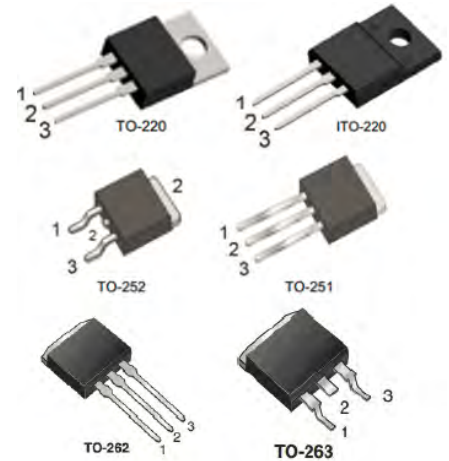
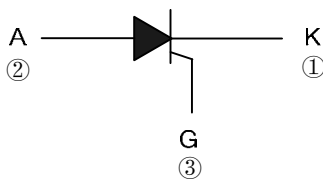




Description

Passivated thyristors in a plastic envelope, intended for use in applications requiring high bidirectional blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

Symbol



Ordering Information

Part No.	Package	Packing
BT151-500R	TO-220	50pcs / Tube
BT151-650R	TO-220	50pcs / Tube
BT151-800R	TO-220	50pcs / Tube
BT151F-400R	ITO-220	50pcs / Tube
BT151F-650R	ITO-220	50pcs / Tube
BT151F-800R	ITO-220	50pcs / Tube
BT151P-600R	TO-251	75pcs / Tube
BT151P-650R	TO-251	75pcs / Tube
BT151P-800R	TO-251	75pcs / Tube
BT151D-600R	TO-252	2.5Kpcs / 13" Reel
BT151D-650R	TO-252	2.5Kpcs / 13" Reel
BT151D-800R	TO-252	2.5Kpcs / 13" Reel
BT151-600R	TO-220	50pcs / Tube

**ABSOLUTE MAXIMUM RATING** ($T_J = 25^\circ\text{C}$, unless otherwise stated)

PARAMETER		SYMBOL	RATINGS	UNIT
Repetitive Peak Off-State Voltages	BT151x-500R	$V_{\text{DRM}}, V_{\text{RRM}}$	500 (Note 2)	V
	BT151x-650R		650 (Note 2)	
	BT151x-800R		800	
Average On-State Current (half sine wave; $T_{\text{mb}} \leq 109^\circ\text{C}$)		$I_{\text{T(AV)}}$	7.5	A
RMS on-State Current (all conduction angles)		$I_{\text{T(RMS)}}$	12	A
Non-Repetitive Peak On-State Current (half sine wave; $T_J = 25^\circ\text{C}$ prior to surge)	$t = 10 \text{ ms}$	I_{TSM}	100	A
	$t = 8.3 \text{ ms}$		110	
I^2t for Fusing ($t = 10 \text{ ms}$)		I^2t	50	A^2s
Repetitive Rate of Rise of On-State Current After Triggering ($I_{\text{TM}} = 20 \text{ A}$; $I_{\text{G}} = 50 \text{ mA}$; $dI_{\text{G}}/dt = 50 \text{ mA}/\mu\text{s}$)		dI_{T}/dt	50	$\text{A}/\mu\text{s}$
Peak Gate Current		I_{GM}	2	A
Peak Gate Voltage		V_{GM}	5	V
Peak Reverse Gate Voltage		V_{RGM}	5	V
Peak Gate Power		P_{GM}	5	W
Average Gate Power (Over any 20 ms period)		$P_{\text{G(AV)}}$	0.5	W
Operating Junction Temperature		T_J	125	$^\circ\text{C}$
Storage Temperature		T_{STG}	-40 ~150	$^\circ\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Although not recommended, off-state voltages up to 800V may be applied without damage, but the thyristor may switch to the on-state. The rate of rise of current should not exceed $15\text{A}/\mu\text{s}$.

THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Mounting Base	TO-220/TO-262/TO-263	θ_{JMb}	1.3	K/W
	ITO-220		1.7	
	TO-251/TO-252		2.4	
Junction to Ambient	TO-220/TO-262/TO-263	θ_{JA}	60	K/W
	ITO-220		65	
	TO-251/TO-252		75	

STATIC CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise stated)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Gate Trigger Current	I_{GT}	$V_{\text{D}} = 12 \text{ V}$, $I_{\text{T}} = 0.1 \text{ A}$		4.2	15	mA
Latching Current	I_{L}	$V_{\text{D}} = 12 \text{ V}$, $I_{\text{GT}} = 0.1 \text{ A}$		12.6	40	mA
Holding Current	I_{H}	$V_{\text{D}} = 12 \text{ V}$, $I_{\text{GT}} = 0.1 \text{ A}$		12	20	mA
On-State Voltage	V_{T}	$I_{\text{T}} = 23 \text{ A}$		1.59	1.75	V
Gate Trigger Voltage	V_{GT}	$V_{\text{D}} = 12 \text{ V}$, $I_{\text{T}} = 0.1 \text{ A}$ $V_{\text{D}} = V_{\text{DRM(max)}}$, $I_{\text{T}} = 0.1 \text{ A}$, $T_J = 125^\circ\text{C}$	0.35	0.7 0.5	1.5	V
Off-State Leakage Current	$I_{\text{D}}, I_{\text{R}}$	$V_{\text{D}} = V_{\text{DRM(max)}}$, $V_{\text{R}} = V_{\text{RRM(max)}}$, $T_J = 125^\circ\text{C}$		0.1	0.5	mA

DYNAMIC CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise stated)

PARAMETER	SYMBOL	CONDITIONS		MIN	MAX	UNIT	
Critical Rate of Rise of Off-State Voltage	dV _D /dt	V _{DM} = 67% V _{DRM(max)} , T _J = 125 °C, exponential waveform;	Gate open circuit	50	130		V/μs
			R _{GK} = 100Ω	200	1000		
Gate Controlled Turn-on Time	t _{GT}	I _{TM} = 40 A, V _D = V _{DRM(max)} , I _G = 0.1 A, dI _G /dt = 5 A/μs			2		μs
Circuit Commutated Turn-off time	t _Q	V _D = 67% V _{DRM(max)} , T _J = 125°C; I _{TM} = 20 A, V _R = 25 V, dI _{TM} /dt = 30 A/μs, dV _D /dt = 50 V/μs. R _{GK} = 100 Ω			70		μs



TYPICAL CHARACTERISTICS

Fig 1. Maximum On-State Dissipation, P_{tot} , Versus Average On-State Current, $I_{T(AV)}$, Where $a = \text{form factor} = I_{T(RMS)} / I_{T(AV)}$

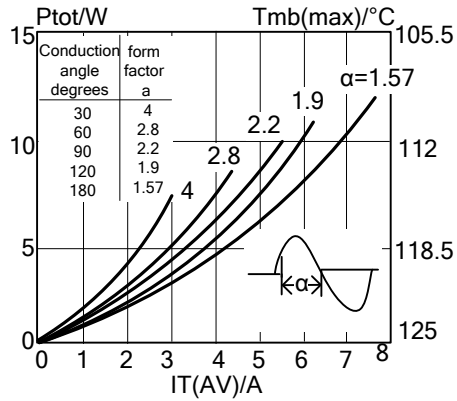


Fig 2. Maximum Permissible Non-Repetitive Peak On-State Current I_{TSM} , Versus Pulse Width t_p for Sinusoidal Currents, $t_p \leq 10\text{ms}$

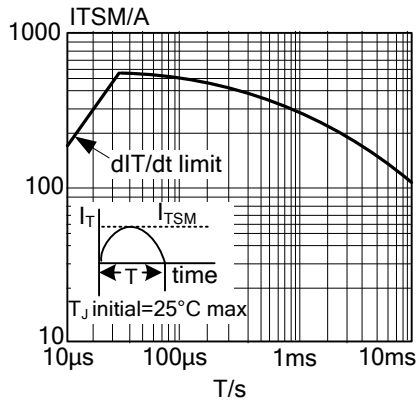


Fig 3. Maximum Permissible Rms Current $I_{T(RMS)}$, Versus Mounting Base Temperature T_{mb}

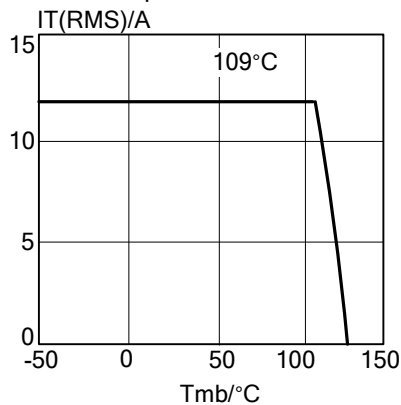


Fig 4. Maximum Permissible Non-Repetitive Peak On-State Current I_{TSM} , Versus Number Of Cycles, For Sinusoidal Currents, $f = 50\text{Hz}$

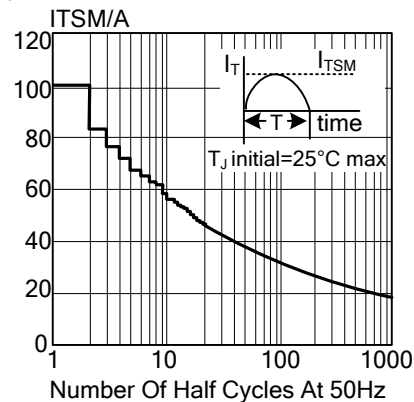


Fig 5. Maximum Permissible Repetitive Rms On-State Current $I_{T(RMS)}$, Versus Surge Duration, For Sinusoidal Currents, $f = 50\text{Hz}$; $T_{mb} \leq 109^\circ\text{C}$

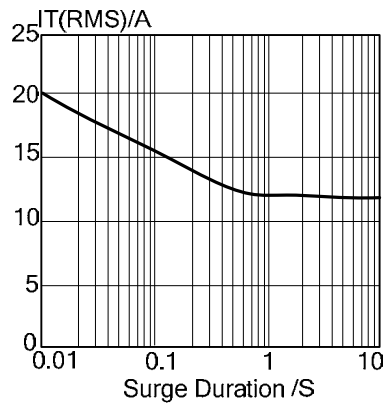
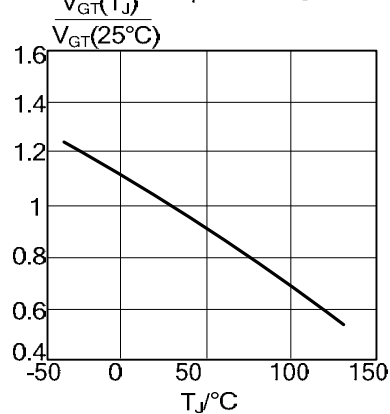


Fig 6. Normalised Gate Trigger Voltage $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$, Versus Junction Temperature T_j





TYPICAL CHARACTERISTICS(Cont.)

Fig 7. Normalised Gate Trigger Current $I_{GT}(T_J)/I_{GT}(25^\circ\text{C})$, Versus Junction Temperature T_J

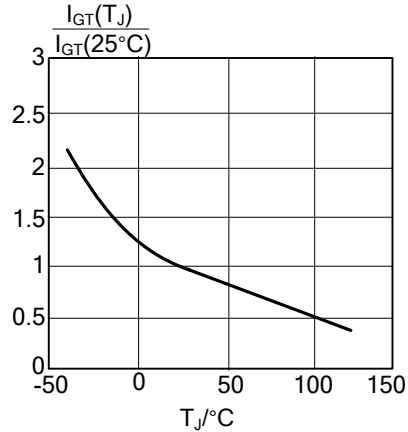


Fig 8. Normalised Latching Current $I_L(T_J)/I_L(25^\circ\text{C})$, Versus Junction Temperature T_J

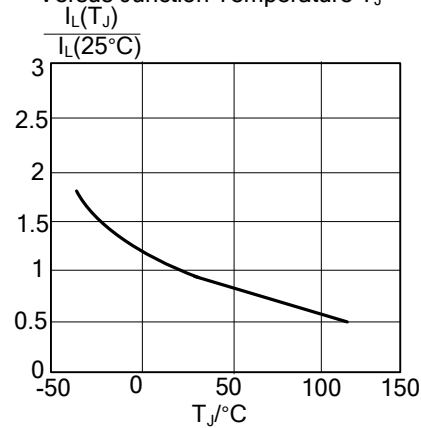


Fig 9. Normalised Holding Current $I_H(T_J)/I_H(25^\circ\text{C})$, Versus Junction Temperature T_J

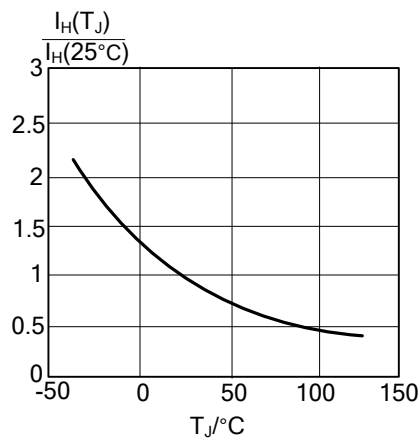


Fig 10. Typical and Maximum On-State Characteristic

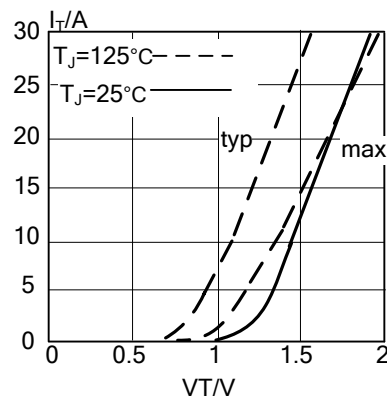


Fig 11. Transient Thermal Impedance Z_{thj-mb} , Versus Pulse Width t_p

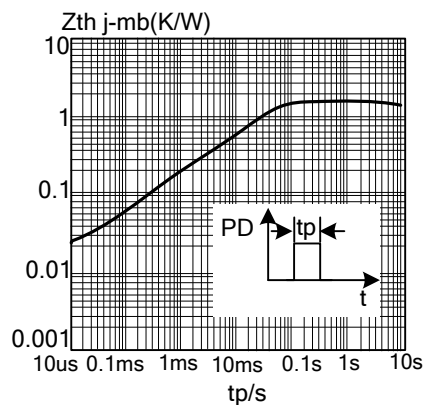
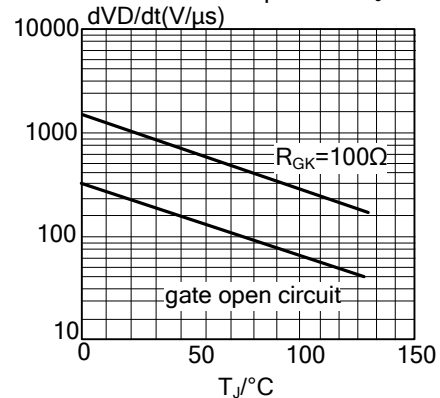
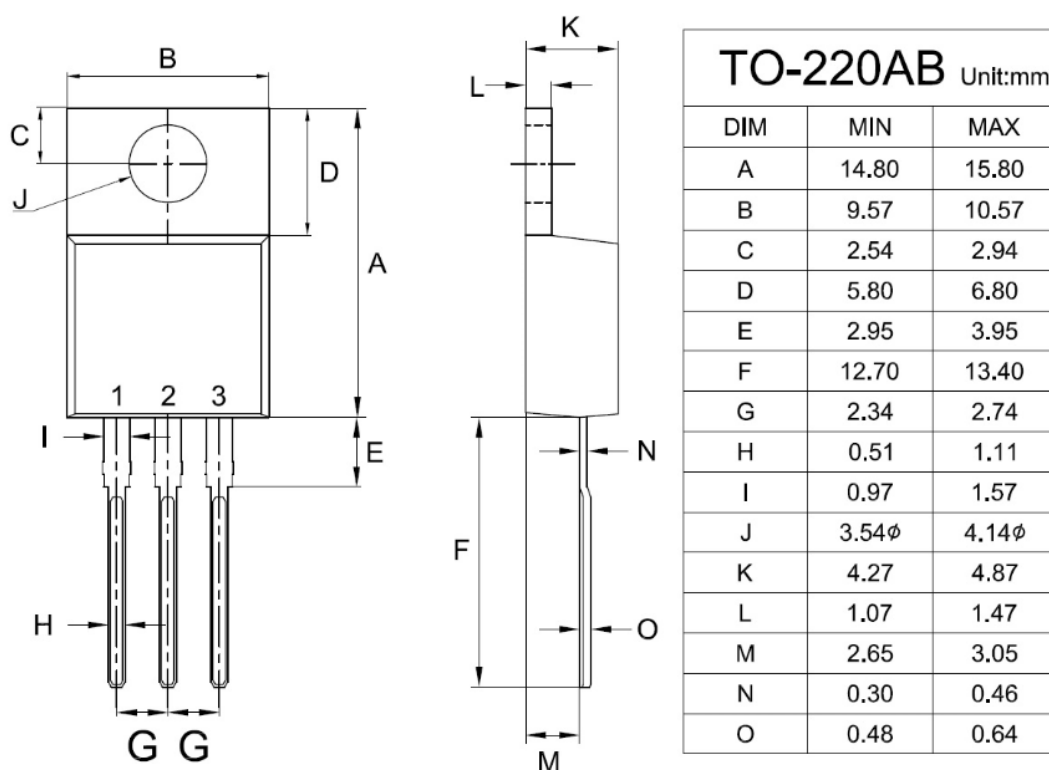
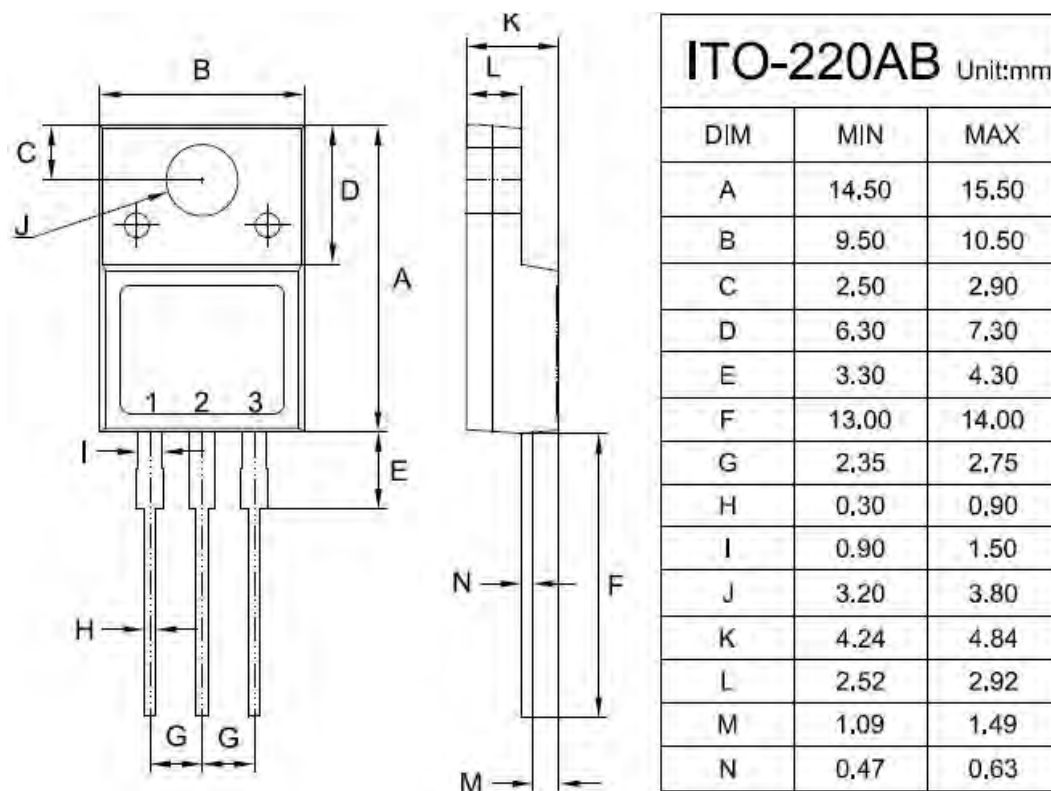


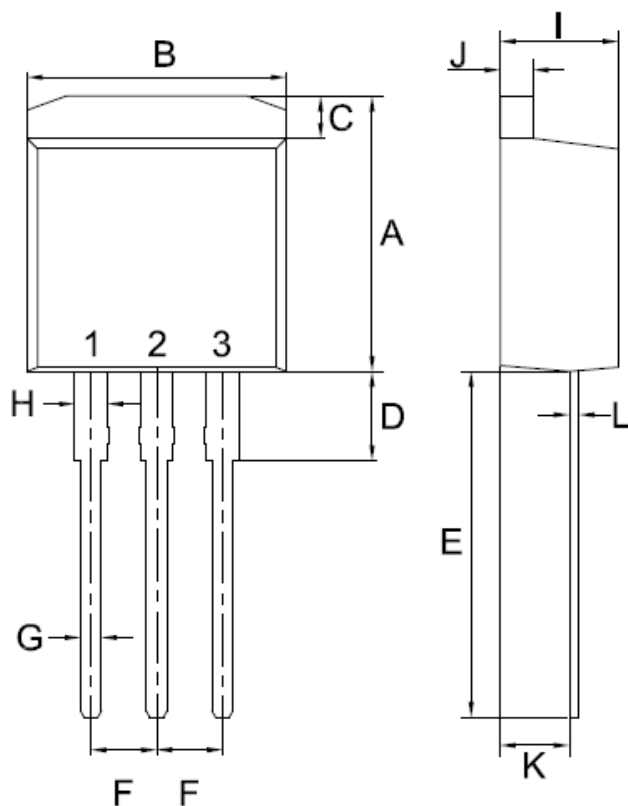
Fig 12. Typical, Critical Rate Of Rise Of Off-State Voltage, dV_D/dt Versus Junction Temperature T_J



**TO-220 Mechanical Drawing****ITO-220 Mechanical Drawing**

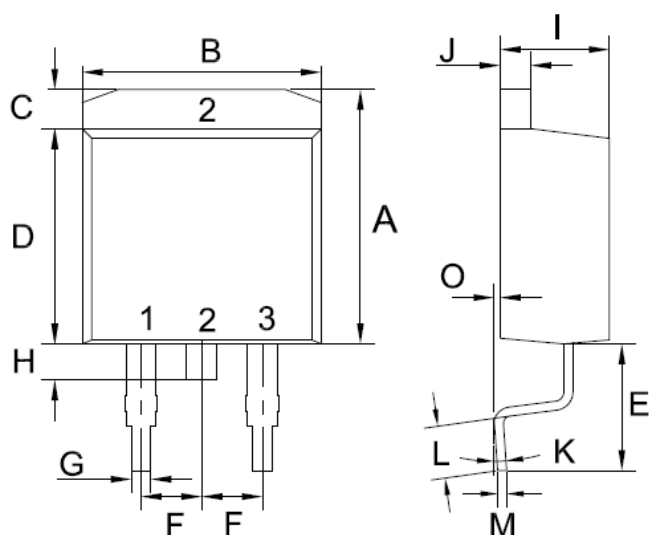


TO-262 Mechanical Drawing



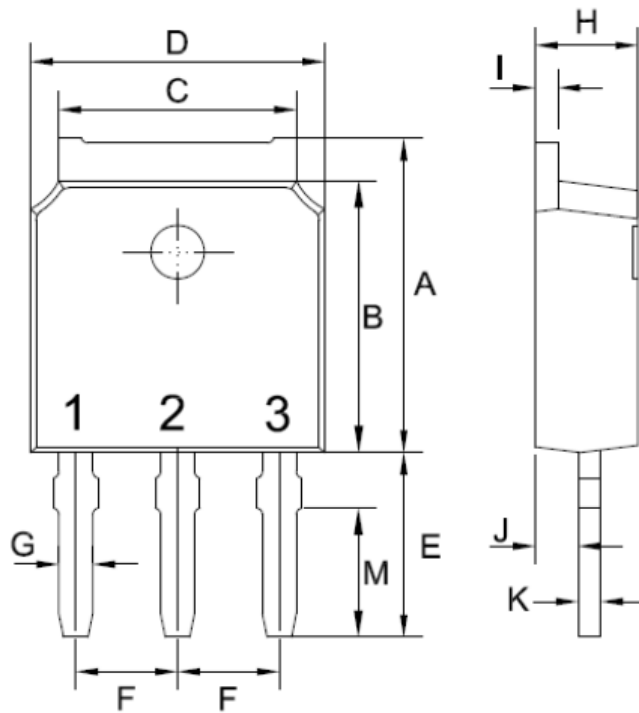
TO-262 (I ² PAK)		
Unit:mm		
DIM	MIN	MAX
A	10.14	11.14
B	9.57	10.57
C	1.44	1.84
D	2.95	3.95
E	12.70	13.40
F	2.34	2.74
G	0.51	1.11
H	0.97	1.57
I	4.27	4.87
J	1.07	1.47
K	2.03	2.92
L	0.30	0.46

TO-263 Mechanical Drawing



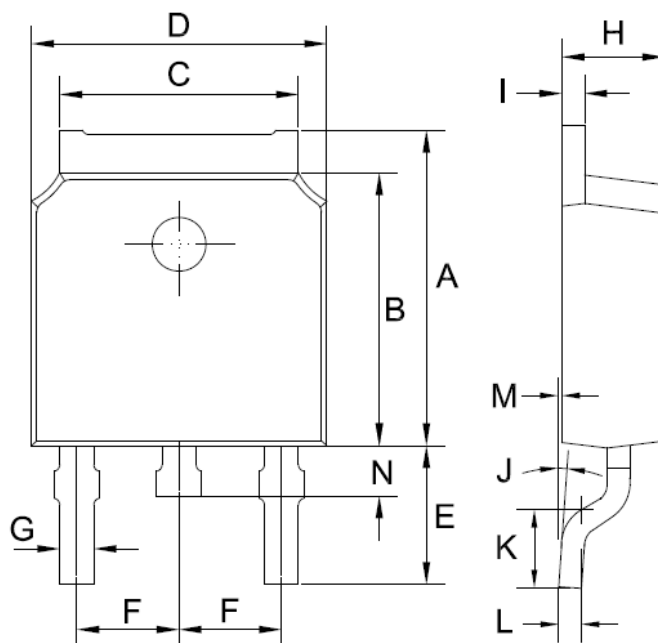
TO-263 (D ² PAK)		
Unit:mm		
DIM	MIN	MAX
A	10.44	10.84
B	9.81	10.21
C	1.44	1.84
D	8.80	9.20
E	4.46	4.66
F	2.44	2.64
G	0.61	1.01
H	0.70	1.30
I	4.27	4.87
J	1.07	1.47
K	0°	8°
L	2.10	2.50
M	0.30	0.46
O	0	0.25

TO-251 Mechanical Drawing



TO-251(IPAK)		
Unit:mm		
DIM	MIN	MAX
A	6.85	7.25
B	5.90	6.30
C	5.13	5.53
D	6.40	6.80
E	3.95	4.35
F	2.19	2.39
G	0.45	0.85
H	2.20	2.40
I	0.41	0.61
J	0.71	1.31
K	0.41	0.61
M	2.96	3.16

TO-252 Mechanical Drawing



TO-252 (DPAK)		
Unit:mm		
DIM	MIN	MAX
A	6.85	7.25
B	5.90	6.30
C	5.13	5.53
D	6.40	6.80
E	2.90	3.30
F	2.19	2.39
G	0.45	0.85
H	2.20	2.40
I	0.41	0.61
J	0°	8°
K	1.45	1.85
L	0.41	0.61
M	0.00	0.12
N	0.60	1.00