

General Description

These N-channel enhanced VDMOSFETS Used advanced trench technology design, provided excellent $R_{DS(on)}$ and low gate charge. Which accords with the RoHS standard.

Features

- Fast switching
- Low on-resistance
- Low gate charge
- 100% avalanche tested

Mechanical Data

- Case: TO-220, ITO-220, TO-263, TO-262, TO-251, TO-252 Package

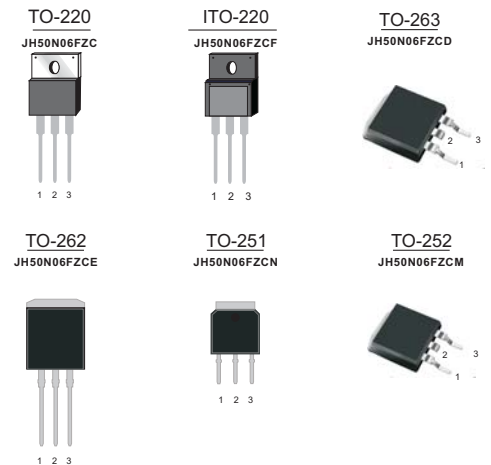
Application

- Switching applications

Ordering Information

Part No.	Package Type	Package	Quality(box)
JH50N06FZC	TO-220	Tube	1000
JH50N06FZCF	ITO-220	Tube	1000
JH50N06FZCD	TO-263	Tape & Reel	800
JH50N06FZCE	TO-262	Tube	1000
JH50N06FZCN	TO-251	Tube	1000
JH50N06FZCM	TO-252	Tape & Reel	3000

Product Summary			
V_{DS}	$R_{DS(on)}$ (m Ω) Typ	I_D (A)	Q_g (Typ)
60V	18 @ 10V	25	60nc



Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

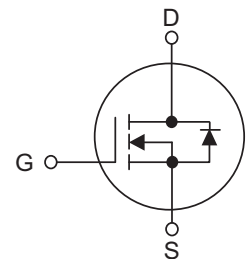


Table1 Absolute Maximum Ratings ($T_C=25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	TO-220/TO-263/TO-262 TO-252/TO-251	ITO-220	Unit
Drain-Source Voltage	V_{DS}	60		V
Gate-Source Voltage	V_{GS}	± 20		V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	50	A
		$T_C=100^\circ\text{C}$	30	
Pulsed Drain Current (Note 1)	I_{DM}	200		A
Single Pulse Avalanche Energy(Note 2)	E_{AS}	620		mJ
Avalanche Current(Note 1)	I_{AS}	50		A
Power Dissipation $T_C=25^\circ\text{C}$	P_D	143	83	W
Operating Junction and Storage Temperature	T_J/T_{STG}	-55 ~ +150		C

Table 2. Thermal Characteristics

Parameter	Symbol	TO-220/TO-263/TO-262 TO-252/TO-251	ITO-220	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62.5	62.5	C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	0.87	1.51	C/W

Table 3. Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =250μA	60	66		V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =60V,V _{GS} =0V			1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V,V _{DS} =0V			100	nA
	Reverse		V _{GS} =-20V,V _{DS} =0V			-100	nA
On Characteristics(Note 4)							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =250μA	2	3	4	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V,I _D =25A		18	22	mΩ
Dynamic Characteristics(Note 5)							
Input Capacitance		C _{ISS}	V _{DS} =25V,V _{GS} =0V,f=1MHz		1489		pF
Output Capacitance		C _{OSS}			608		pF
Reverse Transfer Capacitance		C _{RSS}			275		pF
Switching Characteristics (Note 5)							
Turn-On Delay Time		t _{d (on)}	V _{DD} =30V,I _D =50A, V _{GS} =10V,R _G =25Ω		22		ns
Turn-On Rise Time		t _R			82		ns
Turn-Off Delay Time		t _{d (off)}			52		ns
Turn-Off Fall Time		t _f			93		ns
Total Gate Charge		Q _G	V _{DS} =48V,I _D =50A, V _{GS} =10V		60		nC
Gate-Source Charge		Q _{GS}			6		nC
Gate-Drain Charge		Q _{GD}			31		nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _S =30A		0.9	1.2	V
Maximum Continuous Drain-Source Diode Forward Current		I _S				50	A
Reverse Recovery Time		trr	V _{GS} =0V, I _F =50A		68		ns
Reverse Recovery Charge		Q _{RR}	dI _F /dt=100A/μs (Note 1)		4200		nC

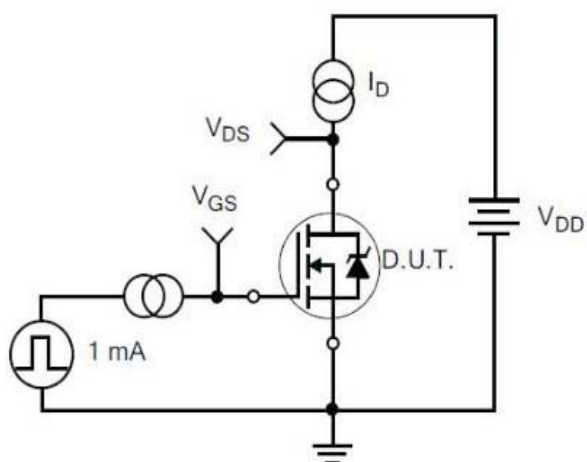
Notes : 1 Repetitive Rating: Pulse width limited by maximum junction temperature

2 $L=0.5\text{mH}$, $I_D=50A$, $V_{DD}=50V$, $V_{GATE}=60V$, Starting $T_J=25^\circ\text{C}$

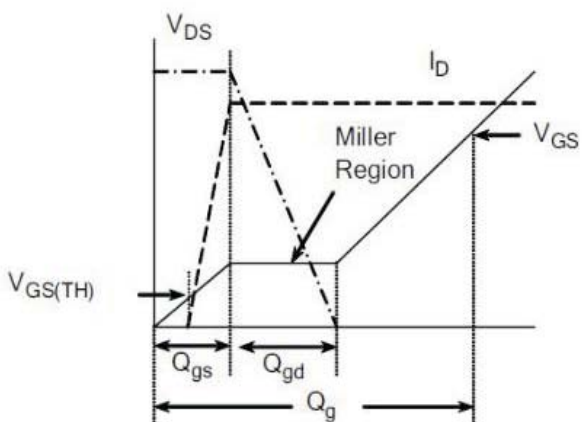
4 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

5 Guaranteed by design, not subject to production

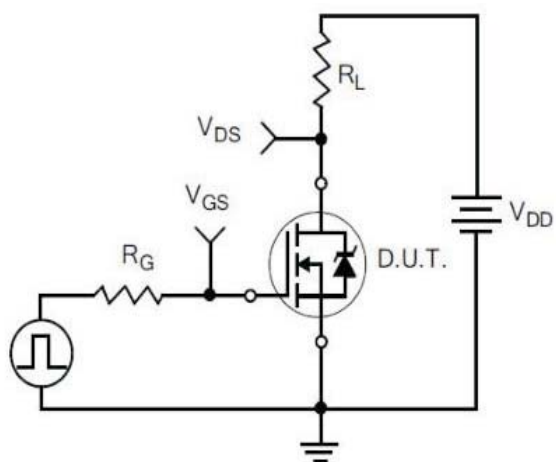
Typical Test Circuit



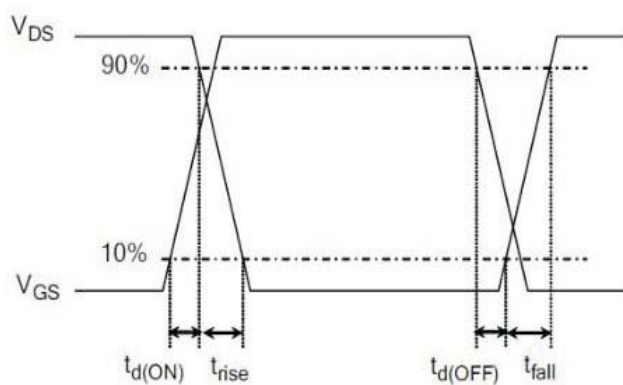
1) Gate Charge Test Circuit



2) Gate Charge Waveform

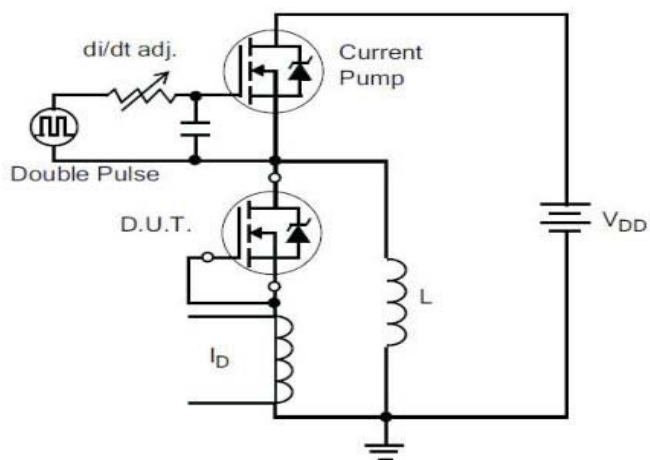


3) Resistive Switching Test Circuit

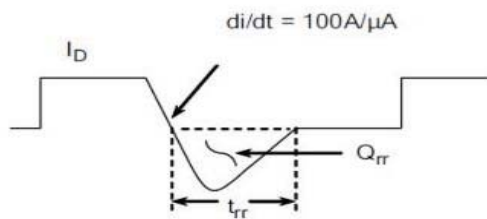


4) Resistive Switching Waveforms

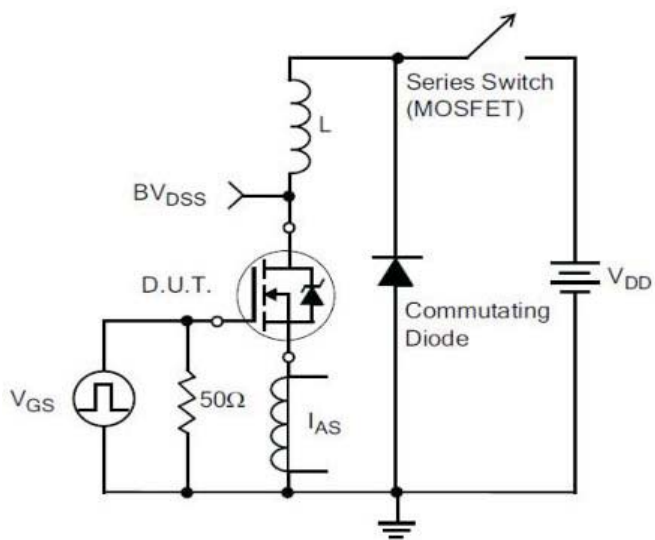
Typical Test Circuit



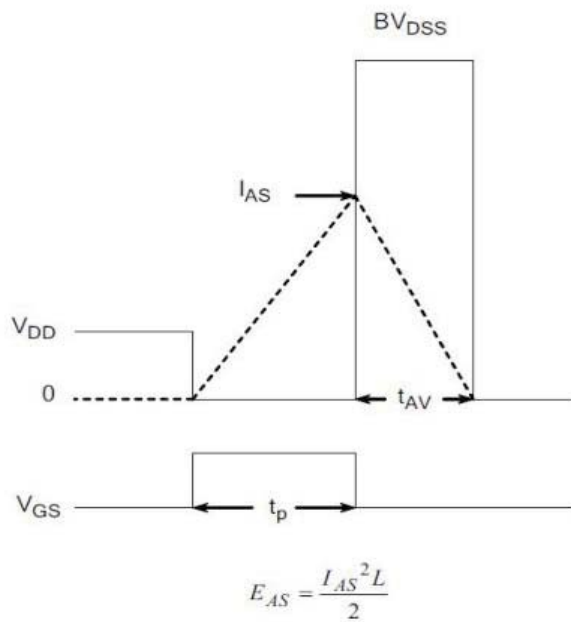
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

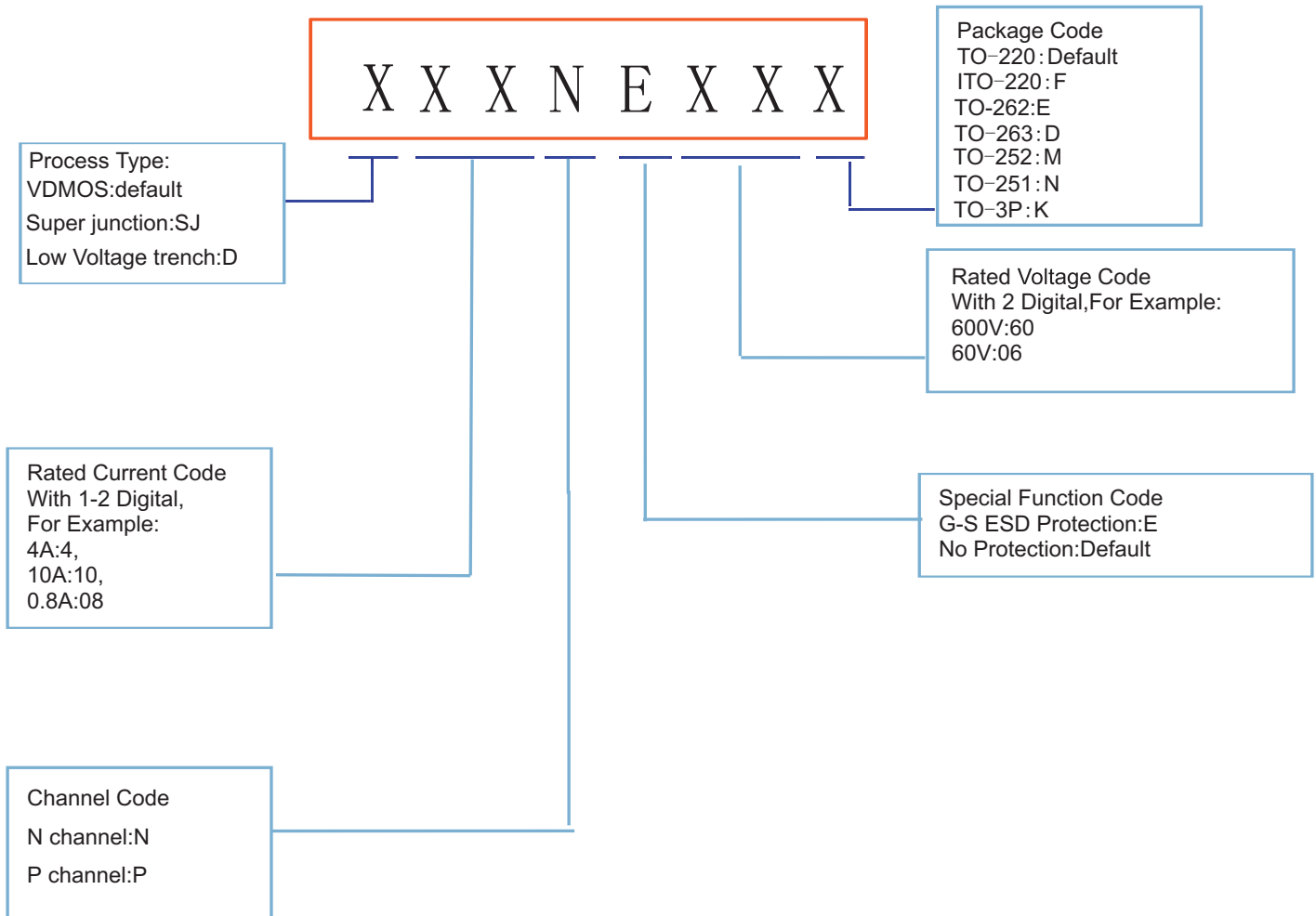


7) . Unclamped Inductive Switching Test Circuit



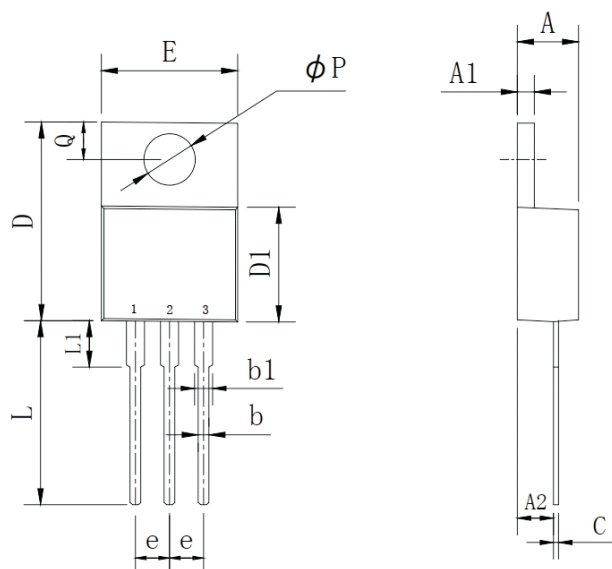
8) Unclamped Inductive Switching Waveforms

Product Names Rules



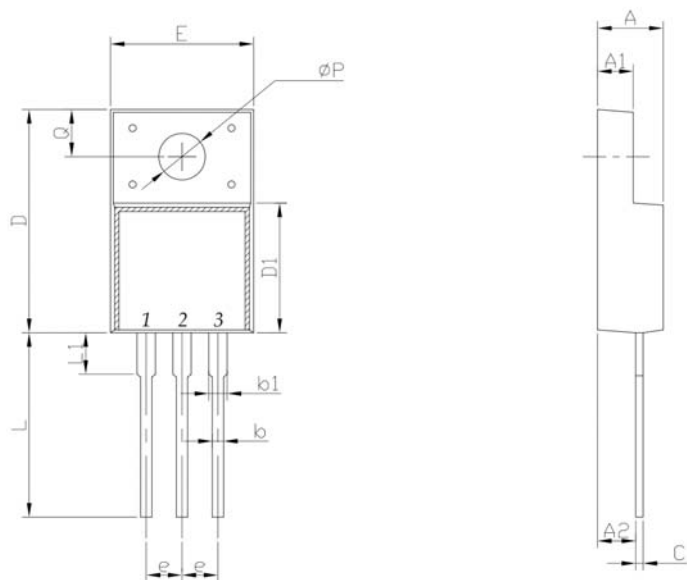
Dimensions

TO-220 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	2.03	2.92	0.080	0.115
b	0.51	1.11	0.020	0.044
b1	0.97	1.6	0.038	0.063
C	0.3	0.7	0.012	0.028
D	14.6	15.9	0.575	0.626
D1	8.04	9.3	0.317	0.366
E	9.57	10.57	0.377	0.416
e	2.34	2.74	0.092	0.108
L	12.58	14.3	0.495	0.563
L1	2.8	4.2	0.110	0.165
P	3.4	4.14	0.134	0.163
Q	2.45	3	0.096	0.118

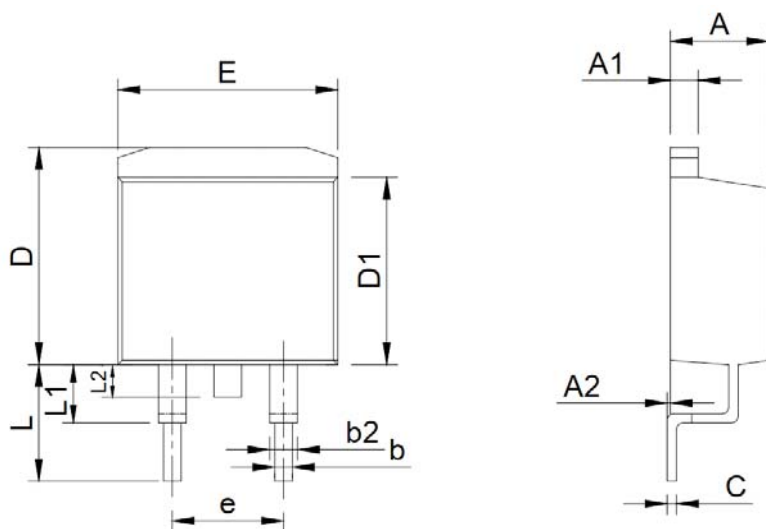
ITO-220 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.24	4.9	0.167	0.193
A1	2.3	2.92	0.091	0.115
A2	2.61	2.81	0.103	0.111
b	0.3	1	0.012	0.039
b1	0.9	1.55	0.035	0.061
C	0.3	0.7	0.012	0.028
D	14.5	16.36	0.571	0.644
D1	8.8	9.41	0.346	0.370
E	9.5	10.5	0.374	0.413
e	2.3	2.75	0.091	0.108
L	12.6	14	0.496	0.551
L1	2.45	4.3	0.096	0.169
P	2.9	3.8	0.114	0.150
Q	2.5	3.55	0.098	0.140

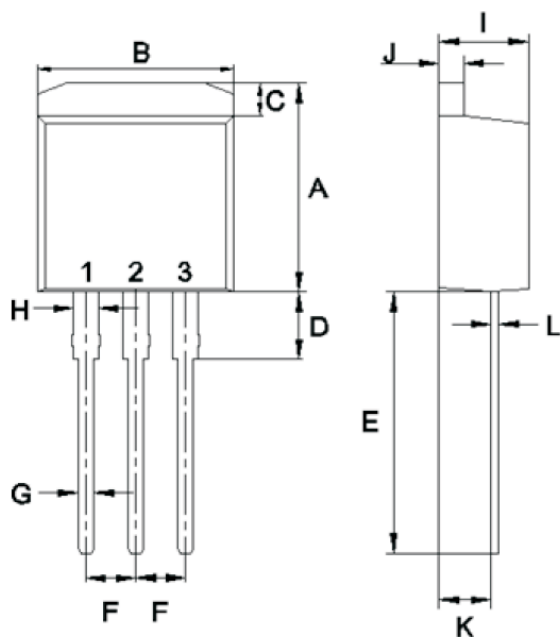
Dimensions

TO-263 PACKAGE OUTLINE DIMENSIONS



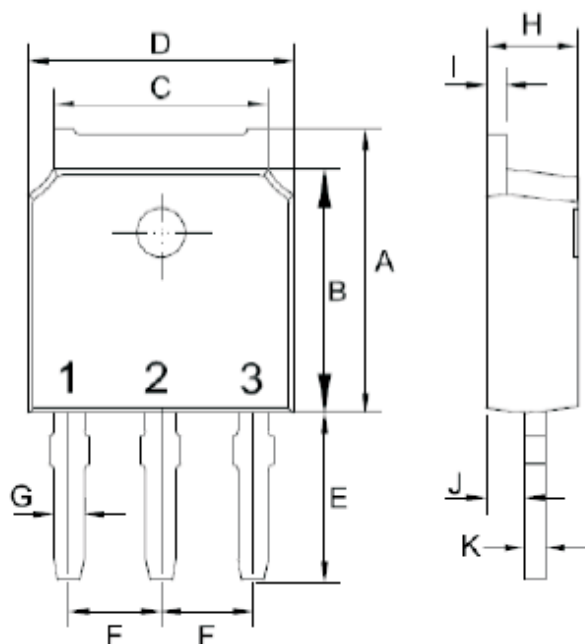
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	0	0.25	0.000	0.010
b	0.61	1.01	0.024	0.040
b1	1.2	1.34	0.047	0.053
C	0.3	0.6	0.012	0.024
D	9.48	10.84	0.373	0.427
D1	8.49	9.3	0.334	0.366
E	9.7	10.31	0.382	0.406
e	4.88	5.28	0.192	0.208
L	4.46	5.85	0.176	0.230
L1	1.33	2.33	0.052	0.092
L2	0	2.2	0.000	0.087

TO-262 PACKAGE OUTLINE DIMENSIONS

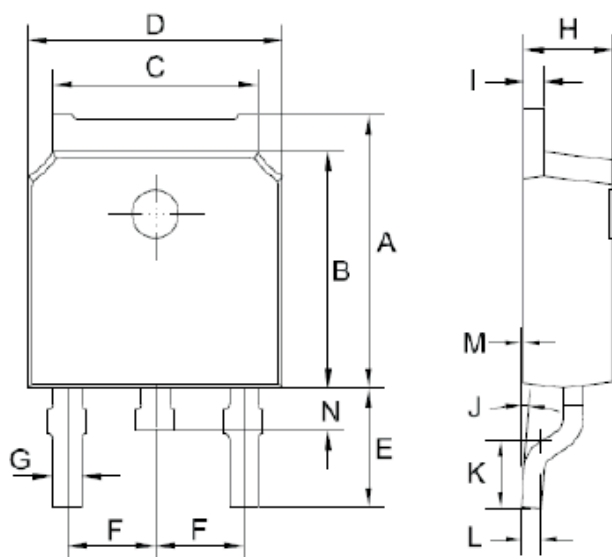


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	10.14	11.14	0.399	0.439
B	9.57	10.57	0.377	0.416
C	1.15	1.84	0.045	0.072
D	2.95	3.95	0.116	0.156
E	12.25	13.75	0.482	0.541
F	2.34	2.74	0.092	0.108
G	0.51	1.11	0.020	0.044
H	0.97	1.57	0.038	0.062
I	4.25	4.87	0.167	0.192
J	1.07	1.47	0.042	0.058
K	2.03	2.92	0.080	0.115
L	0.3	0.6	0.012	0.024

Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	6.85	7.25	0.270	0.285
B	5.8	6.3	0.228	0.248
C	5	5.53	0.197	0.218
D	6.3	6.8	0.248	0.268
E	3.5	4.35	0.138	0.171
F	2.19	2.39	0.086	0.094
G	0.45	0.85	0.018	0.033
H	2.2	2.4	0.087	0.094
I	0.41	0.61	0.016	0.024
J	0.71	1.31	0.028	0.052
K	0.41	0.61	0.016	0.024



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	6.85	7.25	0.270	0.285
B	5.8	6.3	0.228	0.248
C	5	5.53	0.197	0.218
D	6.3	6.8	0.248	0.268
E	2.6	3.3	0.102	0.130
F	2.19	2.39	0.086	0.094
G	0.45	0.85	0.018	0.033
H	2.2	2.4	0.087	0.094
I	0.41	0.61	0.016	0.024
J	0	8	0	8
K	1.45	1.85	0.057	0.073
L	0.41	0.61	0.016	0.024
M	0	0.12	0.000	0.005
N	0.6	1	0.024	0.039

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