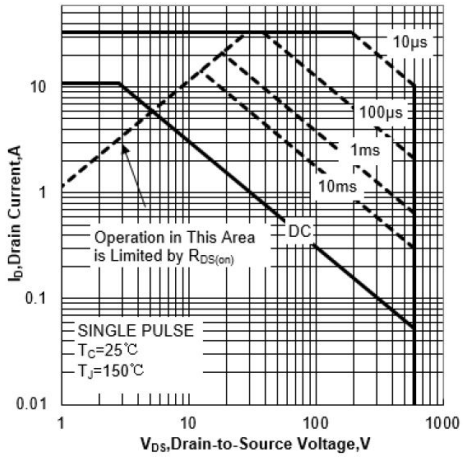


Fig3. Power Dissipation (TO-220)

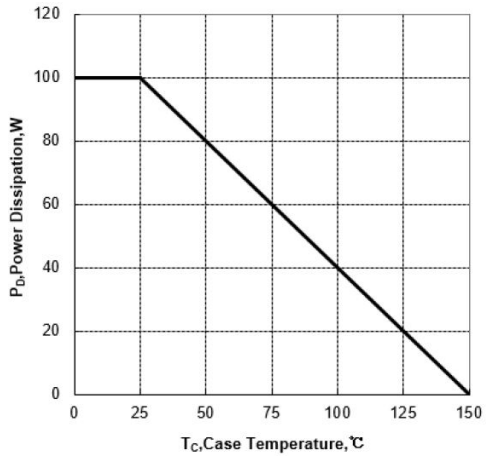


Fig4. Power Dissipation (TO-220F)

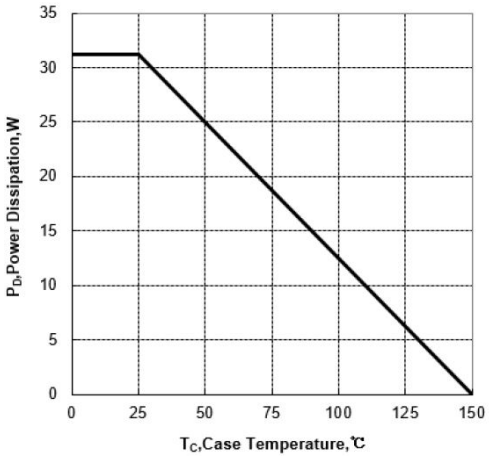


Fig5. Max Thermal Impedance (TO-220)

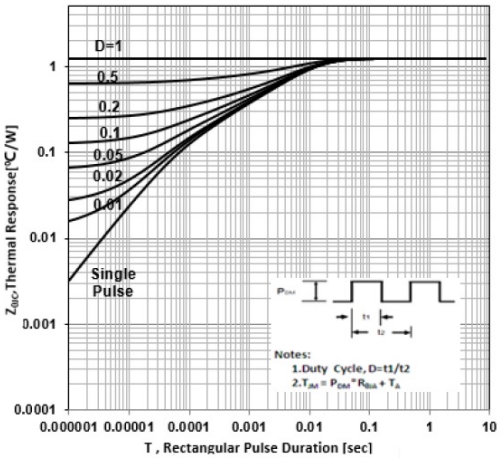


Fig6. Max Thermal Impedance (TO-220F)

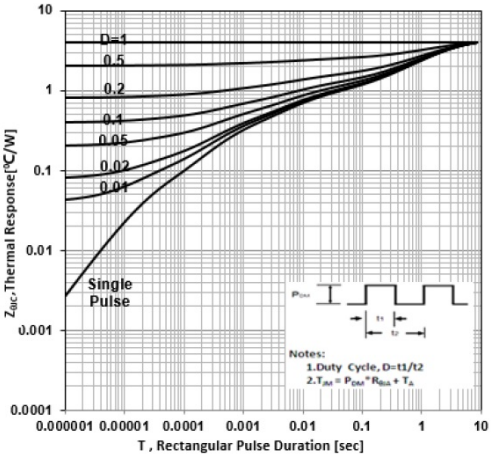


Fig7. Typical Output Characteristics

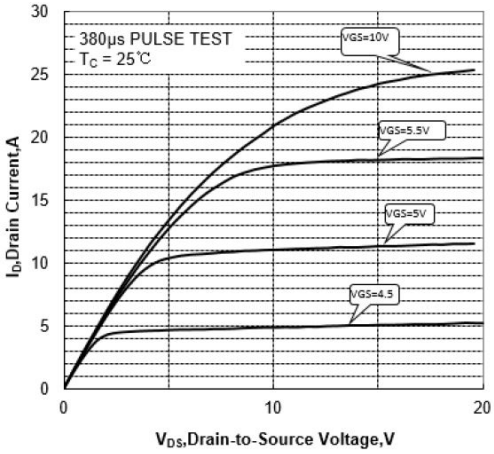


Fig8. Typical Transfer Characteristics

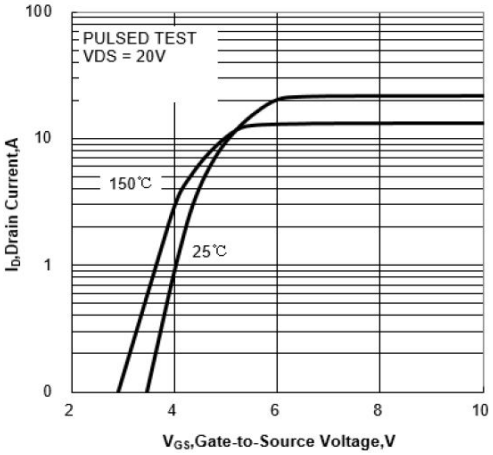


Fig9. Typical Drain to Source ON Resistance vs. Drain Current

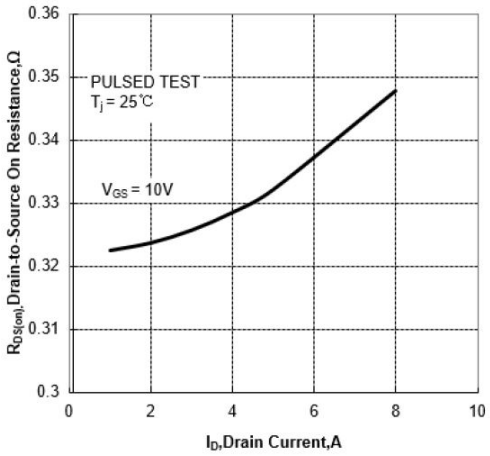


Fig10. Typical Drain to Source on Resistance vs. Junction Temperature

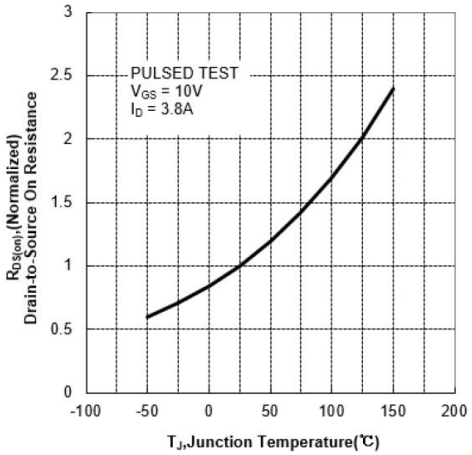


Fig11. Typical Threshold Voltage vs. Junction Temperature

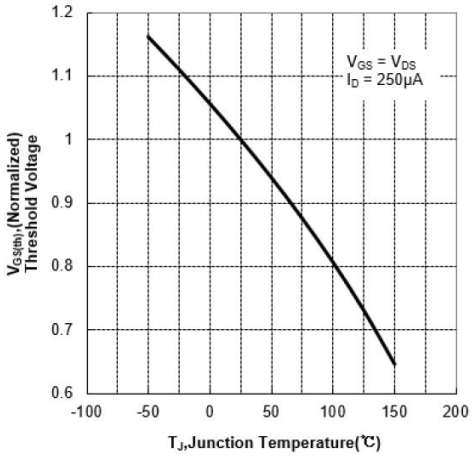


Fig12. Typical Breakdown Voltage vs. Junction Temperature

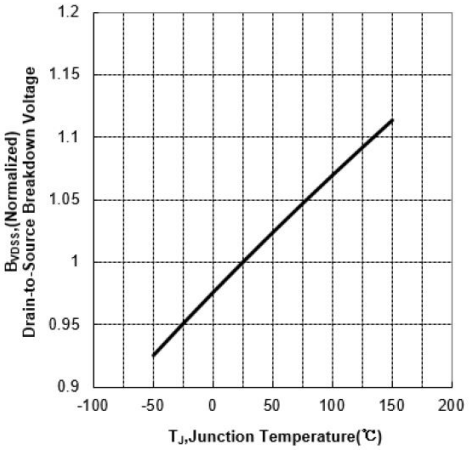


Fig 13. Typical Capacitance vs. Drain to Source Voltage

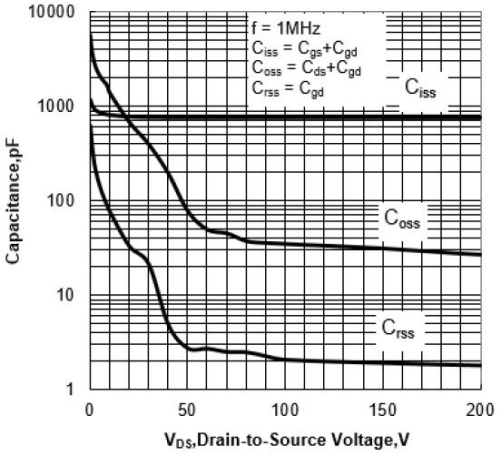


Fig 14. Typical Gate Charge vs. Gate to Source Voltage

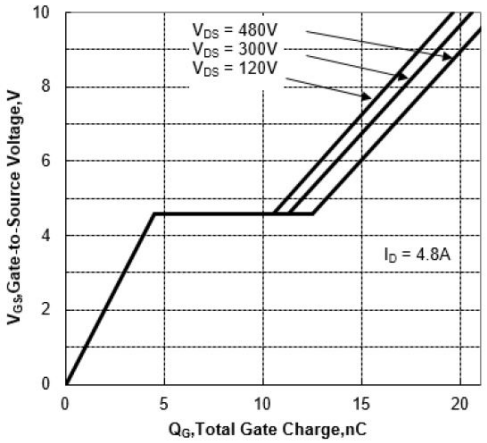


Fig15. Gate Charge Test Circuit

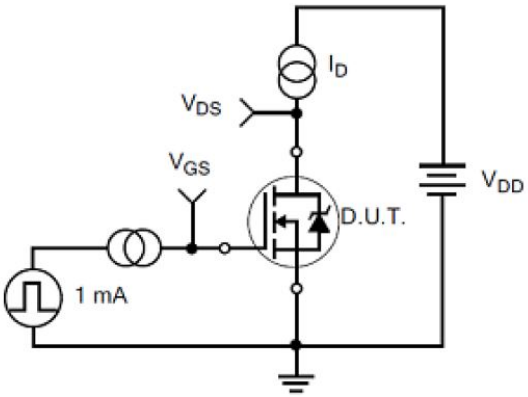


Fig16. Gate Charge Waveforms

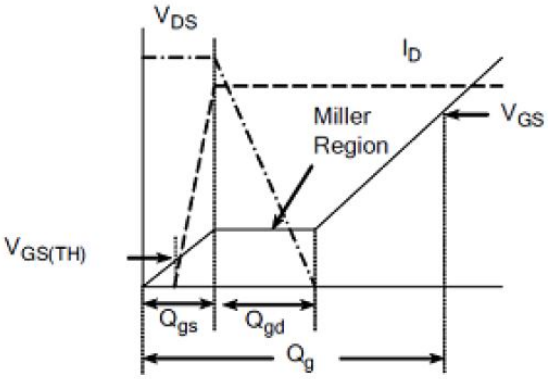


Fig17. Resistive Switching Test Circuit

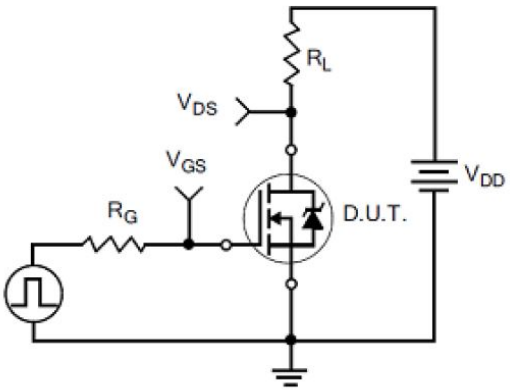


Fig18. Resistive Switching Waveforms

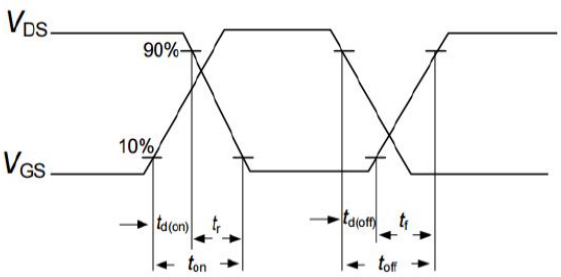


Fig 19. Diode Reverse Recovery Test Circuit

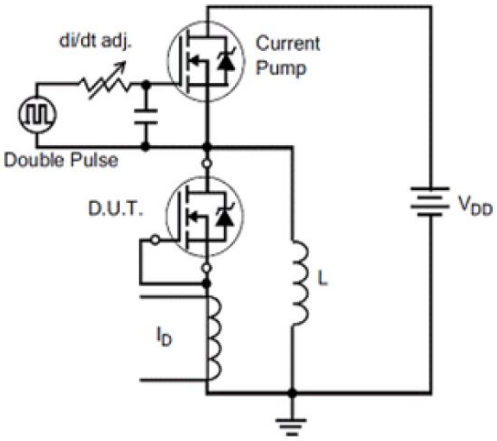


Fig 20. Diode Reverse Recovery Waveform

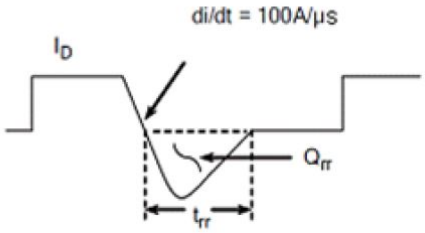


Fig 21. Unclamped Inductive Switching Test Circuit

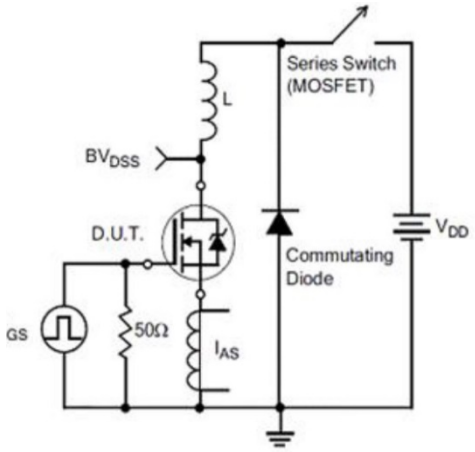
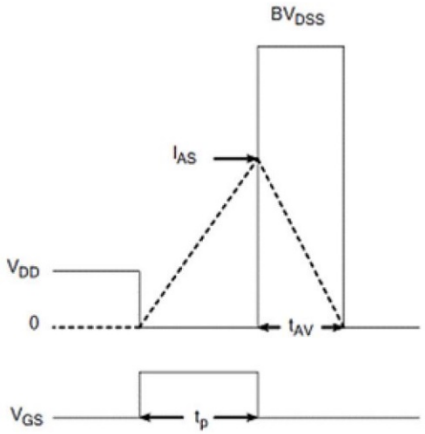
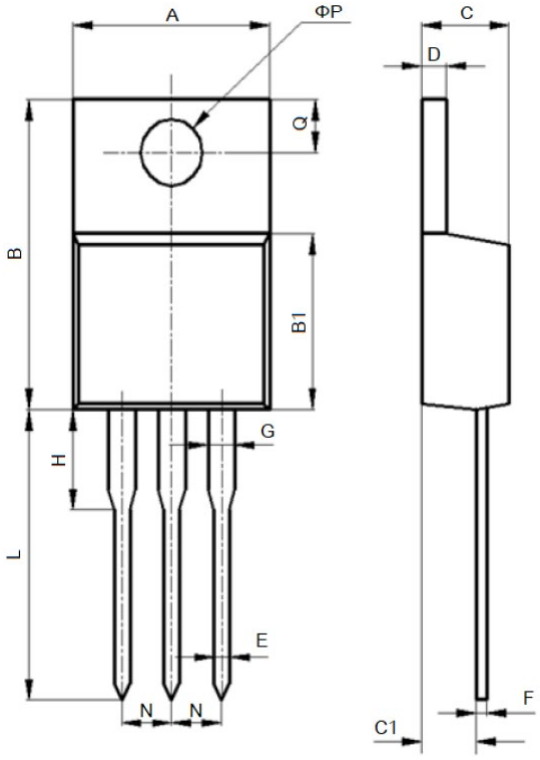


Fig 22. Unclamped Inductive Switching Waveform



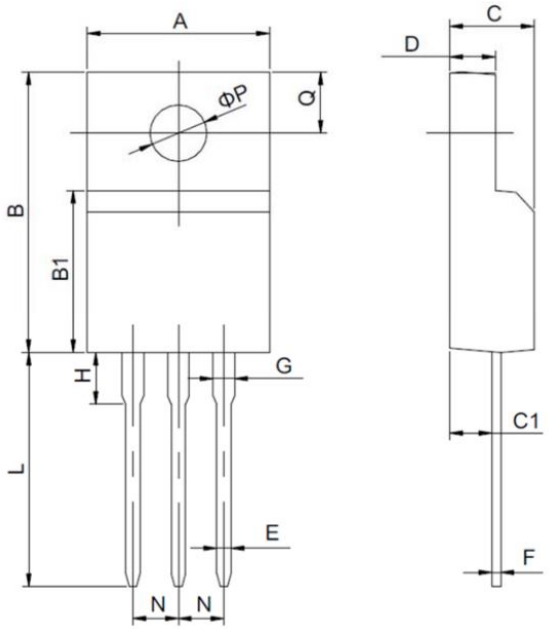
PACKAGE INFORMATION

Dimension in TO-220 (Unit: mm)



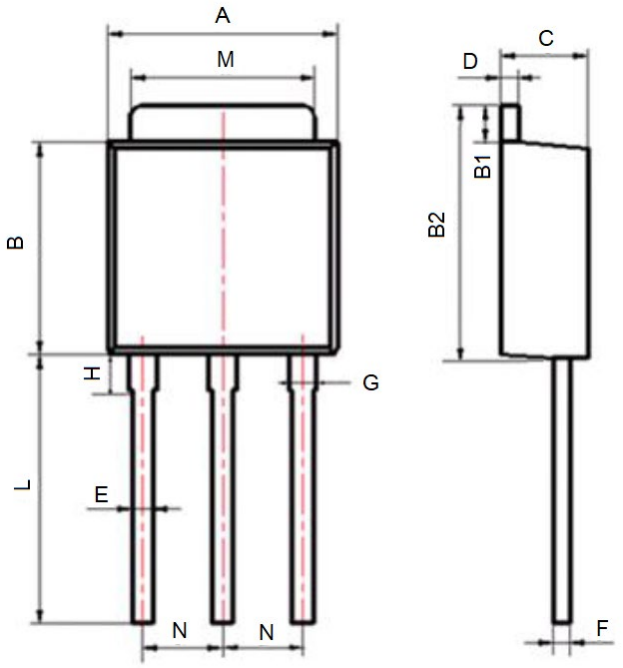
Symbol	Min.	Max.
A	9.600	10.600
B	15.000	16.000
B1	8.900	9.500
C	4.300	4.800
C1	2.300	3.100
D	1.200	1.400
E	0.700	0.900
F	0.300	0.600
G	1.170	1.370
H	2.700	3.800
L	12.600	14.800
N	2.340	2.740
Q	2.400	3.000
ΦP	3.500	3.900

Dimension in TO-220F (Unit: mm)



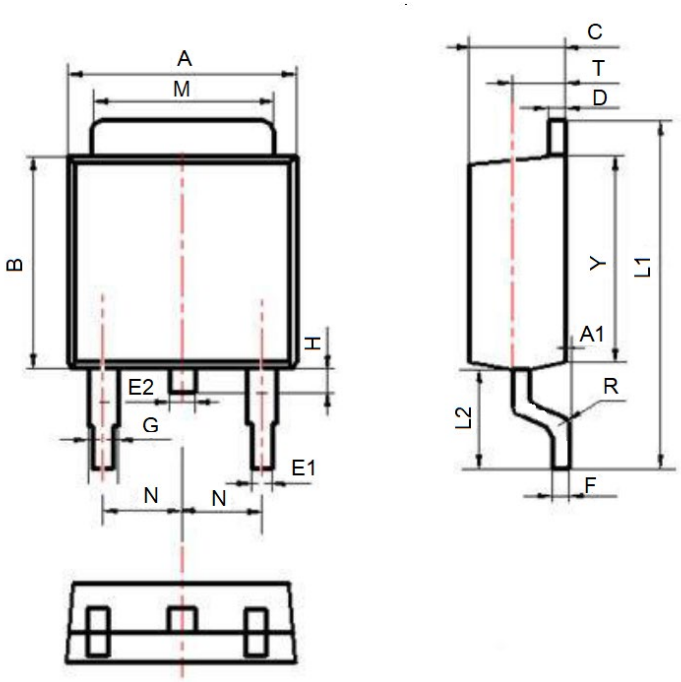
Symbol	Min.	Max.
A	9.600	10.400
B	15.400	16.200
B1	8.900	9.500
C	4.300	4.900
C1	2.100	3.000
D	2.400	3.000
E	0.600	1.000
F	0.300	0.600
G	1.120	1.420
H	1.600	3.800
L	12.000	14.000
N	2.340	2.740
Q	3.150	3.550
ΦP	2.900	3.300

Dimension in TO-251 (Unit: mm)



Symbol	Min.	Max.
A	6.300	6.900
B	5.700	6.300
B1	1.000	1.200
B2	6.800	7.400
C	2.100	2.500
D	0.300	0.600
E	0.500	0.700
F	0.300	0.600
G	0.700	1.000
H	1.600	2.400
L	3.900	4.300
M	5.100	5.500
N	2.090	2.490

Dimension in TO-252 (Unit: mm)



Symbol	MILLIMETERS	
	Min.	Max.
A	6.300	6.900
A1	0	0.130
B	5.700	6.300
C	2.100	2.500
D	0.300	0.600
E1	0.600	0.900
E2	0.700	1.000
F	0.300	0.600
G	0.700	1.200
L1	9.600	10.500
L2	2.700	3.100
H	0.600	1.000
M	5.100	5.500
N	2.090	2.490
R	0.300	
T	1.400	1.600
Y	5.100	6.300

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