SEMICONDUCTOR

SJ14N80 Series
800V 14A Power MOSFET

FEATURES

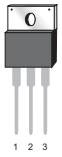
- $R_{DS(ON)}$<0.40Ω@V_{GS}=10V
- 100% avalanche tested
- RoHS compliant

Product Summary			
V_{DS}	$R_{DS(on)}$ (Ω) Typ	I_D (A)	Qg (Typ)
800V	0. 38@ 10V	14	43nc

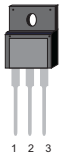
MECHANICAL DATA

- Case:TO-220,ITO-220,TO-263 package

TO-220 SJ14N80



ITO-220 SJ14N80F



TO-263 SJ14N80D

Ordering Information

Part No.	Package Type	Package	Quality(box)
SJ14N80	TO-220	Tube	1000
SJ14N80F	ITO-220	Tube	1000
SJ14N80D	TO-263	Tape & Reel	800

Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

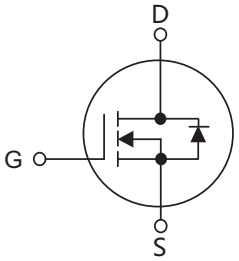


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	TO-220/TO-263	ITO-220	Unit
Drain-Source Voltage		V_{DS}	800		V
Gate-Source Voltage		V_{GS}	±30		V
Continuous Drain Current	T_C=25°C	I_D	14		A
	T_C=100°C		11		
Pulsed Drain Current (Note 1)		I_{DM}	30		A
Single Pulse Avalanche Energy(Note 2)		E_{AS}	283		mJ
Avalanche Current(Note 1)		I_{AR}	2.4		A
Repetitive Avalanche Energy(Note 1)		E_{AR}	0.43		mJ
Peak Diode Recovery dv/dt(Note 3)		dv/dt	15		V/ns
Drain Source voltage slope(Vds=720V)		dVds/dt	50		V/ns
Power Dissipation T_C=25°C		P_D	151	35	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55 ~ +150		°C
Maximum Temperature for soldering		T_L	300		°C

Table 2.Thermal Characteristics

Parameter	Symbol	TO-220/TO-263	ITO-220	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62	62	°C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	0. 82	3. 57	°C/W

Table 3. Electrical Characteristics (T_J=25°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	800	--	--	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=800V,V_{GS}=0V	--	--	1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=30V,V_{DS}=0V	--	--	100	nA
	Reverse		V_{GS}=-30V,V_{DS}=0V	--	--	-100	nA
On Characteristics(Note 4)							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250μA	2.5	--	4.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=7A	--	0.38	0.40	Ω
Dynamic Characteristics(Note 5)							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1MHz	--	800	--	pF
Output Capacitance		C_{OSS}		--	340	--	pF
Reverse Transfer Capacitance		C_{RSS}		--	10	--	pF
Switching Characteristics (Note 5)							
Turn-On Delay Time		td(on)	V_{DD}=400V,I_D=5A, R_G=20Ω	--	13	--	ns
Turn-On Rise Time		t_R		--	11	--	ns
Turn-Off Delay Time		td(off)		--	10	--	ns
Turn-Off Fall Time		tf		--	12	--	ns
Total Gate Charge		Q_G	V_{DS}=480V,I_D=7A, V_{GS}=10V	--	43	60	nC
Gate-Source Charge		Q_{GS}		--	5	--	nC
Gate-Drain Charge		Q_{GD}		--	22	--	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_S=7A	--	1.0	1.5	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		--	--	14	A
Reverse Recovery Time		trr	V_{GS}=0V, I_F=7A dI$_F$/dt=100A/μs (Note 1)	--	345	--	ns
Reverse Recovery Charge		Q_{RR}		--	4.5	--	μC

Notes : 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 L=79mH, I_{AS}=3.5A,V_{DD}=50V,Starting T_J=25°C
3 I_{SD}≤ID,di/dt≤200A/μs,V_{DD}≤BVDSS,Starting TJ=25°C
4 Pulse Test: Pulse width ≤300μS, Duty cycle≤2%
5 Guaranteed by design,not subject to production

Typical characteristics Diagrams

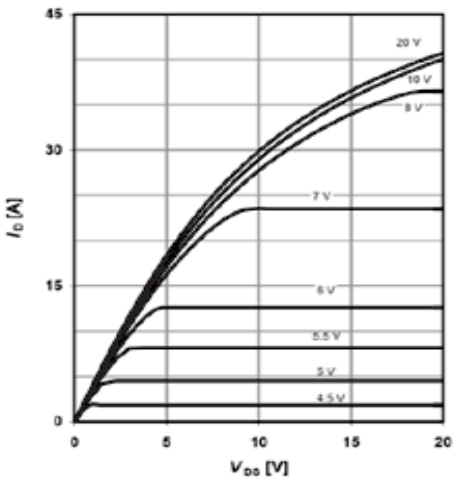


Figure 1: On-Region Characteristics@25C

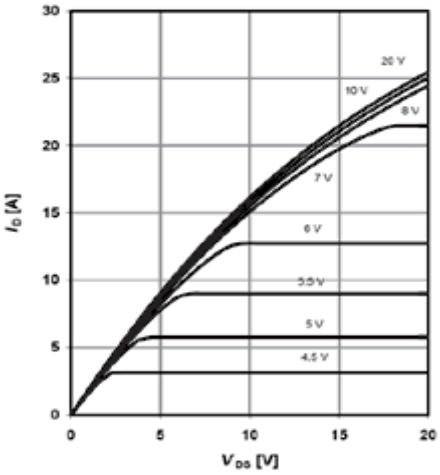


Figure 2: On-Region Characteristics@125C

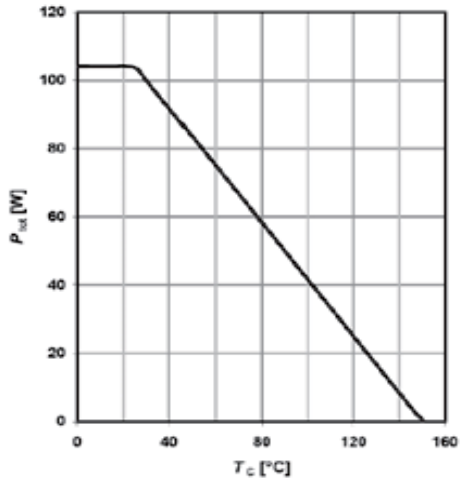


Figure 3:PowerDissipation
TO-220

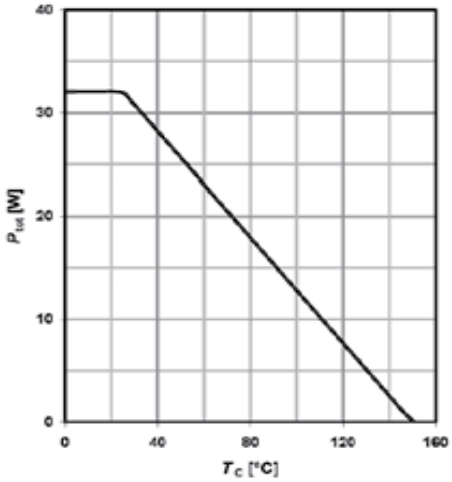


Figure 4 : Power dissipation
TO-220FullPAK

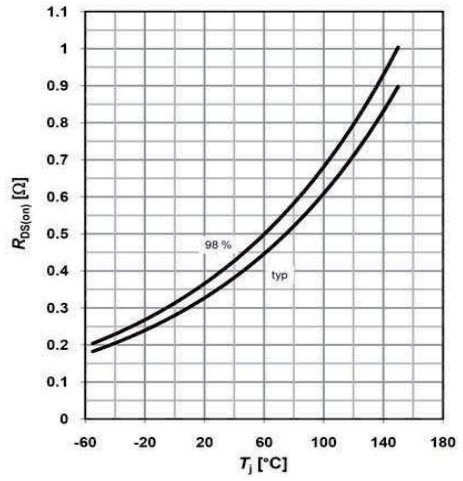


Figure 5: On-Resistance vs. Junction Temperature

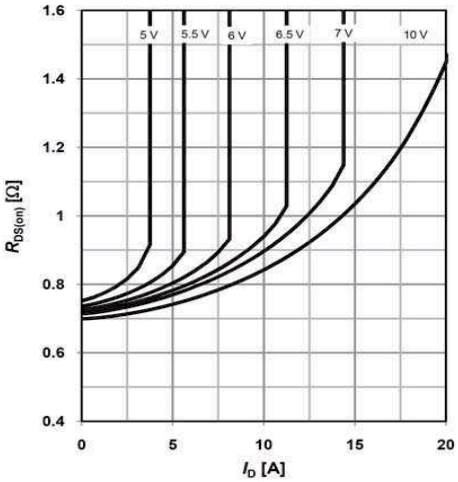


Figure 6: On-Resistance vs. DrainCurrent, Tj=125° C

Typical characteristics Diagrams

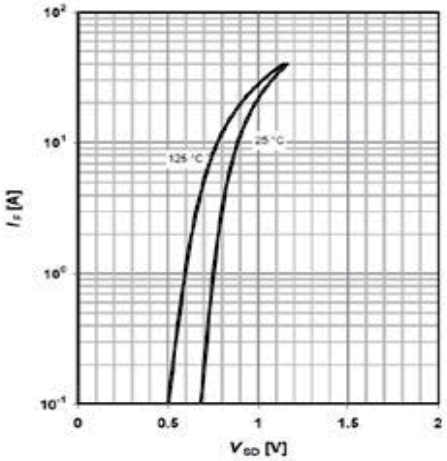


Figure 7: Body-Diode Characteristics

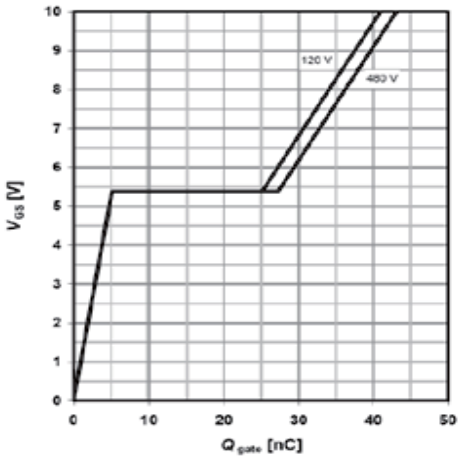


Figure 8: Gate-Charge Characteristics

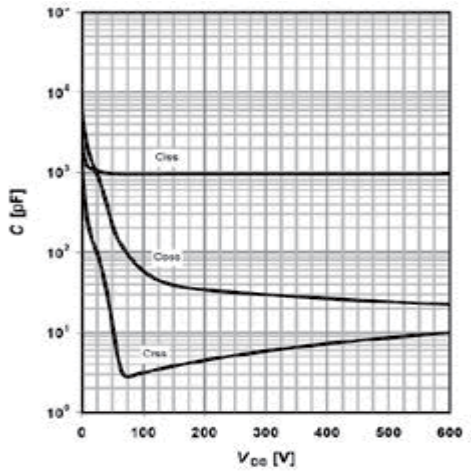


Figure 9: Capacitance Characteristics

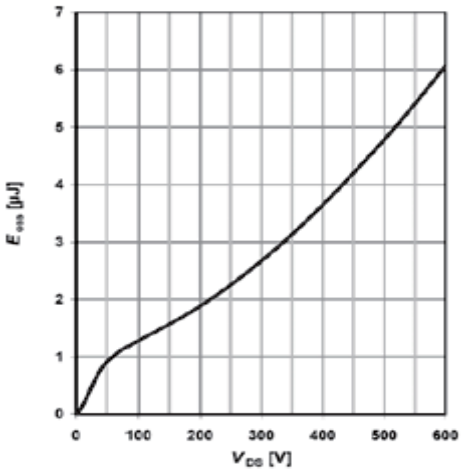


Figure 10: C_{oss} stored Energy

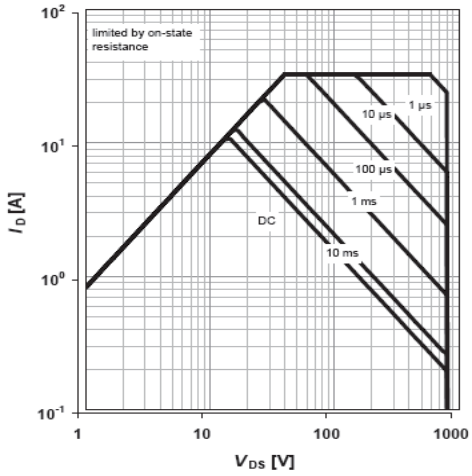


Figure 11: Maximum Forward Biased Safe Operating Area
TO-220, Tc=25° C

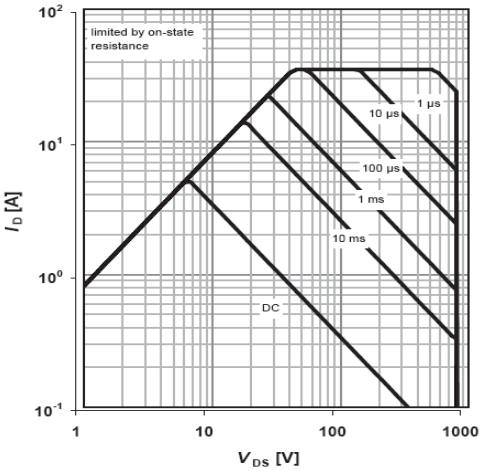


Figure 12: Maximum Forward Biased Safe Operating Area
TO-220 FullPAK, Tc=25° C

Typical characteristics Diagrams

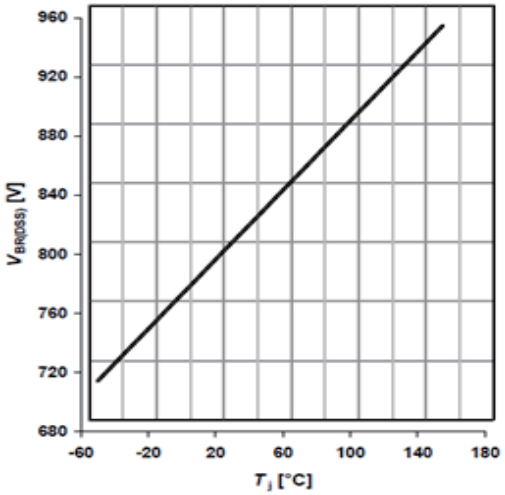


Figure 13:Break Down vs. Junction Temperature

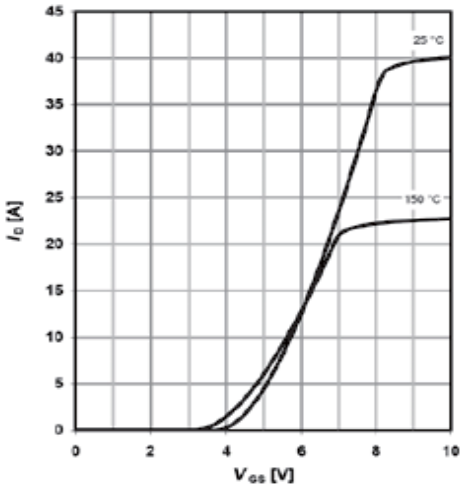
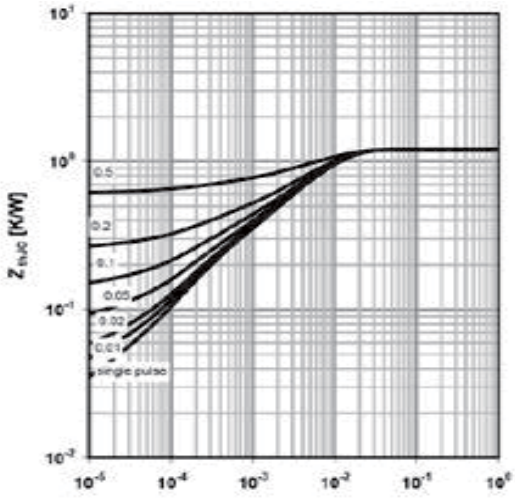
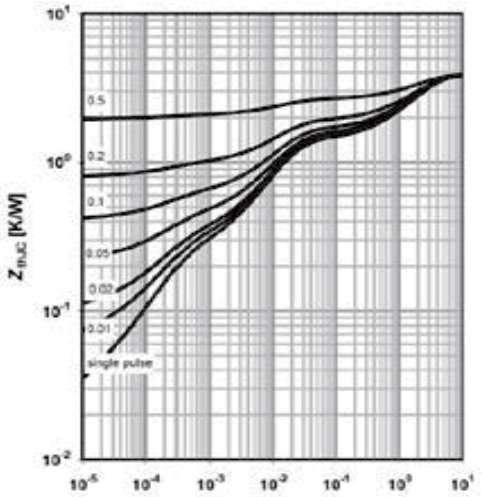


Figure 14: Typical transfer characteristics



Pulse Width (s)
Figure 15:Maximum Transient ThermalImpedance
TO-220



Pulse Width (s)
Figure 16:Maximum Transient ThermalImpedance
TO-220 FullPAK

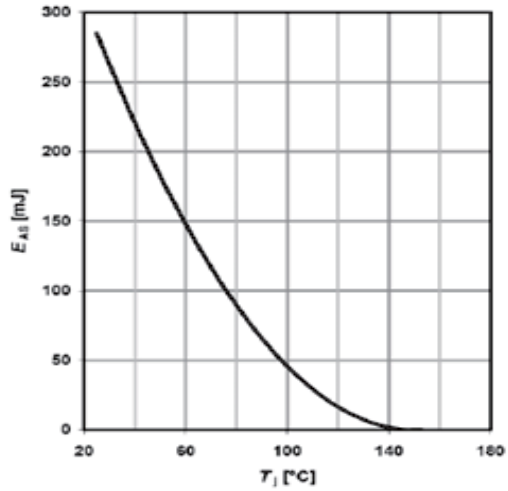
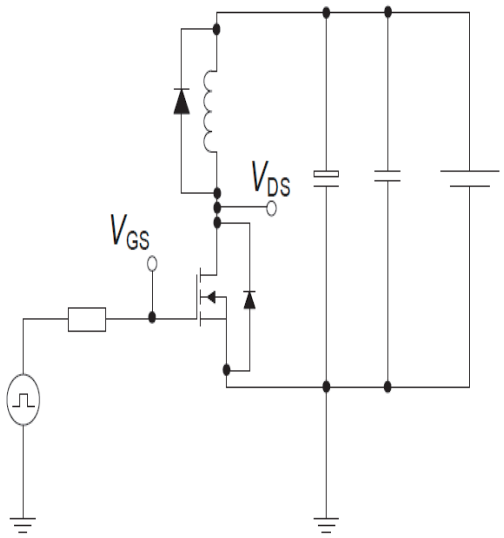


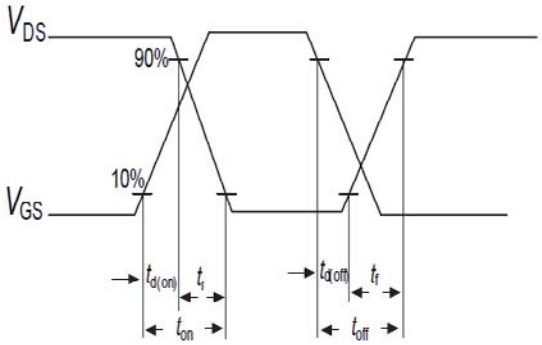
Figure 17:Avalanche energy

Typical characteristics Diagrams

Switching times test circuit for inductive load

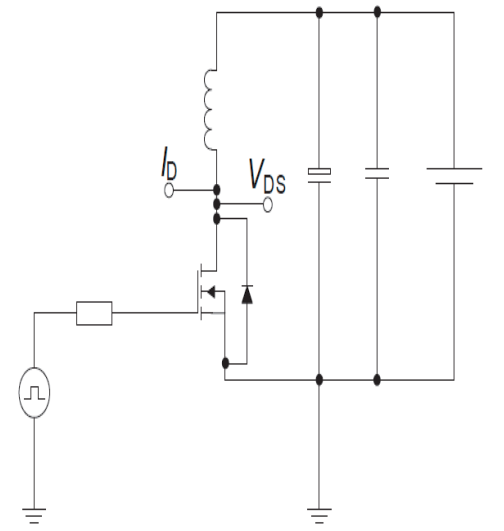


Switching time waveform

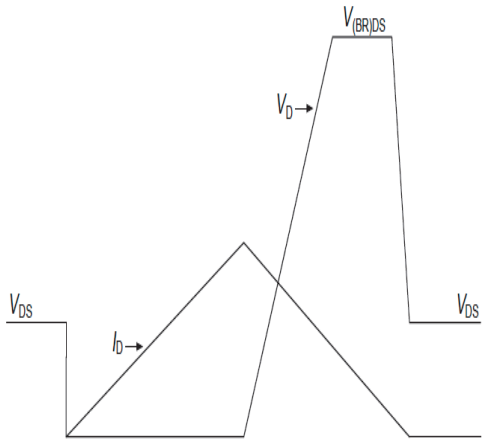


Unclamped inductive load test circuit and waveform

Unclamped inductive load test circuit

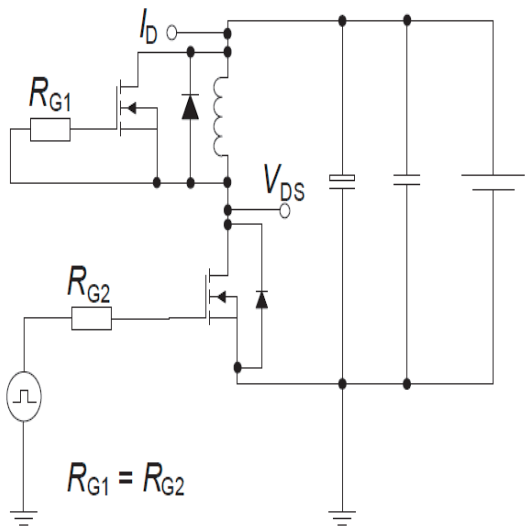


Unclamped inductive waveform

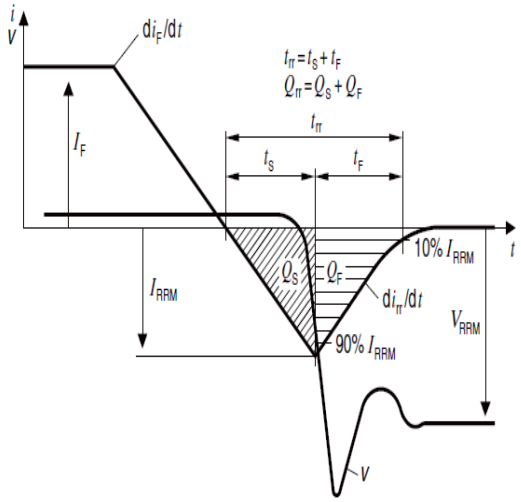


Typical characteristics Diagrams

Test circuit for diode characteristics



Diode recovery waveform



ProductNames Rules

X X X N E X X X

Process Type
VDMOS:default
Super junction:SJ
Low Voltage trench:D

Package Code
TO-220:Default
ITO-220:F
TO-262:E
TO-263:D
TO-252:M
TO-251:N
TO-3P:K

Rated Voltage Code
With 2 Digital,For Example:
600V:60
60V:06

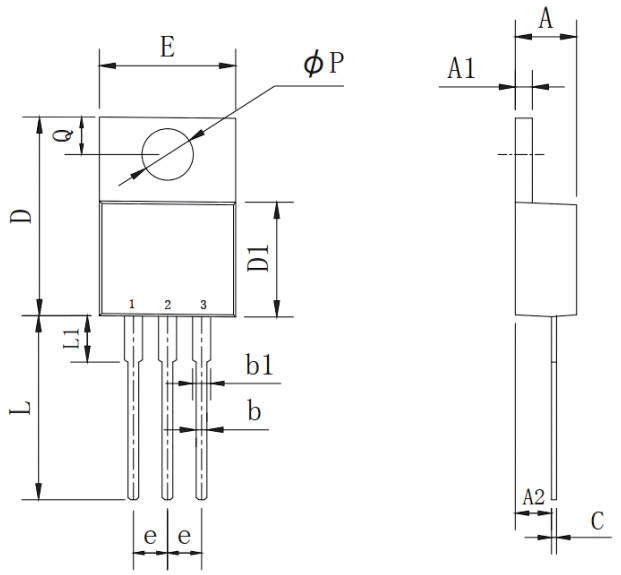
Rated Current Code
With 1-2 Digital,
For Example:
4A:4,
10A:10,
0.8A:08

Special Function Code
G-S ESD Protection:E
No Protection:Default

ChannelCode
N channel:N
P channel:P

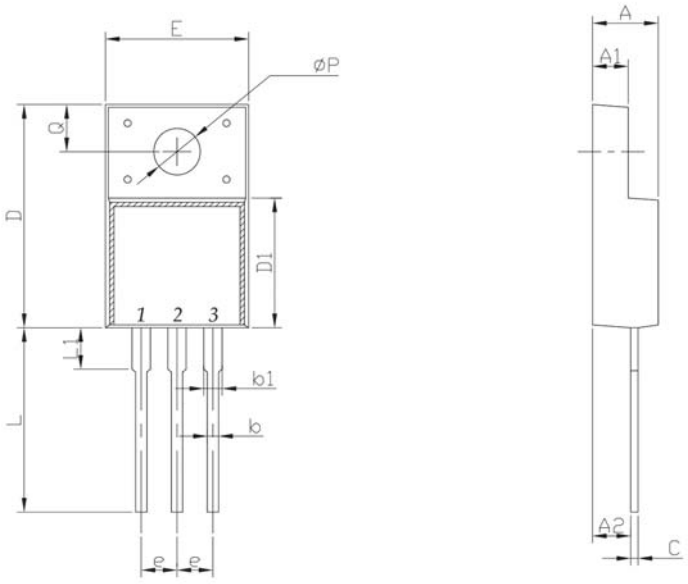
Dimensions

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

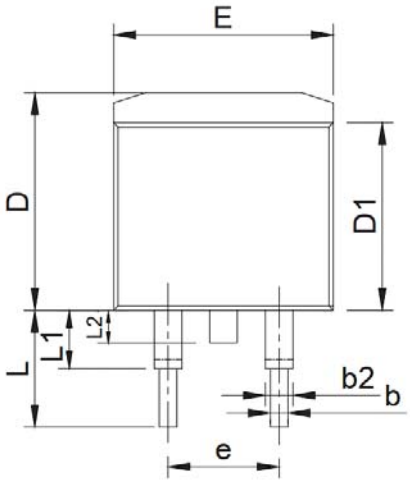
ITO-220 PACKAGE OUTLINE DIMENSIONS

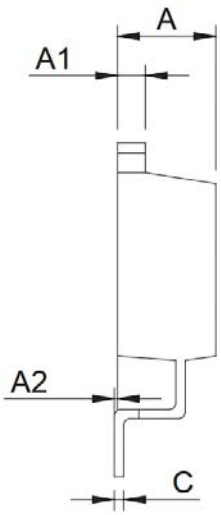


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.24	4.9	0.167	0.193
A1	2.3	2.92	0.091	0.115
A2	2.61	2.81	0.103	0.111
b	0.3	1	0.012	0.039
b1	0.9	1.55	0.035	0.061
C	0.3	0.7	0.012	0.028
D	14.5	16.36	0.571	0.644
D1	8.8	9.41	0.346	0.370
E	9.5	10.5	0.374	0.413
e	2.3	2.75	0.091	0.108
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

Friendship Reminder

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