ESCRIPTION

The AM65R165 is available in TO-220F, TO-247, TO-262-3 and TO-263-2 Packages

BVDSS	RDSON	ID
700V	0.135Ω	24A

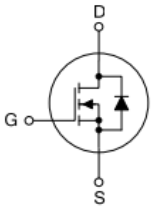
Application:

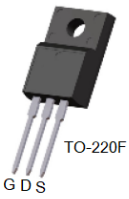
High Frequency Switching Mode Power Supply

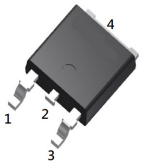
FEATURE

- Fast Switching
- 100% avalanche tested
- Improved dv/dt capability

PIN DESCRIPTION







TO-263-2

ORDERING INFORMATION

Package Type	Part Number	
TO-220F SPQ: 50pcs/Tube	T3F	AM65R165T3FU
		AM65R165T3FVU
TO-247 SPQ: 30pcs/Tube	TL3F	AM65R165TL3FU
		AM65R165TL3FVU
TO-262-3 SPQ: 50pcs/Tube	TS3	AM65R165TS3U
		AM65R165TS3VU
TO-263-2 SPQ: 800pcs/ Reel	S2	AM65R165S2R
		AM65R165S2VR
Note	U: Tube R: Tape & Reel V: Halogen free Package	
AiT provides all RoHS products		

Pin#		Symbol	Function
TO-220F TO-247 TO-262-3	TO-263-2		
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		650V
I_D, Continuous Drain Current		24A
I_D, Continuous Drain Current T_C = 100 °C		15A
I_{DM}, Pulsed Drain Current (1)		72A
V_{GS}, Gate-to-Source Voltage		±30V
E_{AS}, Single Pulse Avalanche Energy (2)		550mJ
dv/dt, Peak Diode Recovery dv/dt (3)		15V/ns
P_D, Power Dissipation	TO-262-3, TO-263-2	220W
P_D, Derating Factor above 25°C		1.75W/°C
P_D, Power Dissipation	TO-220F	42W
P_D, Derating Factor above 25°C		0.33W/°C
T_J, Operating Junction Temperature Range		150°C
T_{STG}, Storage Temperature Range		-55°C~+150°C
T_L, Maximum Temperature for Soldering		300°C
$R_{\theta JA}$, Junction-to-Ambient	TO-247, TO-262-3, TO-263-2	62.5°C/W
$R_{\theta JC}$, Junction-to-Case		0.57°C/W
$R_{\theta JA}$, Junction-to-Ambient	TO-220F	80°C/W
$R_{\theta JC}$, Junction-to-Case		3°C/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°C

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

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	650	-	-	V
BV_{DSS} Temperature Coefficient	ΔBV_{DSS} / ΔT_J	I_D=250μA Reference 25°C	-	0.67	-	V/°C
Drain to Source Leakage Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=520V, V_{GS}=0V, T_J=125°C	-	-	100	
Gate to Source Forward Leakage	$I_{GSS(F)}$	V_{GS}=+30V	-	-	100	nA
Gate to Source Reverse Leakage	$I_{GSS(R)}$	VGS=-30V	-	-	-100	nA
ON Characteristics						
Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=9A *	-	0.135	0.16	Ω
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}= V_{GS}, I_D=250μA*	2.5	-	4.5	V
Dynamic Characteristics						
Gate Resistance	R_g	f=1MHz	-	3.2	-	Ω
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	1830	-	pF
Output Capacitance	C_{oss}		-	1050	-	
Reverse Transfer Capacitance	C_{rss}		-	52	-	
Switching Characteristics						
Turn-on Delay Time	$t_{d\ (ON)}$	I_D=11A, V_{DD}=400V, V_{GS}=10V, R_G=2Ω	-	108	-	ns
Rise Time	t_r		-	79	-	
Turn-Off Delay Time	$t_{d\ (OFF)}$		-	222.6	-	
Fall Time	t_f		-	68.4	-	
Total Gate Charge	Q_g	I_D=11A, V_{DD}=400V, V_{GS}=10V	-	43	-	nC
Gate to Source Charge	Q_{gs}		-	10	-	
Gate to Drain (“Miller”) Charge	Q_{gd}		-	16	-	
Source-Drain Diode Characteristics						
Continuous Source Current (Body Diode)	I_S	T_c=25°C	-	-	24	A
Maximum Pulsed Current (Body Diode)	I_{SM}		-	-	72	A
Diode Forward Voltage	V_{SD}	I_S=11A , V_{GS}=0V*	-	-	1.2	V
Reverse Recovery Time	T_{rr}	I_S=11A, Tj=25°C dIF/dt =100A/μs V_{GS}=0V	-	271.8	-	ns
Reverse Recovery Charge	Q_{rr}		-	4446	-	nC
Reverse Recovery Current	I_{rrm}		-	29.6	-	A

*Pulse width tp≤300μs, δ≤2%

TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Safe Operating Area (TO-220F)

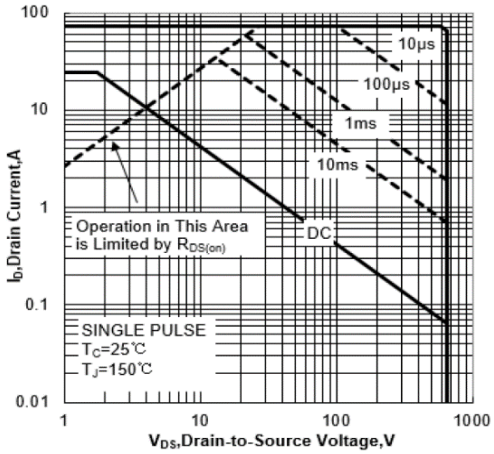


Fig 2. Power Dissipation (TO-220F)

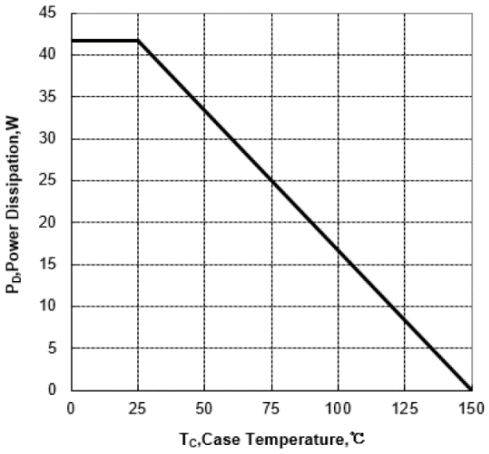


Fig3. Max Thermal Impedance (TO-220F)

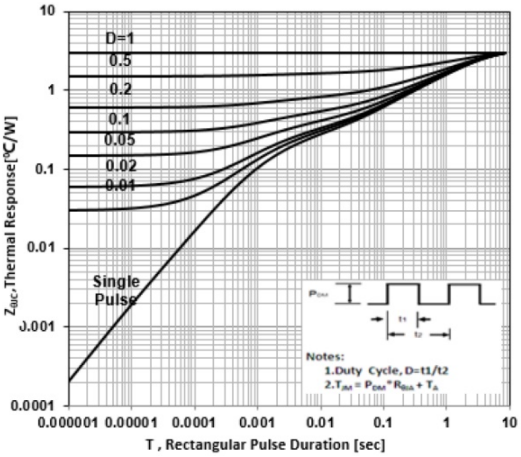


Fig4. Typical Output Characteristics

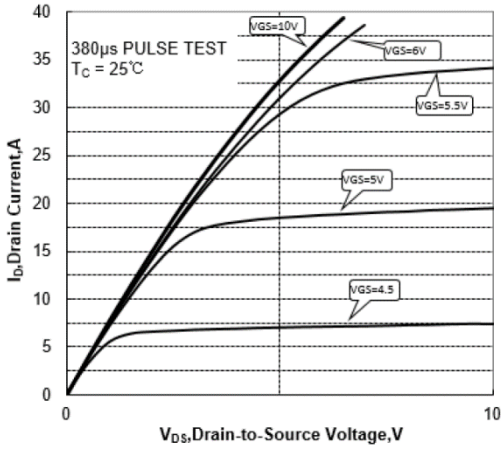


Fig5. Typical Transfer Characteristics

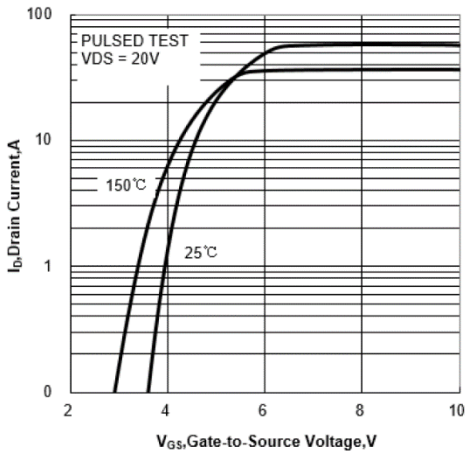


Fig6. Typical Drain to Source ON Resistance vs. Drain Current

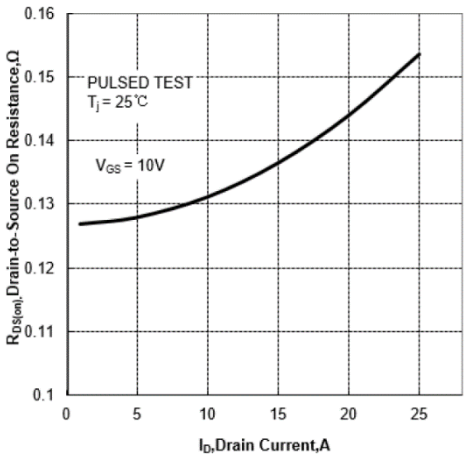


Fig7. Typical Drain to Source on Resistance vs. Junction Temperature

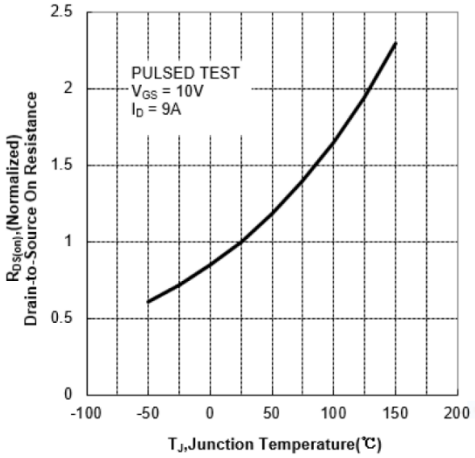


Fig8. Typical Threshold Voltage vs. Junction Temperature

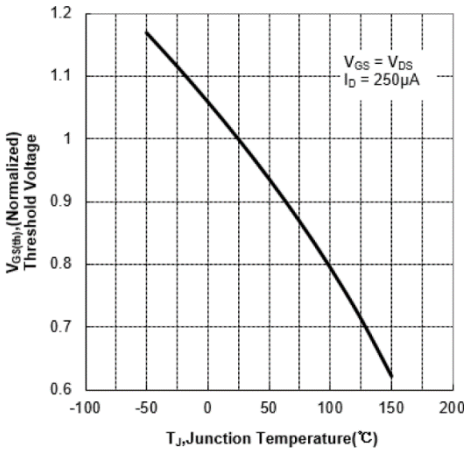


Fig9. Typical Breakdown Voltage vs. Junction Temperature

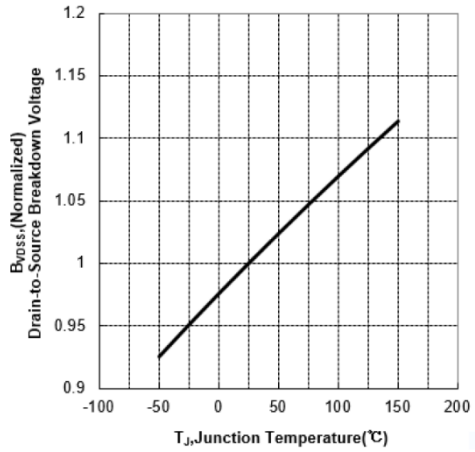


Fig10. Typical Threshold Voltage vs. Junction Temperature

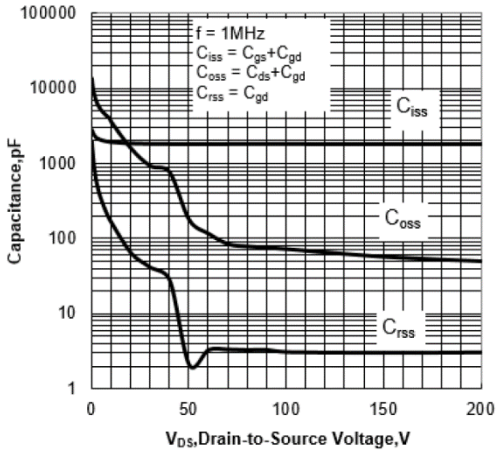


Fig11. Typical Breakdown Voltage vs. Junction Temperature

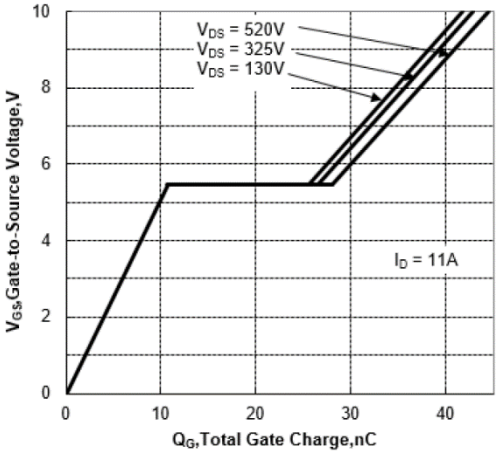


Fig12. Gate Charge Test Circuit

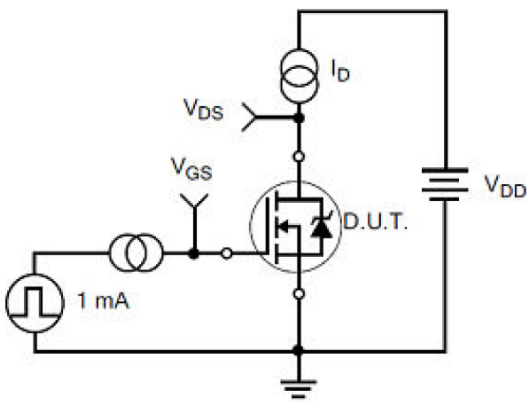


Fig 13. Gate Charge Waveforms

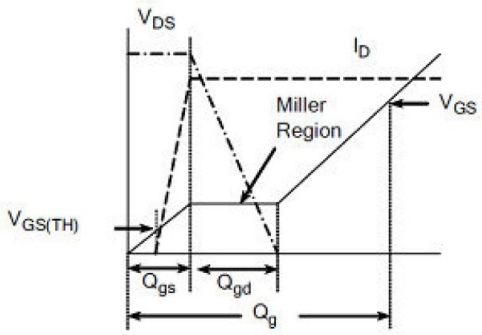


Fig 14. Resistive Switching Test Circuit

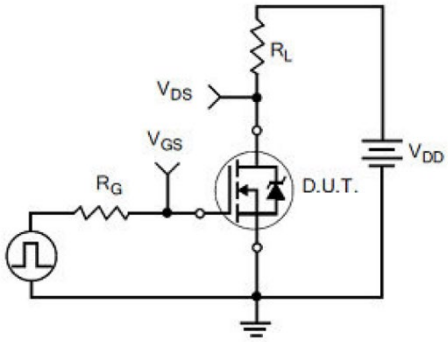


Fig15. Resistive Switching Waveforms

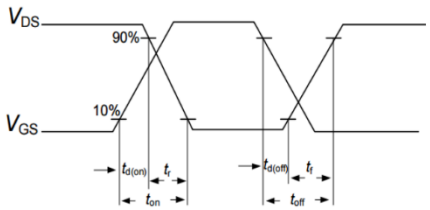


Fig16. Diode Reverse Recovery Test Circuit

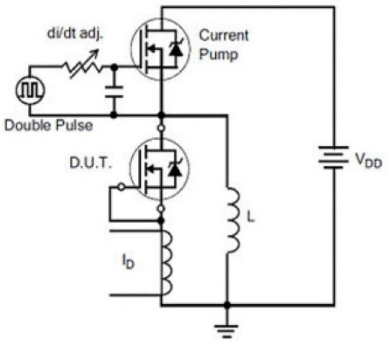


Fig17. Diode Reverse Recovery Waveform

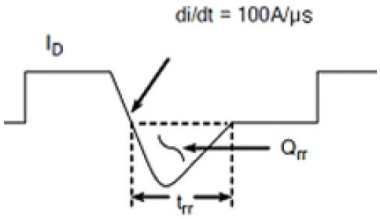


Fig18. Unclamped Inductive Switching Test Circuit

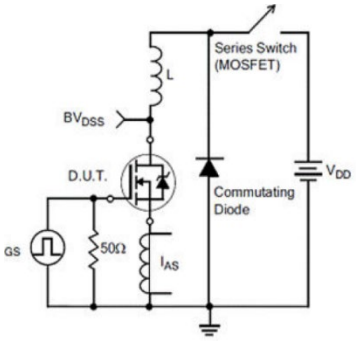
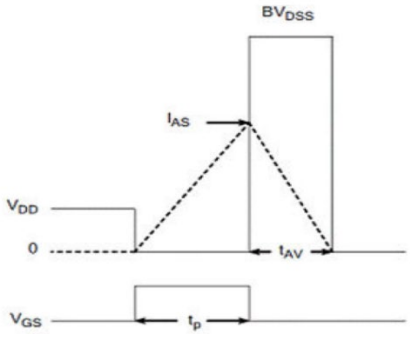
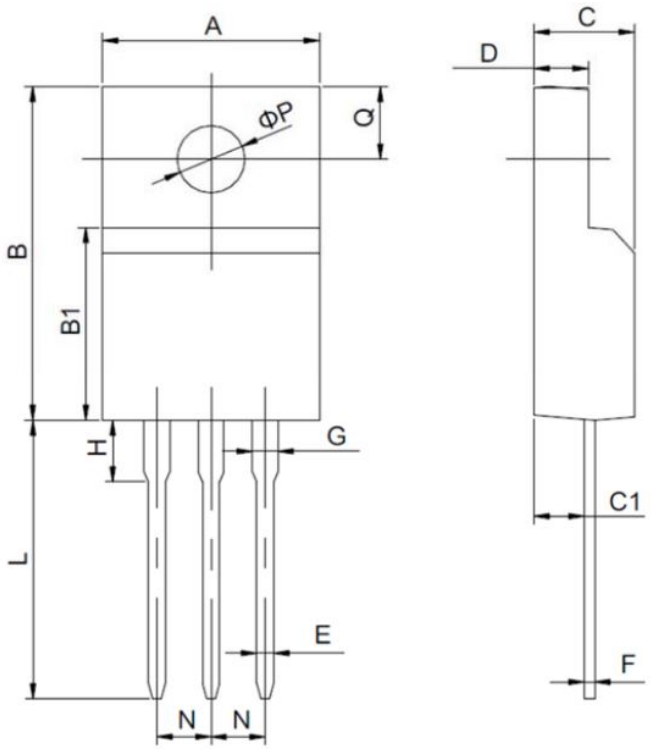


Fig 19. Unclamped Inductive Switching Waveform



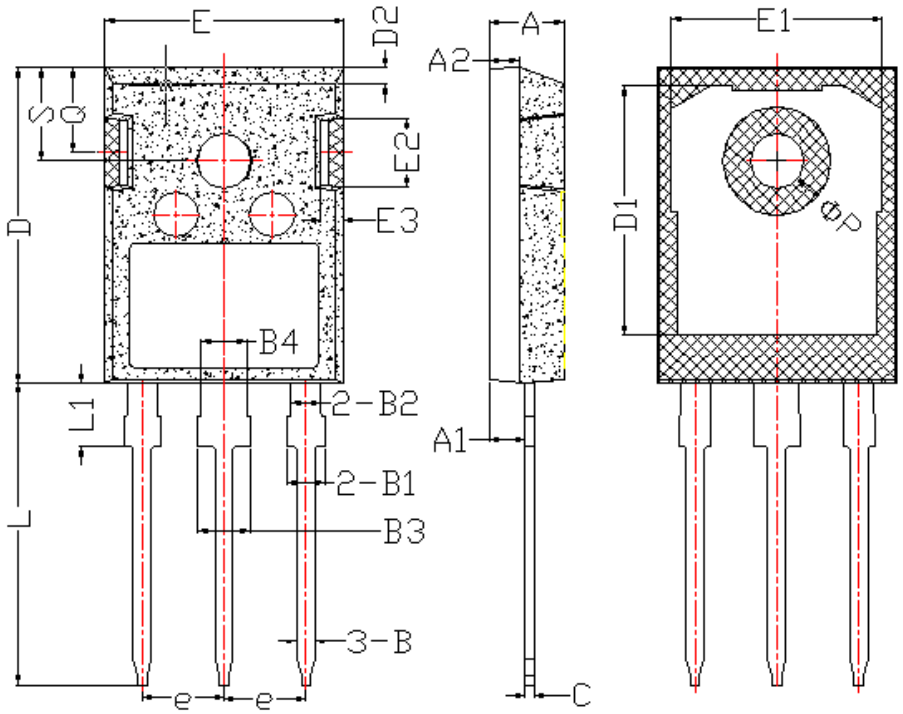
PACKAGE INFORMATION

Dimension in TO-220F (Unit: mm)



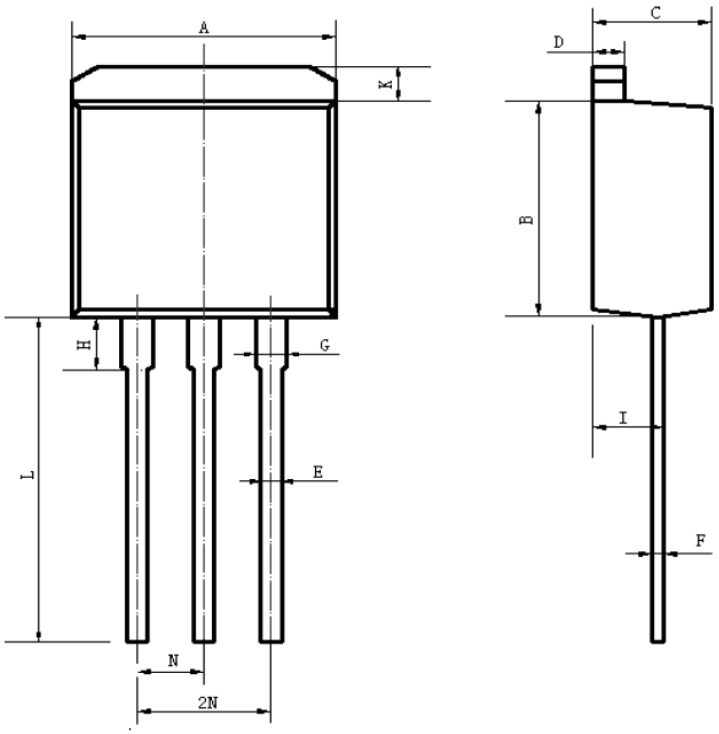
Symbol	Min.	Max.
A	9.600	10.400
B	15.400	16.200
B1	8.900	9.500
C	4.300	4.900
C1	2.100	3.000
D	2.400	3.000
E	0.600	1.000
F	0.300	0.600
G	1.120	1.420
H	1.600	3.800
L	12.000	14.000
N	2.340	2.740
Q	3.150	3.550
ΦP	2.900	3.300

Dimension in TO-247 (Unit: mm)



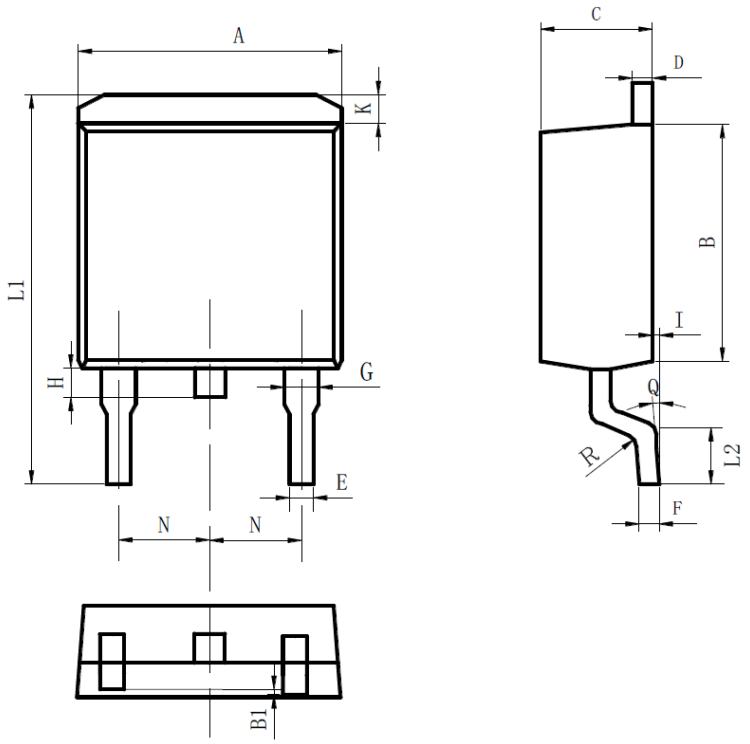
Symbol	Min.	Max.
A	4.900	5.160
A1	2.270	2.530
B	1.850	2.110
B1	1.070	1.330
B2	1.900	2.410
B3	1.750	2.150
B4	2.870	3.130
C	0.550	0.680
D	20.820	21.100
D1	16.250	17.650
D2	1.050	1.350
E	15.700	16.030
E1	13.100	14.150
E2	3.680	5.100
E3	1.680	2.600
e	5.440	
L	19.800	20.310
L1	4.170	4.470
ΦP	3.500	3.700
Q	5.490	6.000
S	6.040	6.300

Dimension in TO-262-3 (Unit: mm)



Symbol	MILLIMETERS	
	Min.	Max.
A	9.800	10.400
B	8.900	9.500
C	4.300	4.800
D	1.150	1.400
E	0.700	0.910
F	0.280	0.550
G	1.070	1.470
H	3.370	3.770
I	2.500	2.900
K	0.900	1.400
L	12.700	14.700
N	2.350	2.700

Dimension in TO-263-2 (Unit: mm)



Symbol	MILLIMETERS	
	Min.	Max.
A	9.800	10.400
B	8.900	9.500
B1	0	0.100
C	4.400	4.800
D	1.160	1.370
E	0.700	0.950
F	0.300	0.600
G	1.070	1.470
H	1.300	1.800
K	0.950	1.370
L1	14.500	16.500
L2	1.600	2.300
I	0	0.200
Q	0°	8°
R	0.4	
N	2.390	2.690

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