

General Description

JINGHENG(JH) has series planar power MOSFET, platforms for voltage up to 900 volts, both with design service and manufacturing capability, including cell, termination design and simulation. This power MOSFET is a high voltage N channel power MOSFET with advanced technology to have better characteristics.

Features

- Fast switching
- Low Ciss and Crss
- Low on resistance
- Excellent avalanche characteristics

Mechanical Data

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

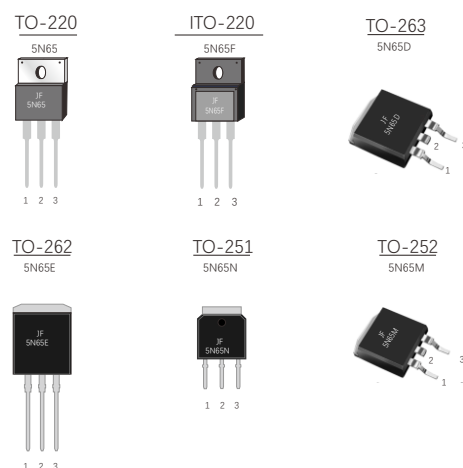
Application

- Switching applications

Ordering Information

Part No.	Package Type	Package	Quality(box)
5N65	TO-220	Tube	1000
5N65F	ITO-220	Tube	1000
5N65D	TO-263	Tape & Reel	800
5N65E	TO-262	Tube	1000
5N65N	TO-251	Tube	1000
5N65M	TO-252	Tape & Reel	3000

Product Summary			
V _{DS}	R _{DS(on)} (Ω)Typ	I _D (A)	Q _g (Typ)
650V	2.0 @ 10V, 2.5A	5	27nc



Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

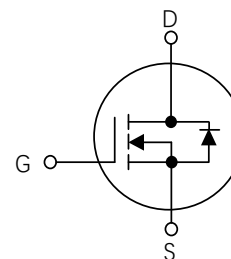


Table1 Absolute Maximum Ratings (T_c=25°C, unless otherwise specified)

Parameter	Symbol	5N65/5N65D/5N65E 5N65M/5N65N	5N65F	Unit
Drain-Source Voltage	V _{DS}	650		V
Gate-Source Voltage	V _{GS}	±30		V
Continuous Drain Current T _c =25°C	I _D	5		A
Pulsed Drain Current (Note 1)	I _{DM}	20		A
Single Pulse Avalanche Energy(Note 2)	E _{AS}	300		mJ
Avalanche Current(Note 1)	I _{AR}	3.6		A
Repetitive Avalanche Energy(Note 1)	E _{AR}	63		mJ
Power Dissipation T _c =25°C	P _D	106	35	W
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +150		°C

Table 2. Thermal Characteristics

Parameter	Symbol	5N65/5N65D/5N65E 5N65M/5N65N	5N65F	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62.5	82	$^{\circ}\text{C}/\text{W}$
Thermal resistance Junction to Case	$R_{\theta JC}$	2.35	5.5	$^{\circ}\text{C}/\text{W}$

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}	$V_{GS}=0V, I_D=250\mu\text{A}$	650			V	
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$			1	μA	
Gate-Source Leakage Current	Forward	I_{GSS}			100	nA	
	Reverse				-100	nA	
On Characteristics(Note 4)							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=5V, I_D=250\text{mA}$	2		4	V	
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.5\text{A}$		2.0	2.2	Ω	
Dynamic Characteristics(Note 5)							
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$		460		pF	
Output Capacitance	C_{OSS}				56		pF
Reverse Transfer Capacitance	C_{RSS}				3		pF
Switching Characteristics (Note 5)							
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=300V, I_D=2\text{A},$ $V_{GS}=10V, R_G=25\Omega$		17		ns	
Turn-On Rise Time	t_R				55		ns
Turn-Off Delay Time	$t_{d(off)}$				75		ns
Turn-Off Fall Time	t_f				60		ns
Total Gate Charge	Q_G	$V_{DS}=480V, I_D=2\text{A},$ $V_{GS}=10V$		17		nC	
Gate-Source Charge	Q_{GS}				5.3		nC
Gate-Drain Charge	Q_{GD}				11		nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1\text{A}$		0.82	1	V	
Maximum Continuous Drain-Source Diode Forward Current	I_S			4		A	
Reverse Recovery Time	t_{rr}	$V_{DS}=100V, I_F=2\text{A}$ $di/dt=100\text{A}/\mu\text{s}(\text{Note 1})$		270		ns	
Reverse Recovery Charge	Q_{RR}				4.1		nC

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

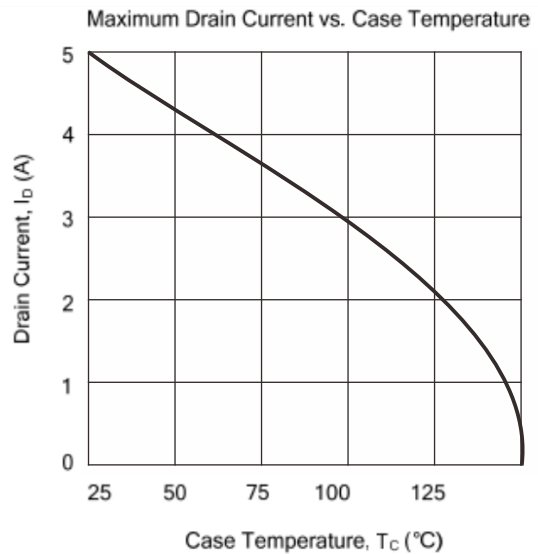
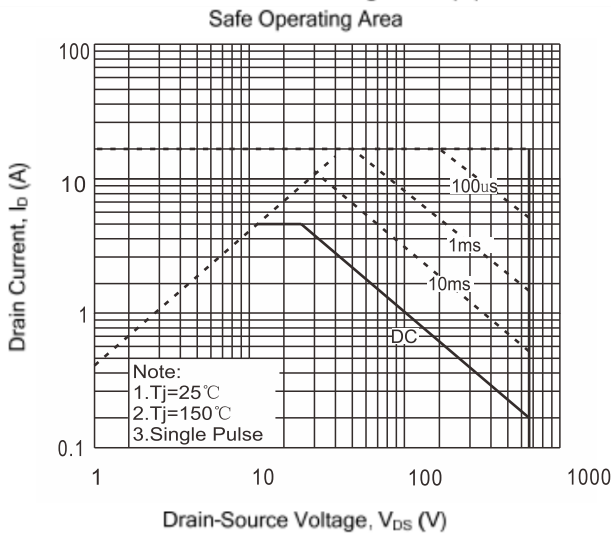
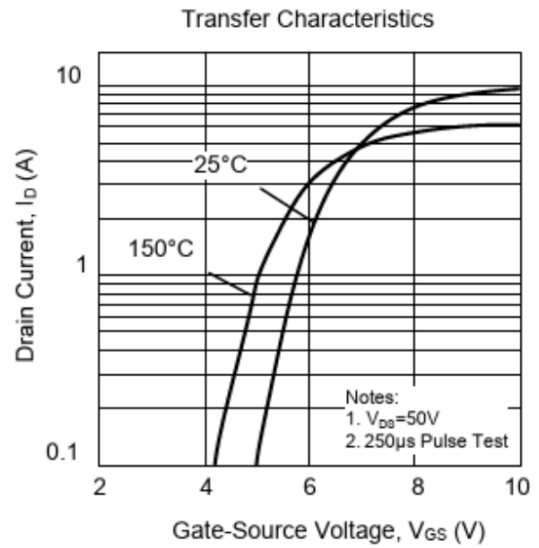
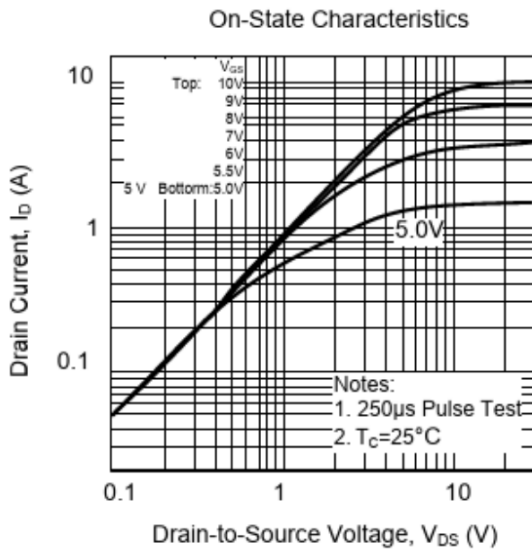
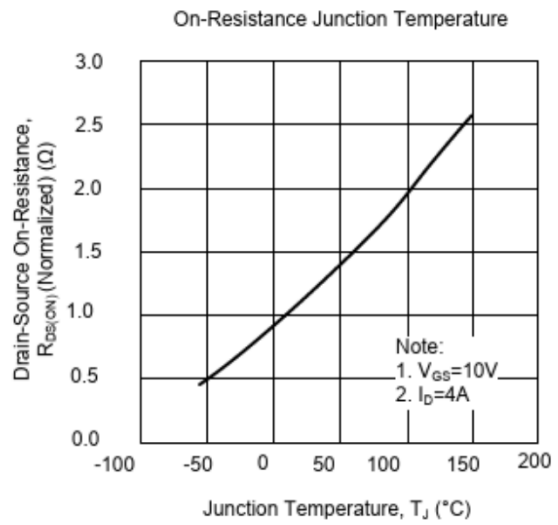
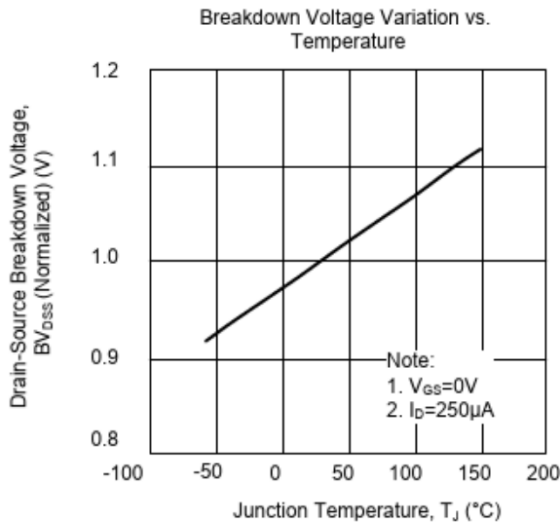
2 $L=30\text{mH}, I_{AS}=4.5\text{A}, V_{DD}=50V, R_G=25\Omega$ Starting $T_J=25^{\circ}\text{C}$

3 $I_{SD} \leq 3\text{A}, di/dt \leq 100\text{A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, starting $T_J=25^{\circ}\text{C}$

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

5 Guaranteed by design, not subject to production

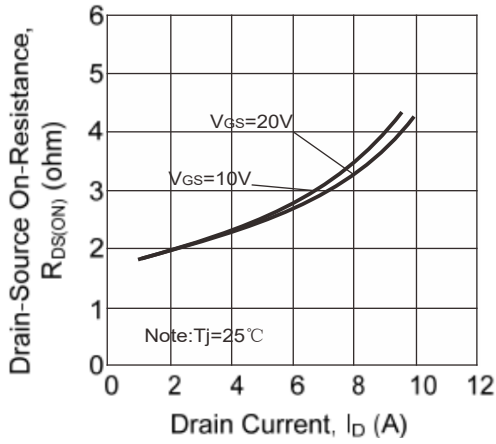
Typical Characteristics Diagrams



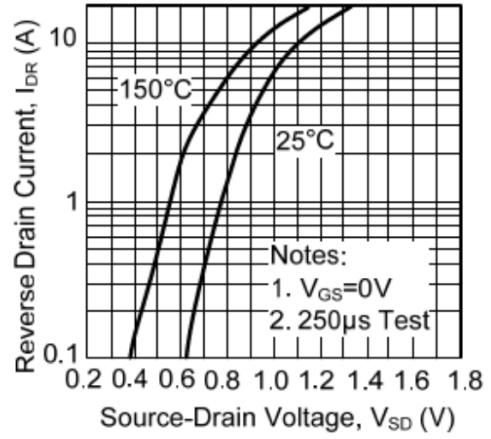


Typical Characteristics Diagrams

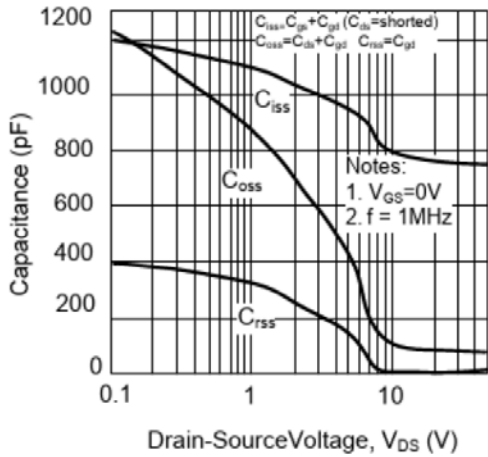
On-Resistance Variation vs. Drain Current and Gate Voltage



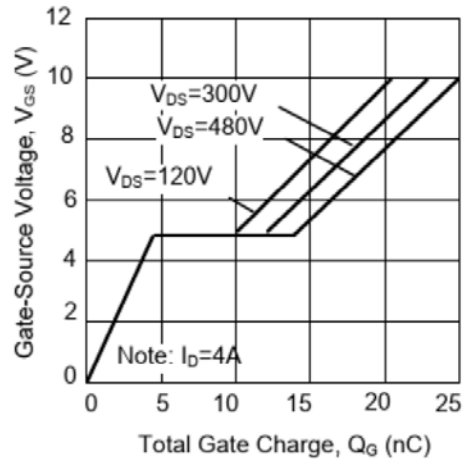
On State Current vs. Allowable Case Temperature



Capacitance Characteristics (Non-Repetitive)



Gate Charge Characteristics



Typical Test Circuit

Table 20 Switching times test circuit and waveform for inductive load

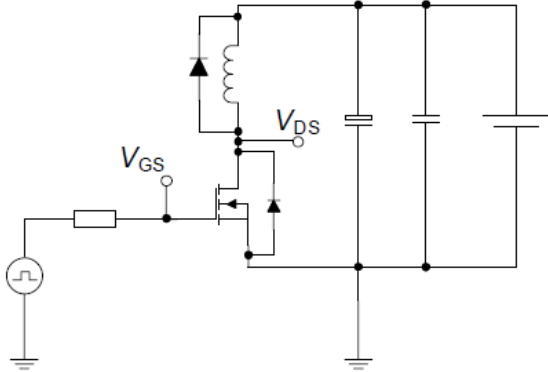
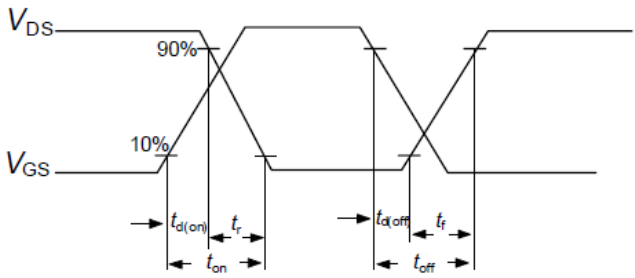
Switching times test circuit for inductive load	Switching time waveform
	

Table 21 Unclamped inductive load test circuit and waveform

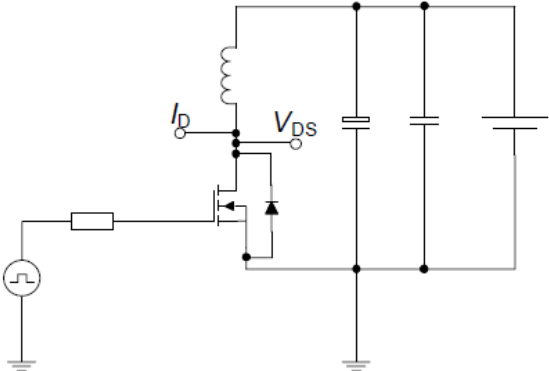
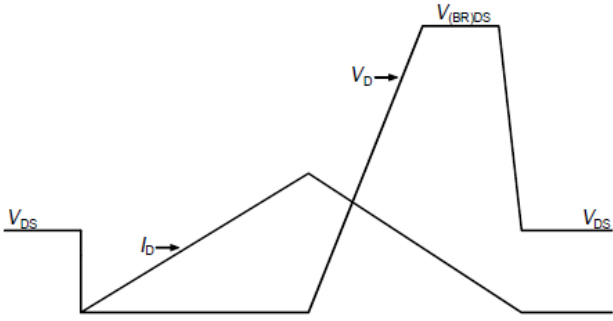
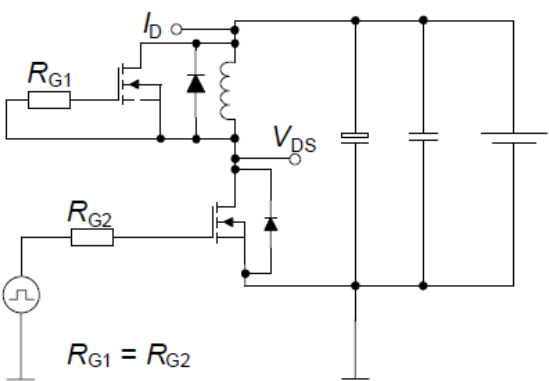
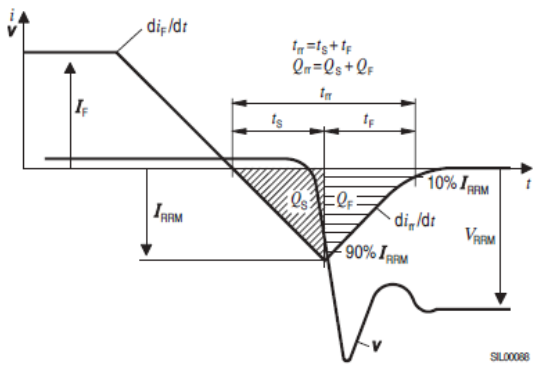
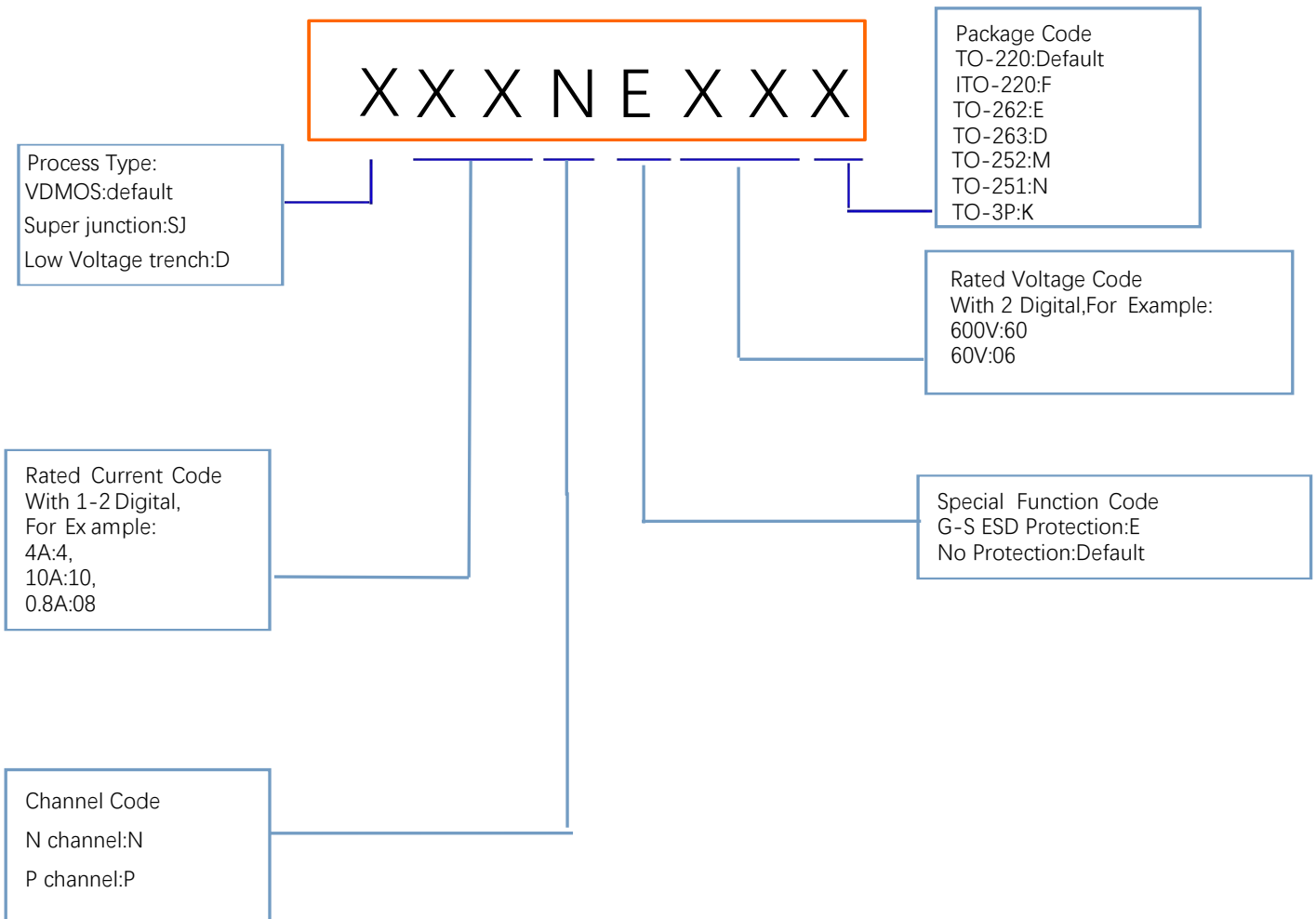
Unclamped inductive load test circuit	Unclamped inductive waveform
	

Table 22 Test circuit and waveform for diode characteristics

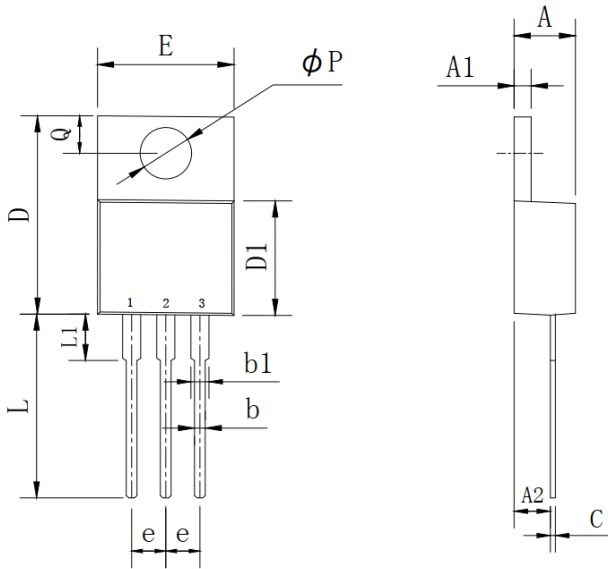
Test circuit for diode characteristics	Diode recovery waveform
	

Product Names Rules



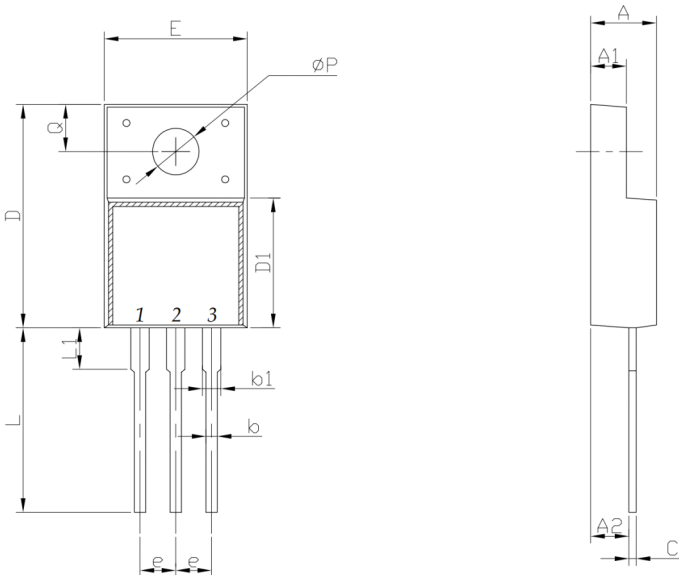
Dimensions

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

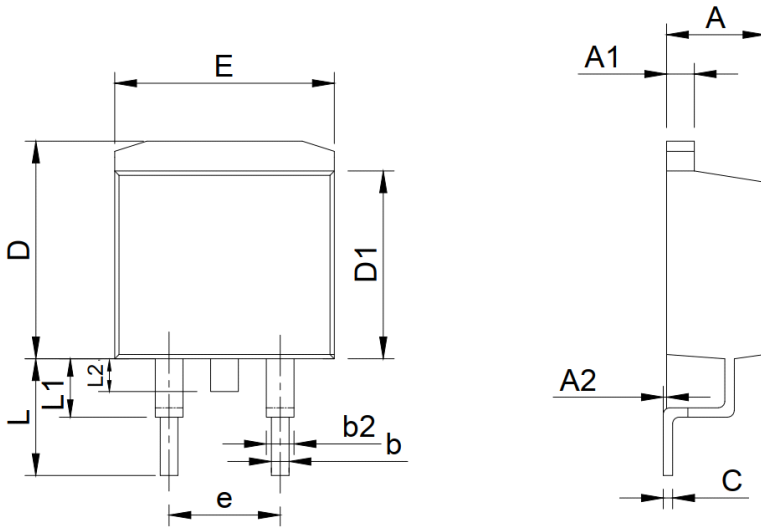
ITO-220 PACKAGE OUTLINE DIMENSIONS



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

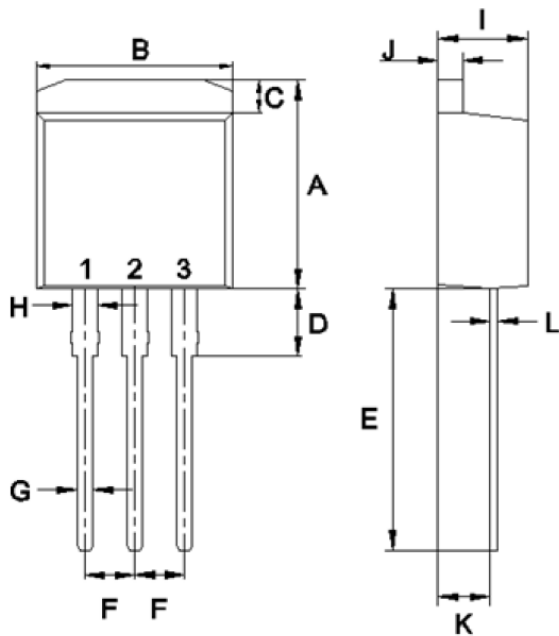
Dimensions

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

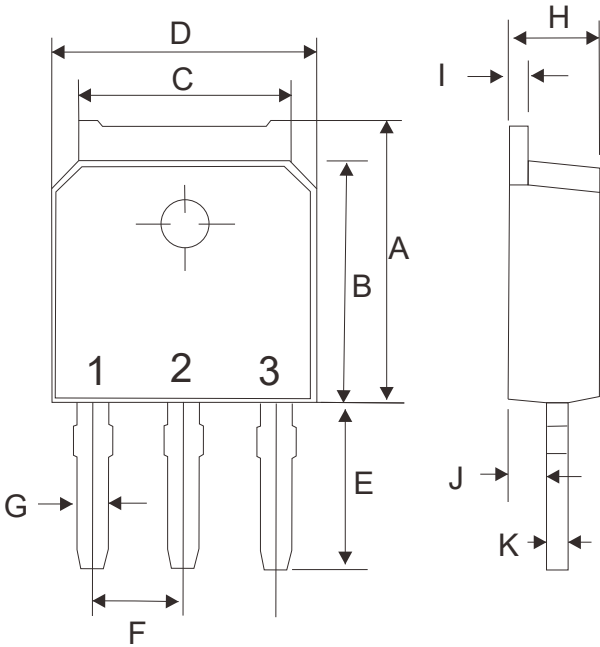
TO-262 PACKAGE OUTLINE DIMENSIONS



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

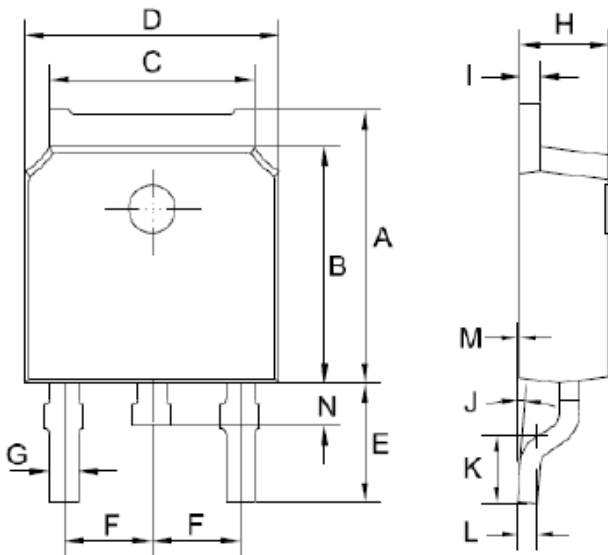
Dimensions

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	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
P	0.6	1	0.024	0.039