SEMICONDUCTOR

8N50 Series
500V N-Channel Power MOSFET

Genaral Description

JINGHENG(JH) has series planar power MOSFET, platforms for voltage up to 500 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.

Product Summary			
V_{DS}	$R_{DS(on)}$(Ω)Typ	I_D(A)	Qg(Typ)
500V	0.7 @ 10V,4A	8	18nc

Features

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

Mechanical Data

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

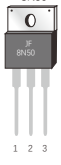
Application

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge

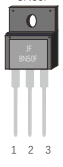
Ordering Information

Part No.	Package Type	Package	Quality(box)
8N50	TO-220	Tube	1000
8N50F	ITO-220	Tube	1000
8N50D	TO-263	Tape & Reel	800
8N50E	TO-262	Tube	1000

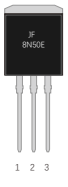
TO-220 8N50



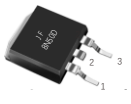
ITO-220 8N50F



TO-262 8N50E



TO-263 8N50D



Pin Definition:

1.Gate
2.Drain
3.Source

Block Diagram

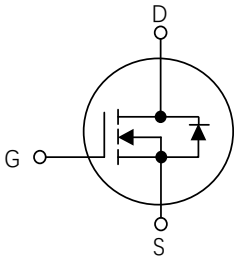


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	8N50/8N50D/8N50E	8N50F	Unit
Drain-Source Voltage		V_{DS}	500		V
Gate-Source Voltage		V_{GS}	±30		V
Continuous Drain Current	T_C=25°C	I_D	8.0	8.0 ※	A
	T_C=100°C		5.1	5.1 ※	
Pulsed Drain Current (Note 1)		I_{DM}	32		A
Single Pulse Avalanche Energy(Note 2)		E_{AS}	320		mJ
Avalanche Current(Note 1)		I_{AR}	8.0		A
Repetitive Avalanche Energy(Note 1)		E_{AR}	12.5		mJ
Power Dissipation T_C=25°C		P_D	125	42	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55 ~ +150		°C

※ limited by maximum junction temperature

Table 2.Thermal Characteristics

Parameter	Symbol	8N50/8N50D/8N50E	8N50F	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62.5	62.5	°C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	1.0	3.0	°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	500			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=500V,V_{GS}=0V			25	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=250mA	2		4	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=4.0A		0.70	0.80	Ω
Dynamic Characteristics(Note 5)							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1MHz		1050		pF
Output Capacitance		C_{OSS}			105		pF
Reverse Transfer Capacitance		C_{RSS}			5.5		pF
Switching Characteristics (Note 5)							
Turn-On Delay Time		td(on)	V_{DD}=250V,I_D=8A, V_{GS}=10V,R_G=25Ω		15		ns
Turn-On Rise Time		t_R			38		ns
Turn-Off Delay Time		td(off)			46		ns
Turn-Off Fall Time		tf			33		ns
Total Gate Charge		Q_G	V_{DS}=400V,I_D=8A, V_{GS}=10V		18		nC
Gate-Source Charge		Q_{GS}			5		nC
Gate-Drain Charge		Q_{GD}			7.5		nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_S=8A			1.6	V
Maximum Continuous Drain-Source Diode Forward Current		I_S				8	A
Reverse Recovery Time		trr	V_{GS}=0V,IF=8A dIF/dt=100A/μs(Note 1)		44		ns
Reverse Recovery Charge		Q_{RR}			45		nC

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 L =10mH, I_{AS}=8A,V_{DD}=50V,R_G=25Ω,Starting T_J=25°C
3 I_{SD}≤8A,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

Figure 1.Output Characteristics

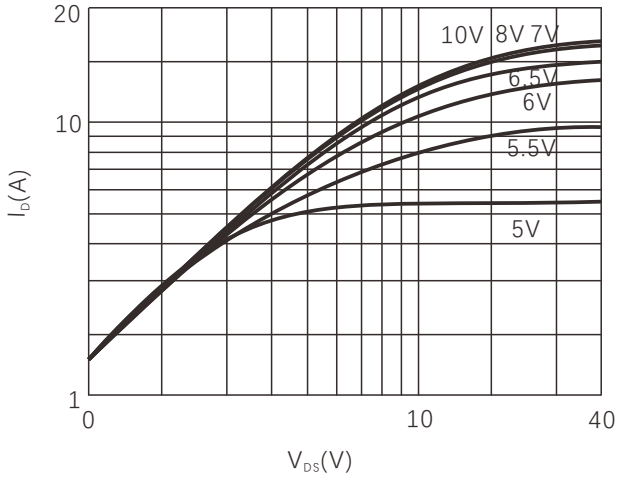


Figure2.Normalized $R_{DS(ON)}$ vs Temperature

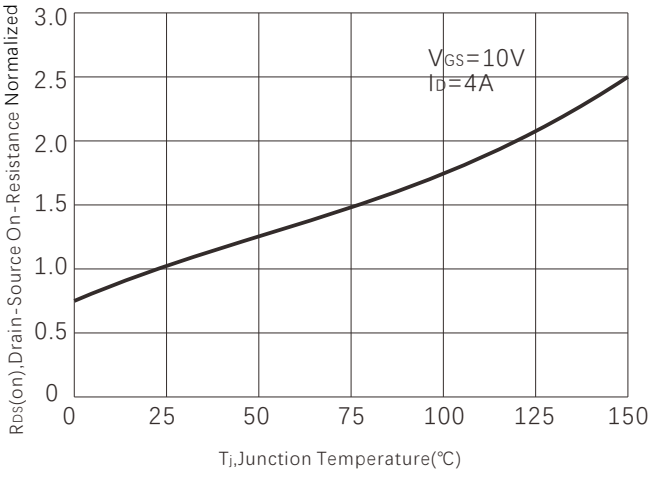


Figure 3.On-Resistance vs.Drain Current

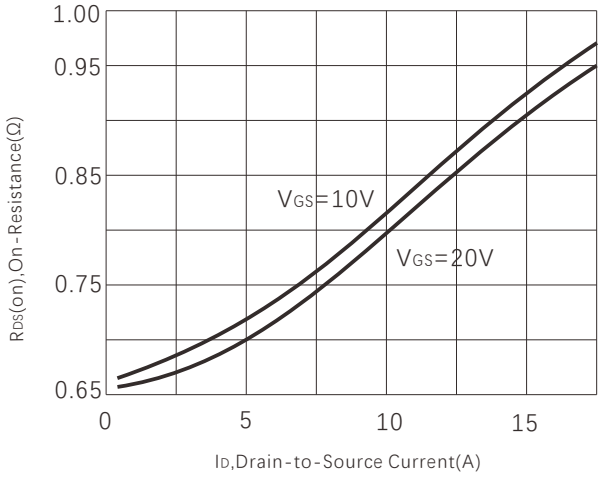


Figure 4. Capacitance

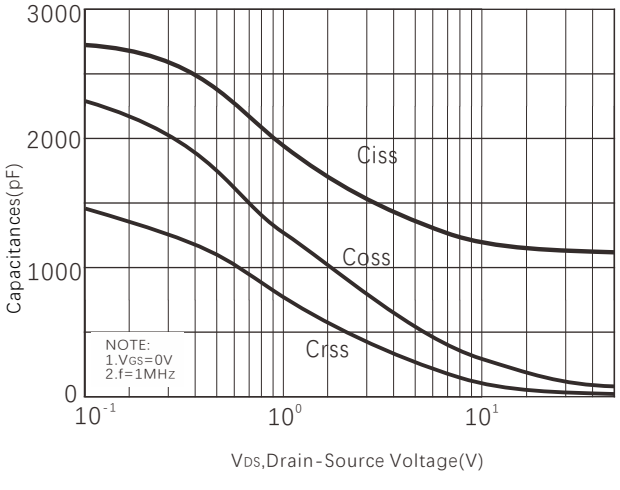


Figure 5.Gate charge

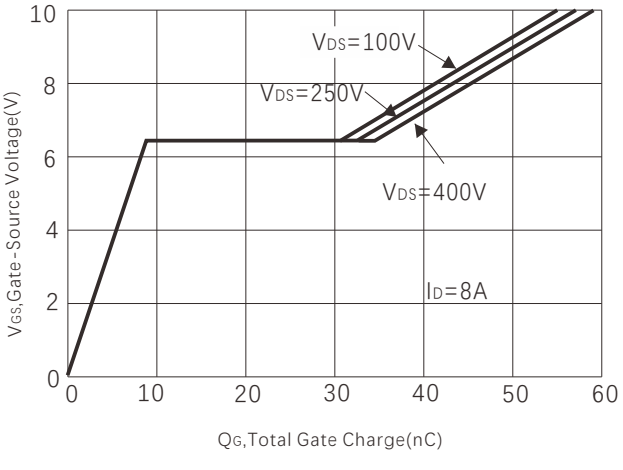
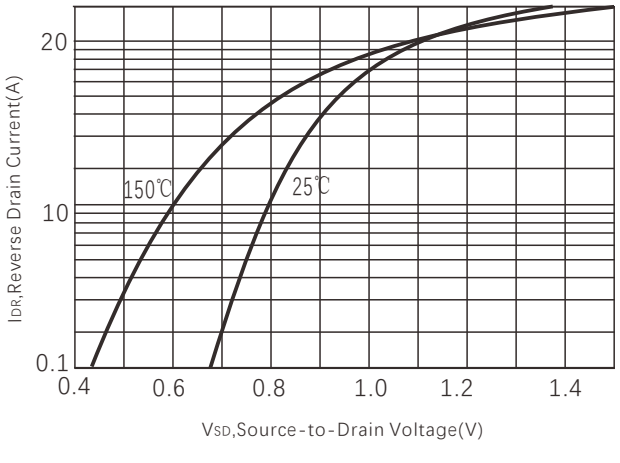


Figure 6.Source-Drain Diode Forward Voltage



Typical Characteristics Diagrams

Figure7.Transfer Characteristics

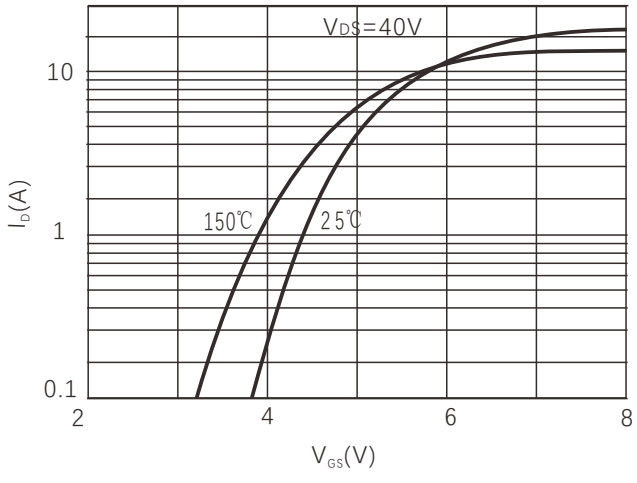


Figure 8.BVdss vs Temperature

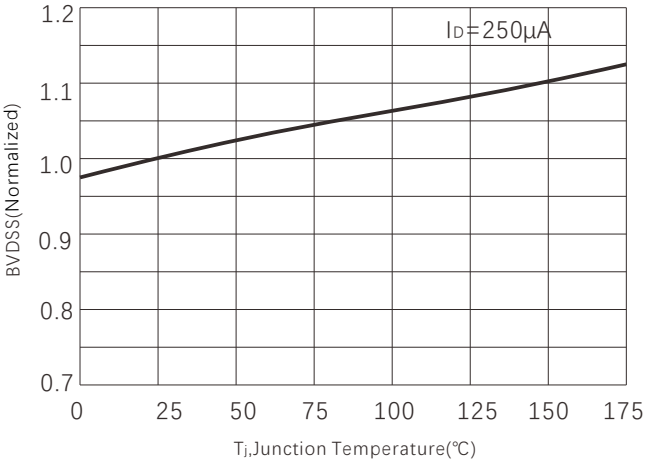


Figure 9. Safe operating area-8N50/D/E

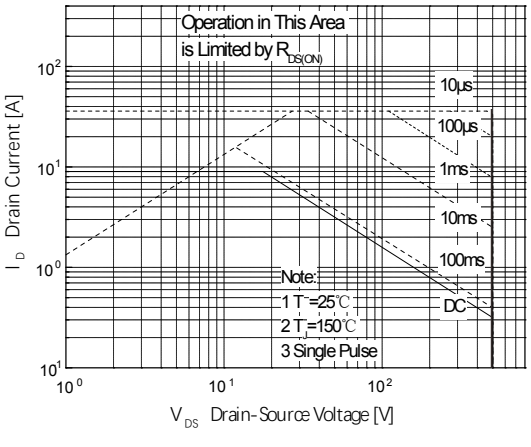


Figure 10. Safe operating area-8N50F

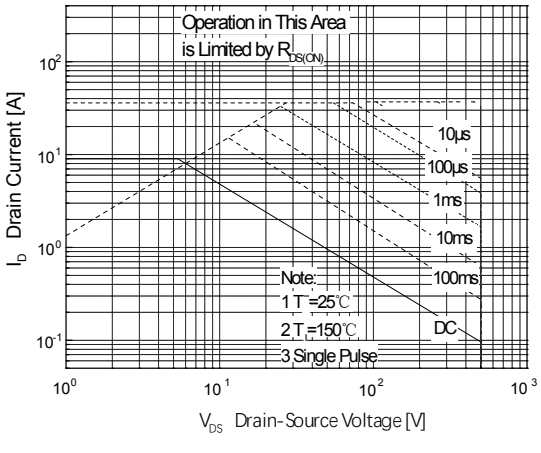


Figure 11. Maximum Transient Thermal Impedance 8N50/D/E

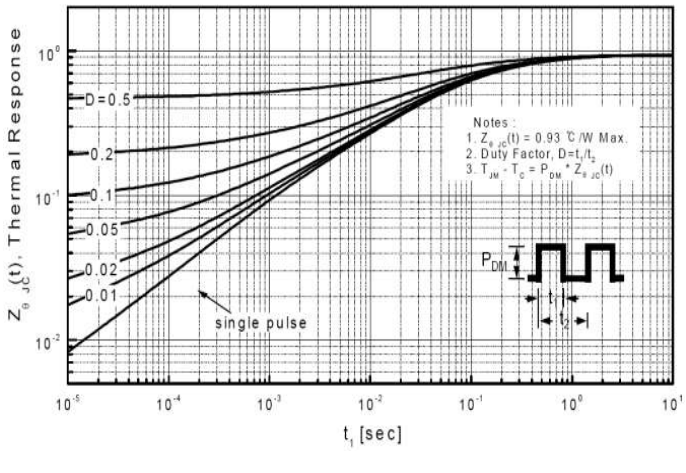
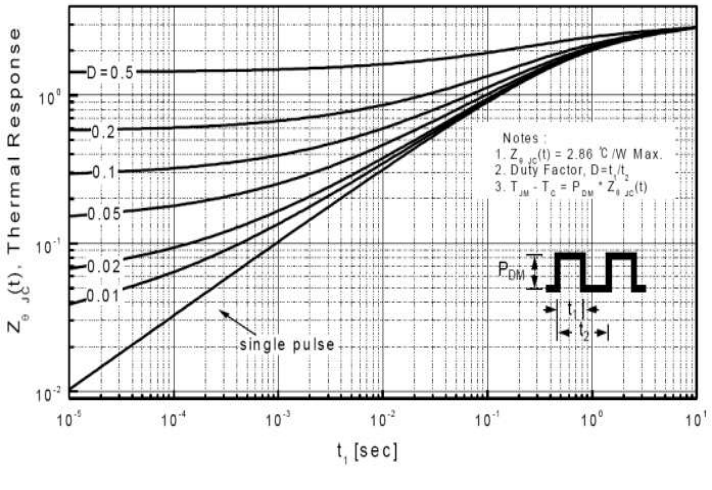
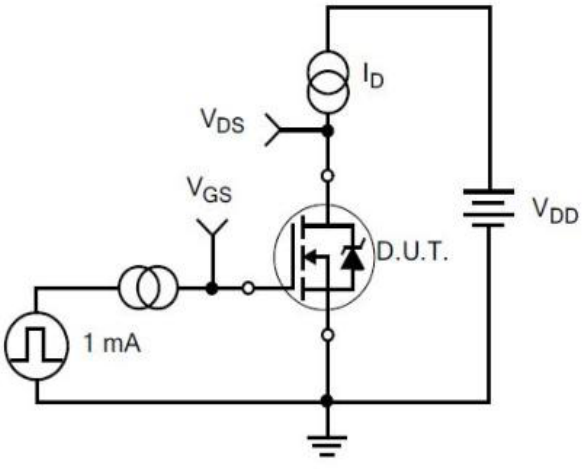


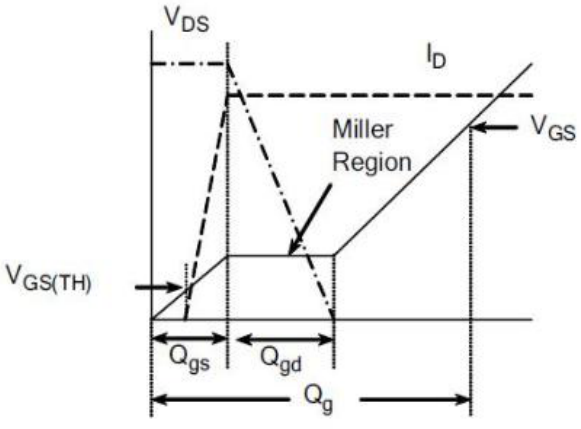
Figure 12. Maximum Transient Thermal Impedance 8N50F



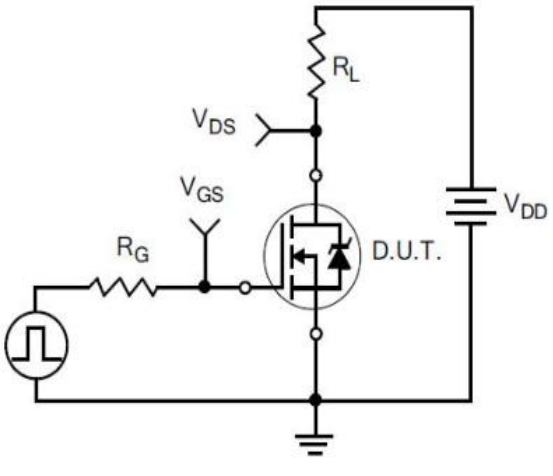
Typical Test Circuit



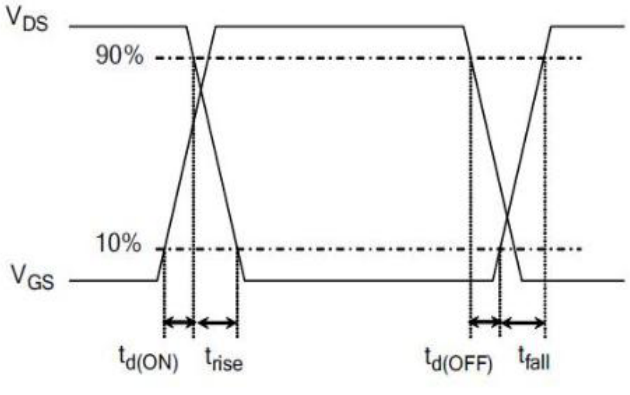
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

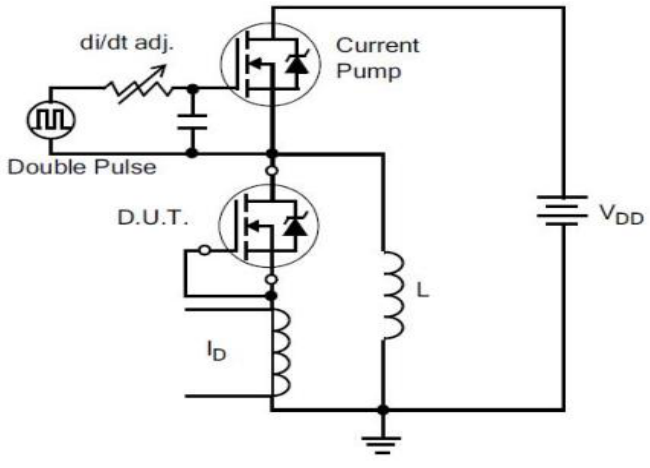


3) Resistive Switching Test Circuit

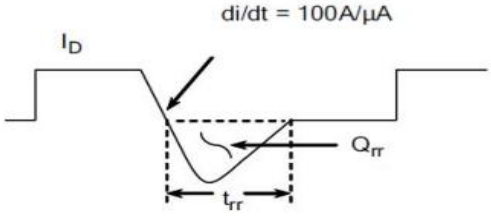


4) Resistive Switching Waveforms

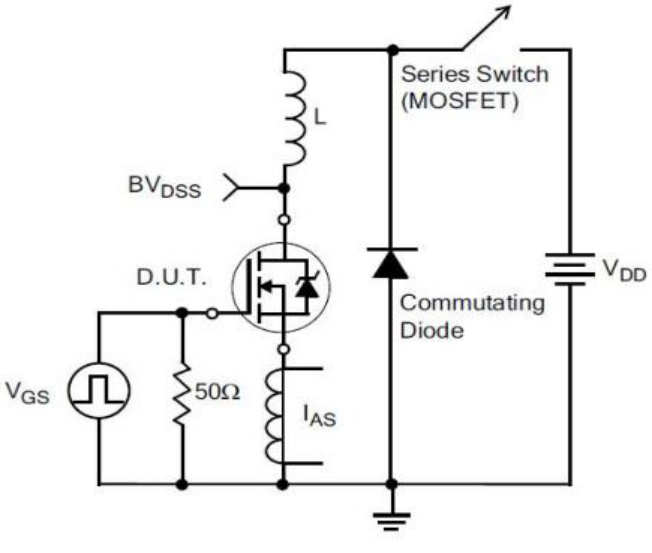
Typical Test Circuit



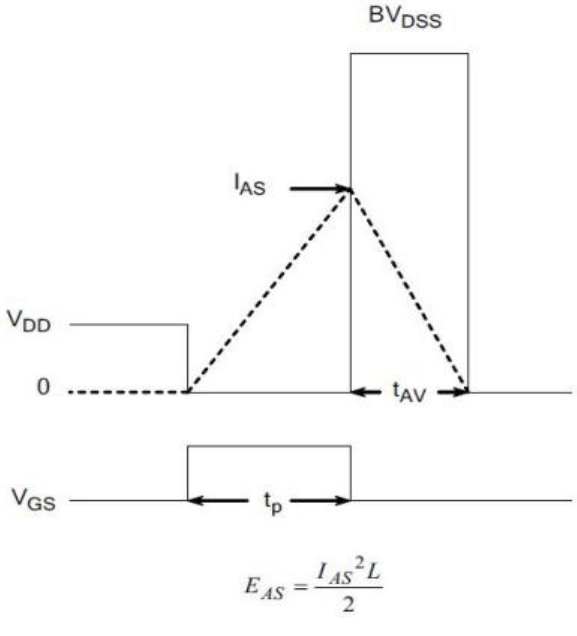
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



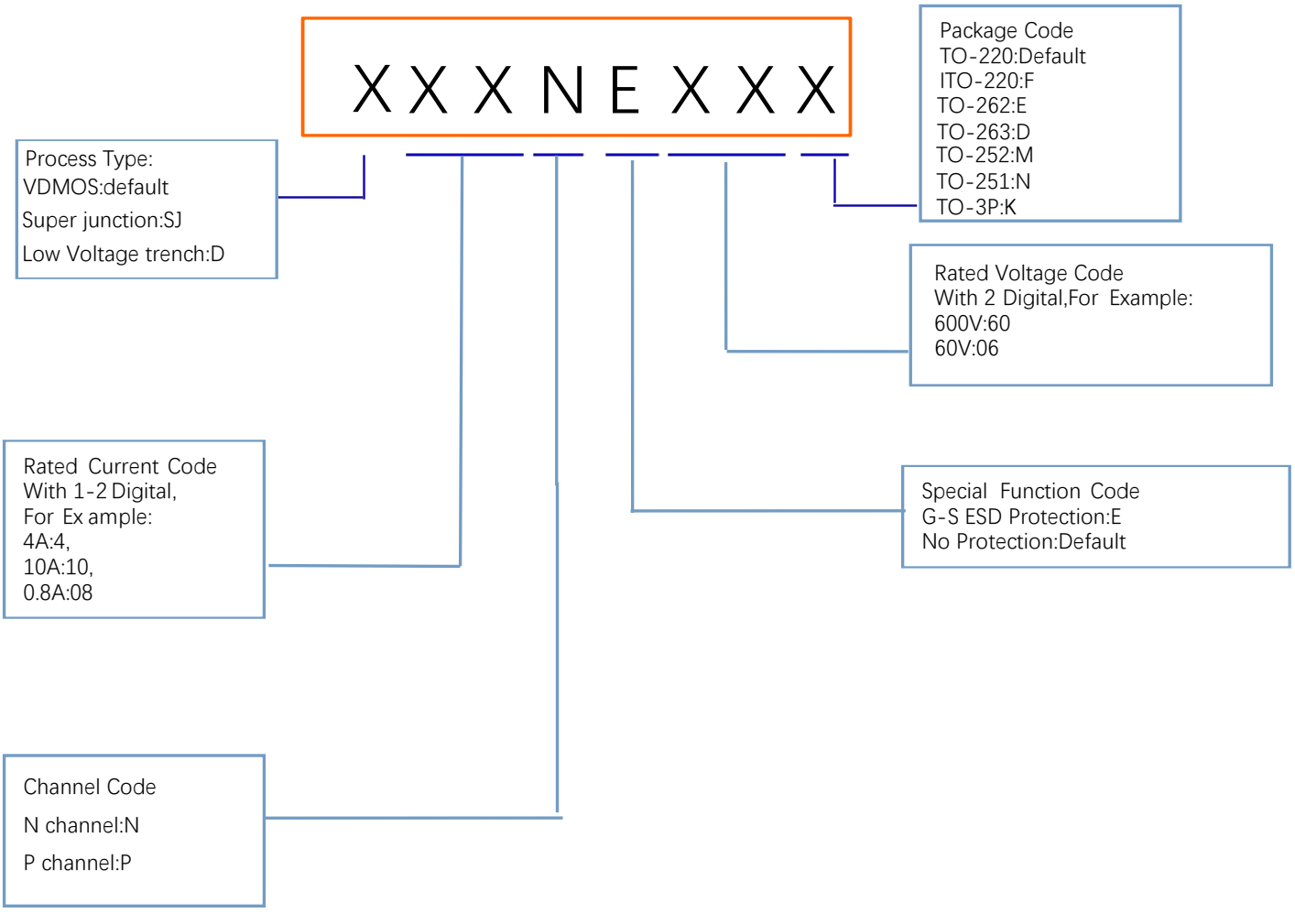
7) . Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

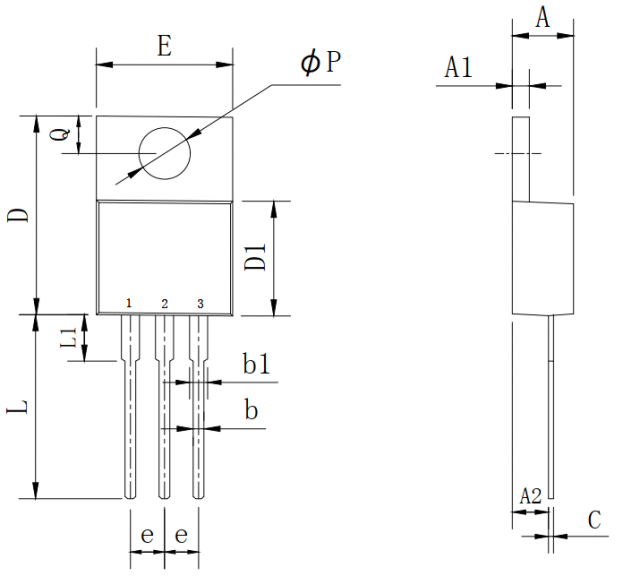
8) Unclamped Inductive Switching Waveforms

Product Names Rules



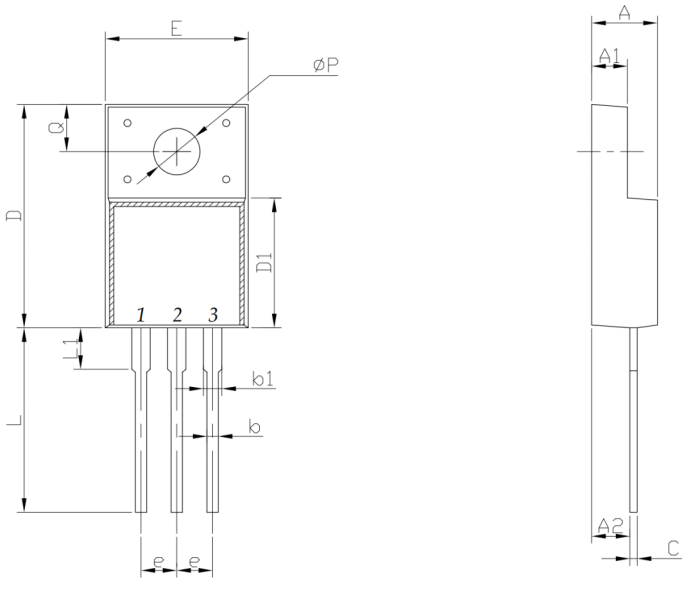
Dimensions

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

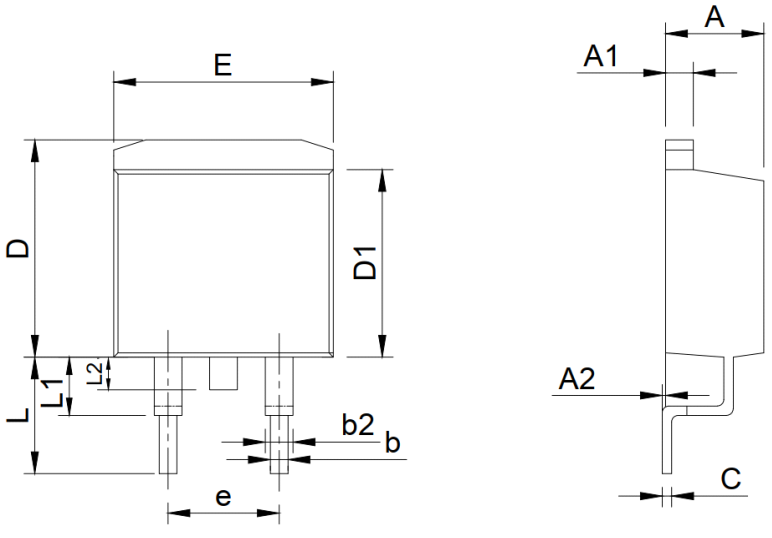
ITO-220 PACKAGE OUTLINE DIMENSIONS



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

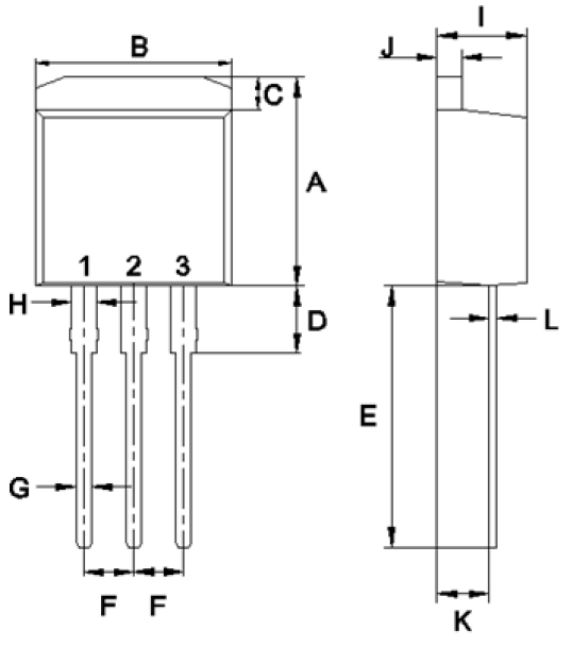
Dimensions

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

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 ofi ts 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's products are not authorized for use as critical components in life support devices or systems without express written approval of JH.