SEMICONDUCTOR

SJ7N70 Series
7A 700V N-Channel Super Junction Power MOSFET

Genaral Description

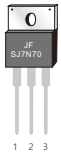
This series of power MOSFET use N channel Multi-EPI Super-Junction technology and design to provide better characteristics, such as fast switchingtime, low Ciss and Crss, low on resistance and excellent avalanche characteristics,making it especially suitable for applications which require superior power density and outstanding efficiency.

Product Summary			
V_{DS}	$R_{DS(on)}$ (Ω) Typ	I_D (A)	Qg (Typ)
700V	0.65 @ 10V	7	10.3nc

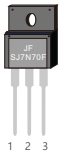
Features

- Low on-resistance
- Ultra low gate charge and input capacitance
- 100% avalanche tested
- Rohs compliant

TO-220 SJ7N70



ITO-220 SJ7N70F



TO-263 SJ7N70D

Mechanical Data

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

TO-251 SJ7N70N

TO-252 SJ7N70M

Application

- Switching applications

Ordering Information

Part No.	Package Type	Package	Quality(box)
SJ7N70	TO-220	Tube	1000
SJ7N70F	ITO-220	Tube	1000
SJ7N70D	TO-263	Tape & Reel	800
SJ7N70N	TO-251	Tube	1000
SJ7N70M	TO-252	Tape & Reel	2500

Pin Definition:

1. Gate
2. Drain
3. Source

Block Diagram

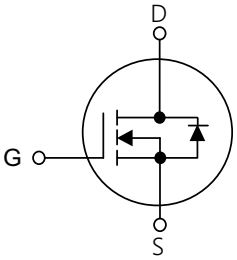


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	TO-220/TO-263/TO-251/TO-252	ITO-220	Unit
Drain-Source Voltage		V_{DS}	700		V
Gate-Source Voltage		V_{GS}	±30		V
Continuous Drain Current	T_C=25°C	I_D	7		A
	T_C=100°C		4		
Pulsed Drain Current (Note 1)		I_{DM}	42		A
Single Pulse Avalanche Energy(Note 2)		E_{AS}	86		mJ
Avalanche Current(Note 1)		I_{AR}	1.7		A
Repetitive Avalanche Energy(Note 1)		E_{AR}	0.42		mJ
Reverse Diode Recovery dv/dt(Note 3)		dv/dt	15		V/ns
Drain Source Voltage Slope (V_{DS}=480V)		dv/dt	50		V/ns
Power Dissipation T_C=25°C		P_D	151	36	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55 ~ +150		°C

Table 2.Thermal Characteristics

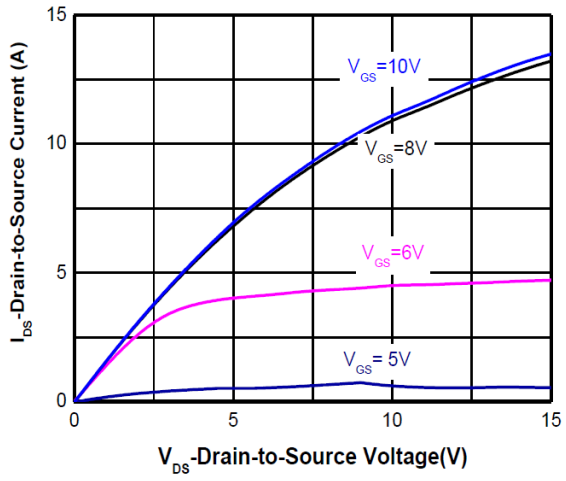
Parameter	Symbol	TO-220/TO-263 TO-251/TO-252	ITO-220	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62	82	°C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	1.2	4.1	°C/W

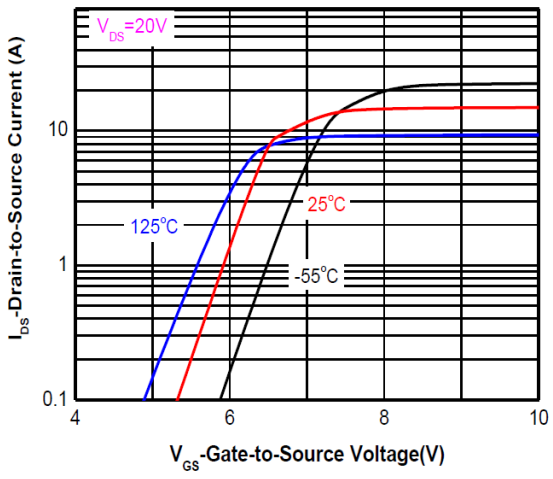
Table 3. Electrical Characteristics (T_J=25°C, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V,I_D=250μA	700	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=600V,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=3.5A	-	0.65	0.75	Ω
Dynamic Characteristics(Note 5)							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1MHz	-	400	-	pF
Output Capacitance		C_{OSS}		-	113	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	6.4	-	pF
Switching Characteristics (Note 5)							
Turn-On Delay Time		td(on)	V_{DD}=400V,I_D=3.5A, R_G=20Ω	-	25	-	ns
Turn-On Rise Time		t_R		-	55	-	ns
Turn-Off Delay Time		td(off)		-	110	-	ns
Turn-Off Fall Time		tf		-	9	-	ns
Total Gate Charge		Q_G	V_{DS}=400V,I_D=3.5A, V_{GS}=10V	-	10.3	-	nC
Gate-Source Charge		Q_{GS}		-	4.4	-	nC
Gate-Drain Charge		Q_{GD}		-	2.9	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_S=3.5A	-	0.9	1.5	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		-	-	7	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}		-	-	18	A
Reverse Recovery Time		trr	V_{GS}=0V, I_S=3.5A dI$_F$/dt=100A/μs (Note 1)	-	190	-	ns
Reverse Recovery Charge		Q_{RR}		-	2.3	-	μC

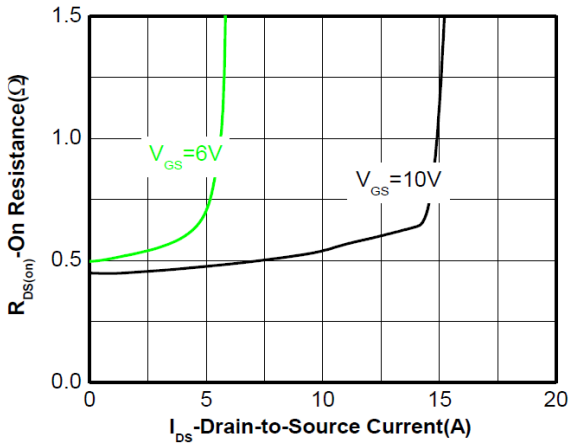
Notes : 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 L=60mH, I_{AS}=3.0A,V_{DD}=150V,Starting T_J=25°C
3 I_{SD}≤4.5A,di/dt≤200A/μS,V_{DD}≤BV_{DSS},starting T_J=25℃
4 Pulse Test: Pulse width ≤300μS, Duty cycle≤2%
5 Guaranteed by design,not subject to production

Typical Characteristics Diagrams

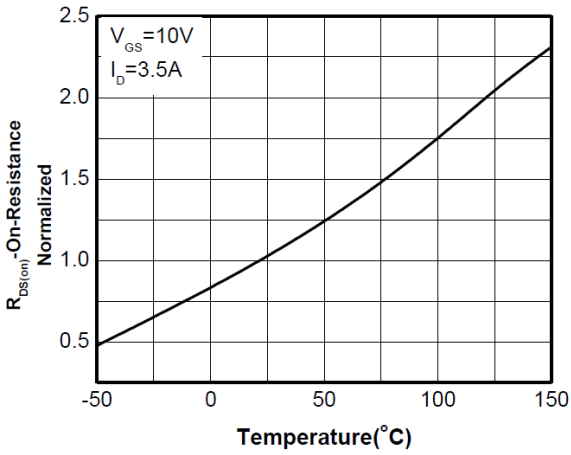




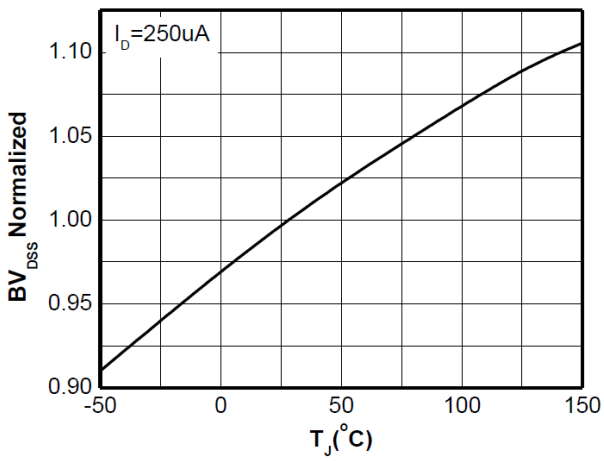
Output characteristics



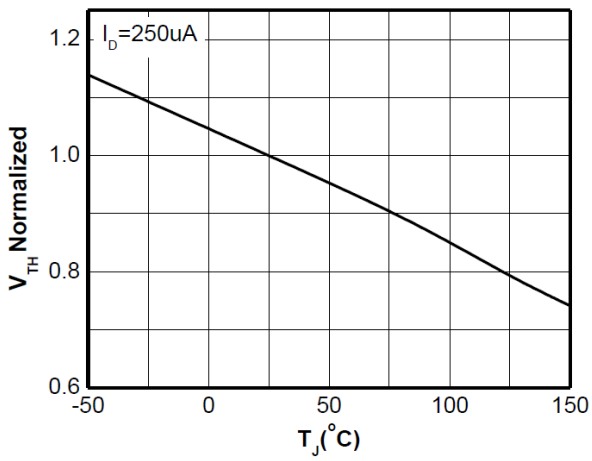
Transfer characteristics



On-Resistance vs. Drain current



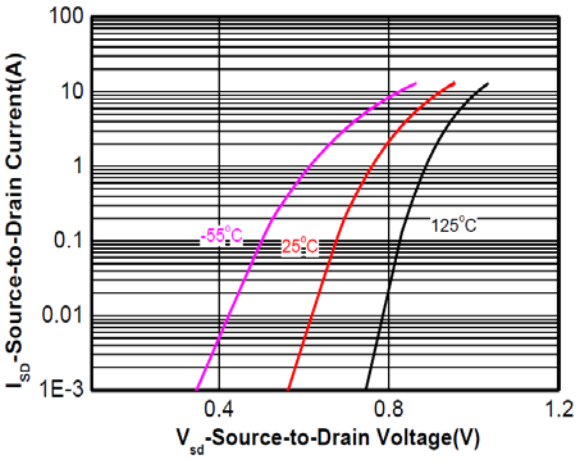
On-Resistance vs. Junction temperature



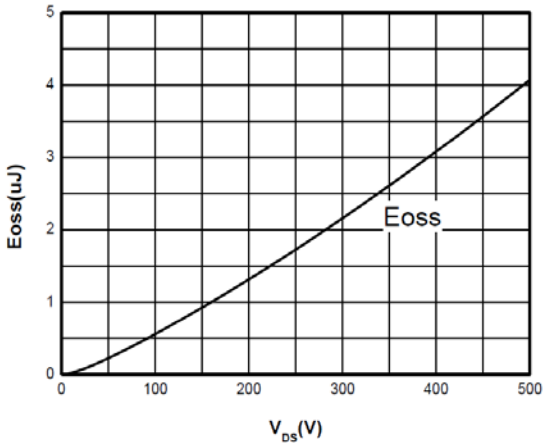
Breakdown Voltage vs. Junction temperature

Threshold voltage vs. Junction temperature

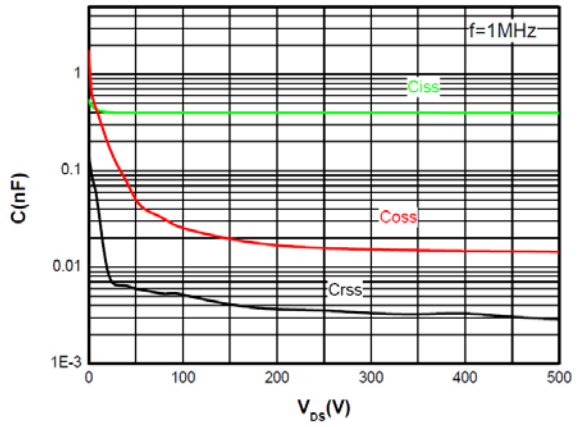
Typical Characteristics Diagrams



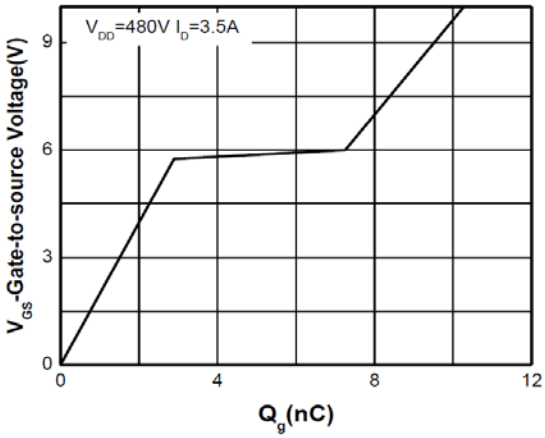
Body diode forward voltage



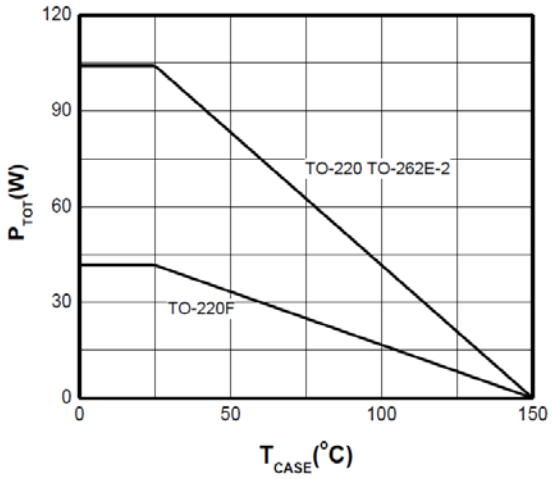
Coss stored Energy



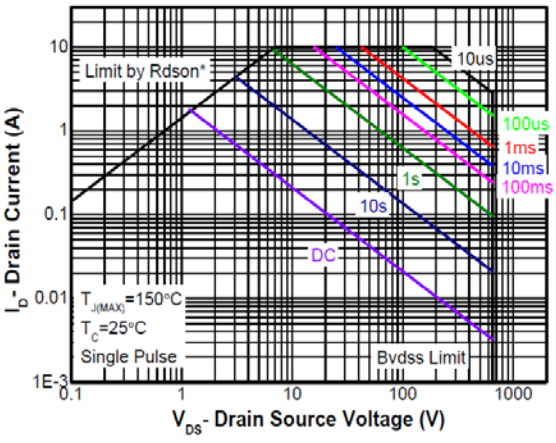
Capacitance



Gate charge Characteristics

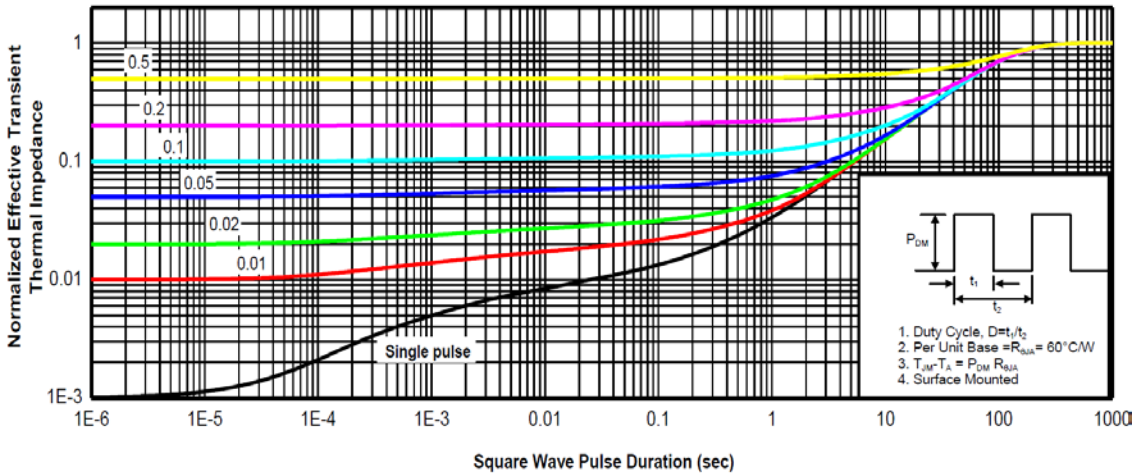


Power dissipation



Safe Operating Area

Typical Characteristics Diagrams



Transient thermal response (Junction-to-Ambient)

Typical Test Circuit

Table 20 Switching times test circuit and waveform for inductive load

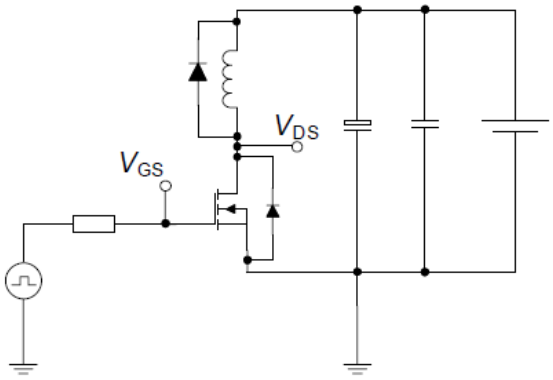
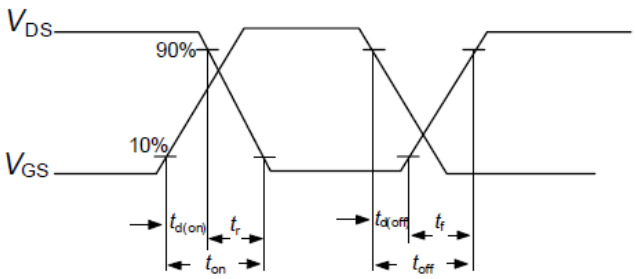
Switching times test circuit for inductive load	Switching time waveform
	

Table 21 Unclamped inductive load test circuit and waveform

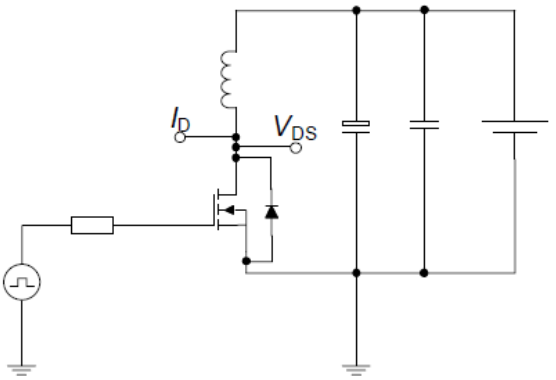
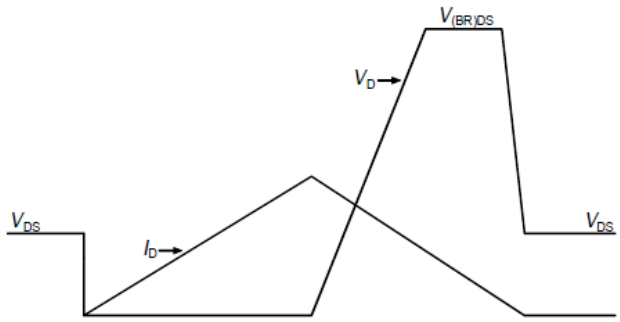
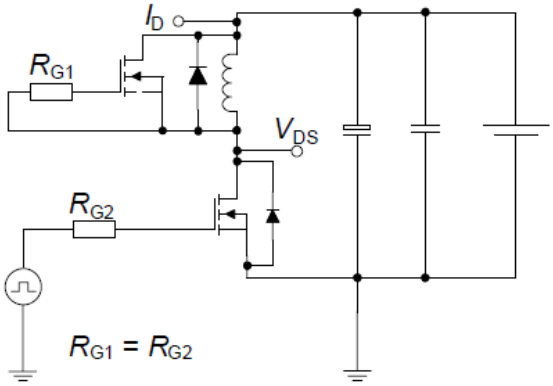
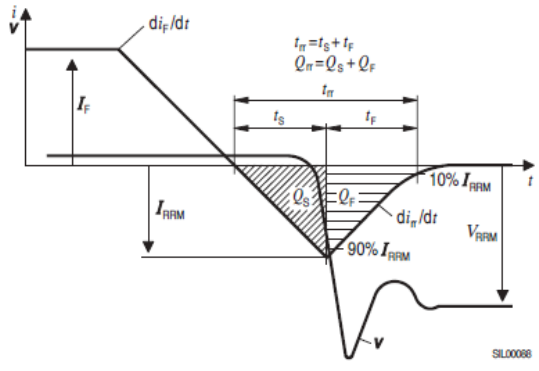
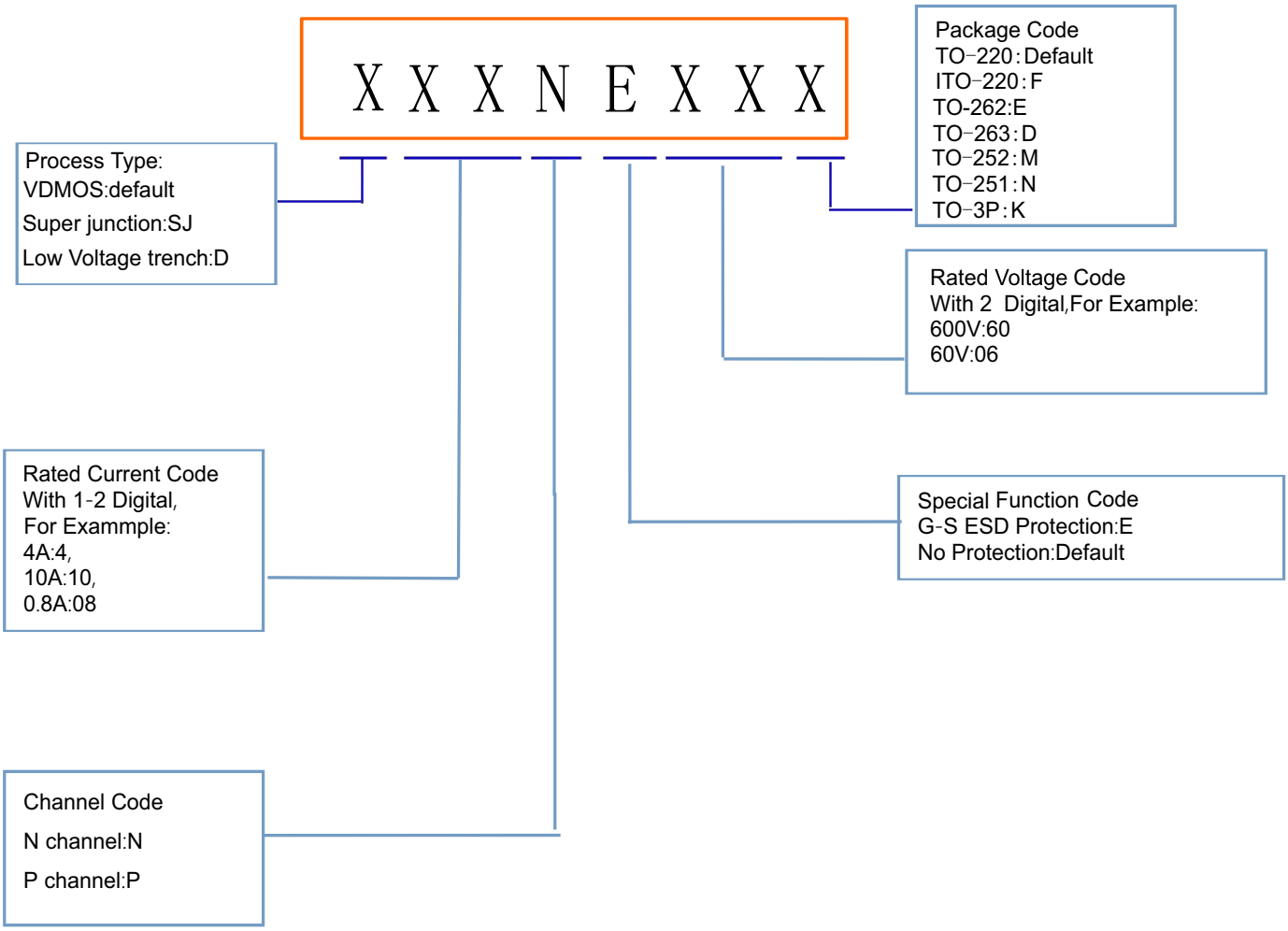
Unclamped inductive load test circuit	Unclamped inductive waveform
	

Table 22 Test circuit and waveform for diode characteristics

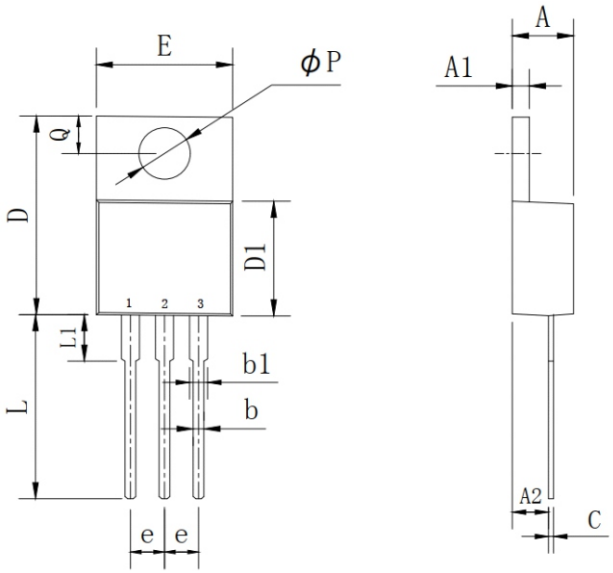
Test circuit for diode characteristics	Diode recovery waveform
	

Product Names Rules



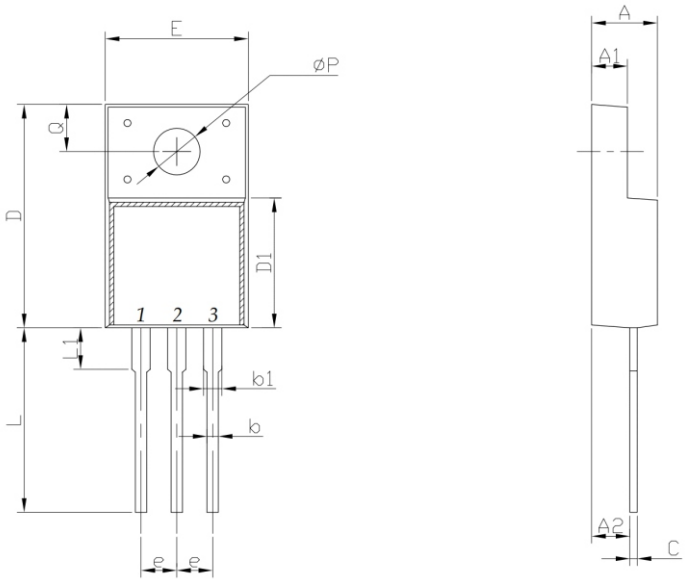
Dimensions

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

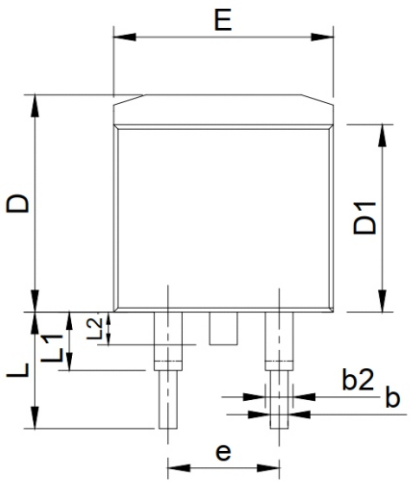
ITO-220 PACKAGE OUTLINE DIMENSIONS

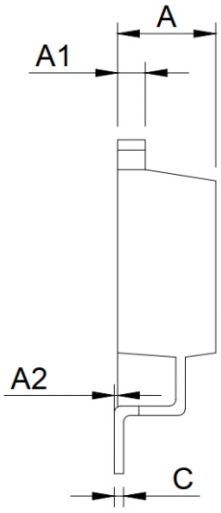


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.24	4.9	0.167	0.193
A1	2.3	2.92	0.091	0.115
A2	2.61	2.81	0.103	0.111
b	0.3	1	0.012	0.039
b1	0.9	1.55	0.035	0.061
C	0.3	0.7	0.012	0.028
D	14.5	16.36	0.571	0.644
D1	8.8	9.41	0.346	0.370
E	9.5	10.5	0.374	0.413
e	2.3	2.75	0.091	0.108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

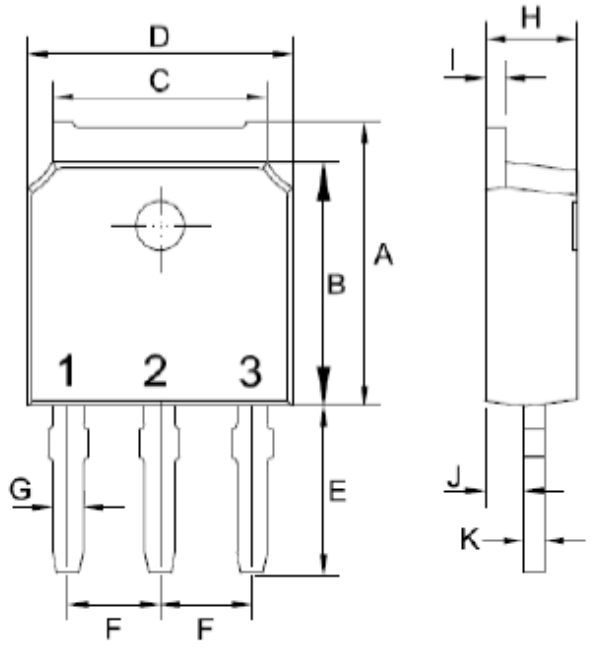




Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	0	0.25	0.000	0.010
b	0.61	1.01	0.024	0.040
b1	1.2	1.34	0.047	0.053
C	0.3	0.6	0.012	0.024
D	9.48	10.84	0.373	0.427
D1	8.49	9.3	0.334	0.366
E	9.7	10.31	0.382	0.406
e	4.88	5.28	0.192	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

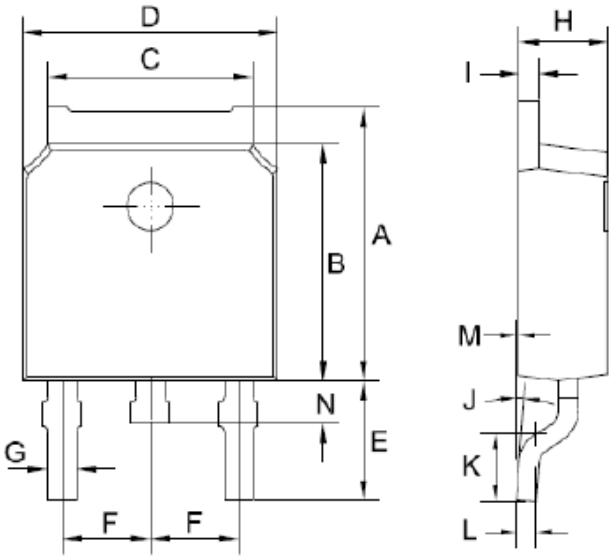
Dimensions

TO-251 PACKAGE OUTLINE 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

TO-252 PACKAGE OUTLINE 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	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	0ú	8ú	0ú	8ú
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
P	0.6	1	0.024	0.039

Friendship Reminder

■ JiNan JingHeng（hereinafter referred to as JH） reserves the right to make changes to this document and its products and specifications at anytime without notice.

■ Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

■ JH makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does JH assume any liability for application assistance or customer product design.

■ JH does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

■ No license is granted by implication or otherwise under any intellectual property rights of JH.

■ JH is products are not authorized for use as critical components in life support devices or systems without express written approval of JH.