

General 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.

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

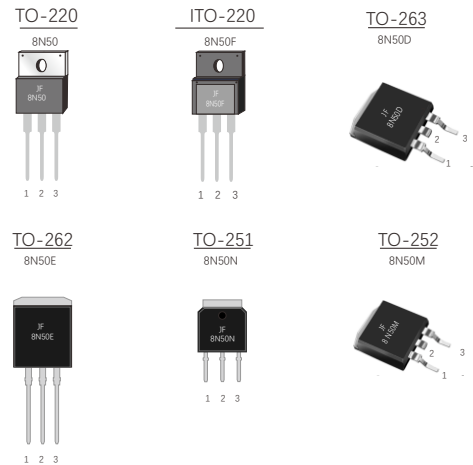
Application

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

Ordering Information

Part No.	Package Type	Package	Quantity(box)
8N50	TO-220	Tube	1000
8N50F	ITO-220	Tube	1000
8N50D	TO-263	Tape & Reel	800
8N50E	TO-262	Tube	1000
8N50N	TO-251	Tube	1000
8N50M	TO-252	Tape & Reel	3000

Product Summary			
V _{DS}	R _{DS(on)} (Ω)Typ	I _D (A)	Q _g (Typ)
500V	0.7 @ 10V,4A	8	18nc



Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

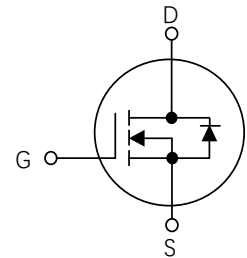


Table1 Absolute Maximum Ratings (T_c=25°C, unless otherwise specified)

Parameter	Symbol	8N50/8N50D/8N50E 8N50M/8N50N	8N50F	Unit
Drain-Source Voltage	V _{DS}	500		V
Gate-Source Voltage	V _{GS}	±30		V
Continuous Drain Current	I _D	T _c =25°C	8.0	8.0 *
		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 8N50M/8N50N	8N50F	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62.5	62.5	$^{\circ}\text{C}/\text{W}$
Thermal resistance Junction to Case	$R_{\theta JC}$	1.0	3.0	$^{\circ}\text{C}/\text{W}$

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}	$V_{GS}=0V, I_D=250\mu\text{A}$	500			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V$			25	μA
Gate-Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse				-100	nA
On Characteristics(Note 4)						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\text{mA}$	2		4	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4.0\text{A}$		0.70	0.80	Ω
Dynamic Characteristics(Note 5)						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$		1050		pF
Output Capacitance	C_{OSS}			105		pF
Reverse Transfer Capacitance	C_{RSS}			5.5		pF
Switching Characteristics (Note 5)						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=250V, I_D=8\text{A},$ $V_{GS}=10V, R_G=25\Omega$		15		ns
Turn-On Rise Time	t_r			38		ns
Turn-Off Delay Time	$t_{d(off)}$			46		ns
Turn-Off Fall Time	t_f	$V_{DS}=400V, I_D=8\text{A},$ $V_{GS}=10V$		33		ns
Total Gate Charge	Q_G			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}	$V_{GS}=0V, I_S=8\text{A}$			1.6	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				8	A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_F=8\text{A}$		44		ns
Reverse Recovery Charge	Q_{RR}	$di/dt=100\text{A}/\mu\text{s}$ (Note 1)		45		nC

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

2 $L=10\text{mH}, I_{AS}=8\text{A}, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

3 $I_{SD} \leq 8\text{A}, di/dt \leq 200\text{A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, 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

Figure 1. Output Characteristics

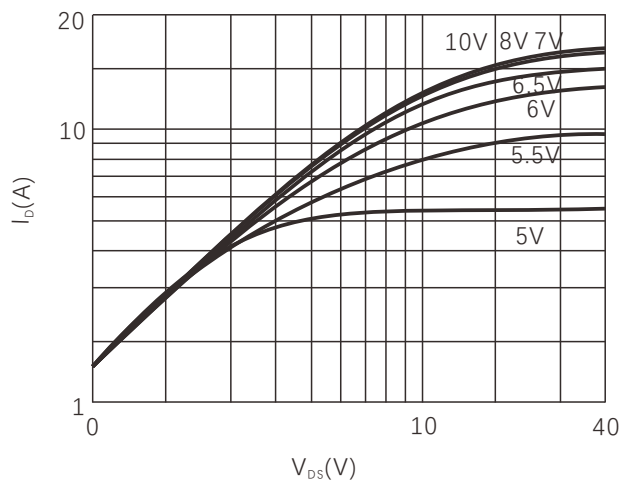


Figure 2. Normalized $R_{DS(on)}$ vs Temperature

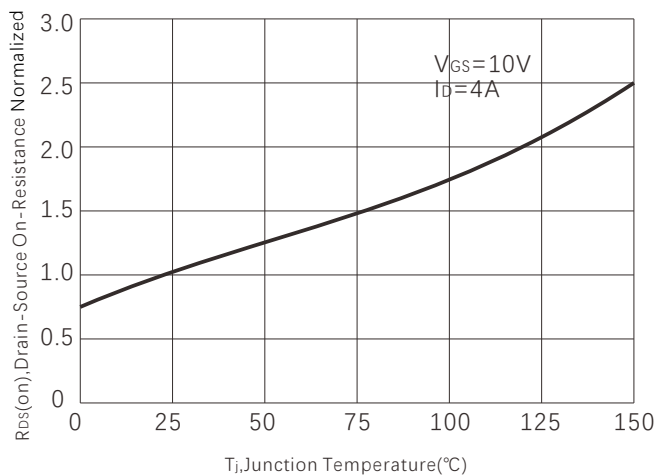


Figure 3. On-Resistance vs. Drain Current

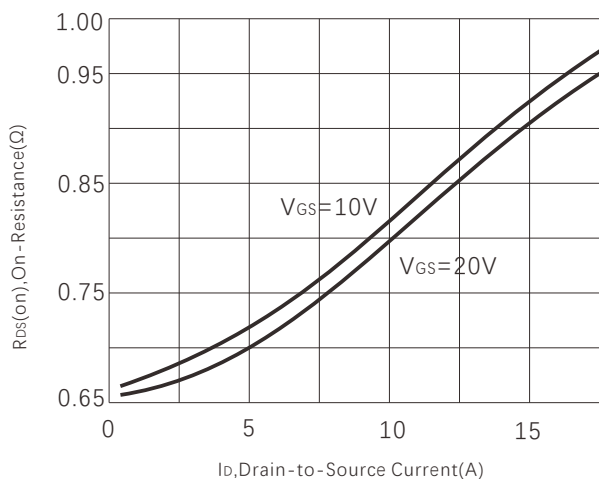


Figure 4. Capacitance

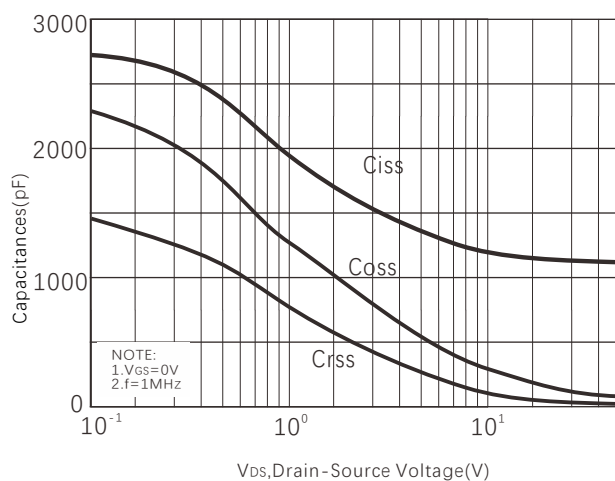


Figure 5. Gate charge

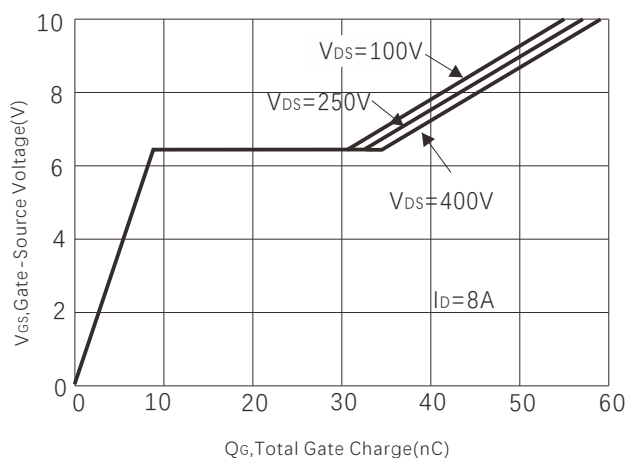
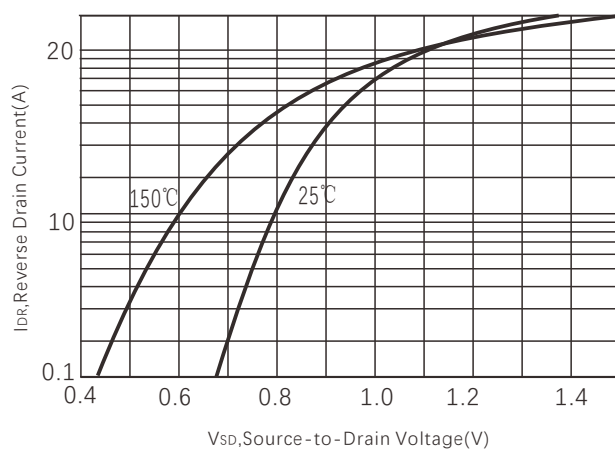


Figure 6. Source-Drain Diode Forward Voltage



Typical Characteristics Diagrams

Figure 7. Transfer Characteristics

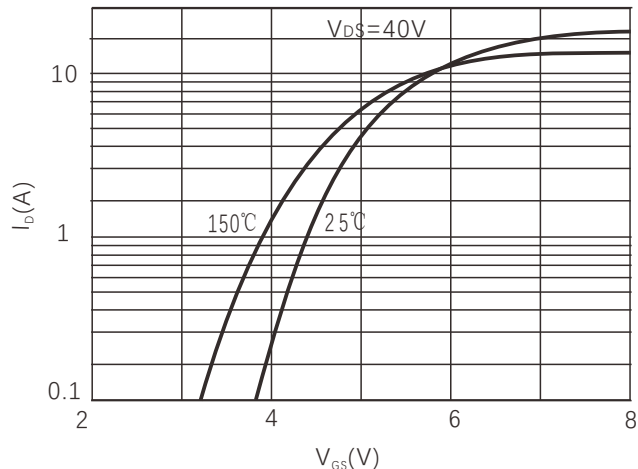


Figure 8. BVdss vs Temperature

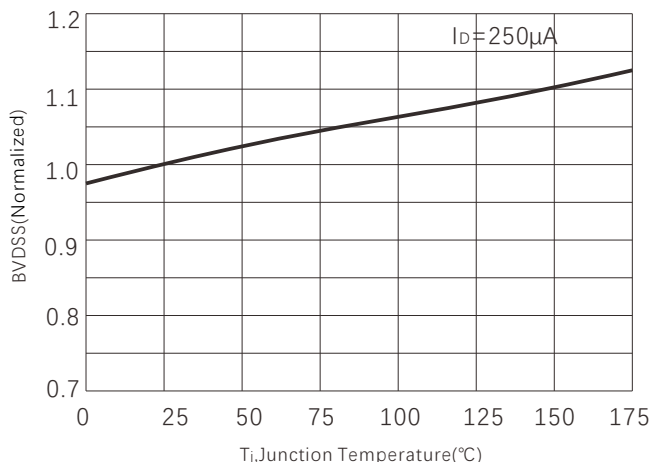


Figure 9. Safe operating area-8N50/D/N/E/M

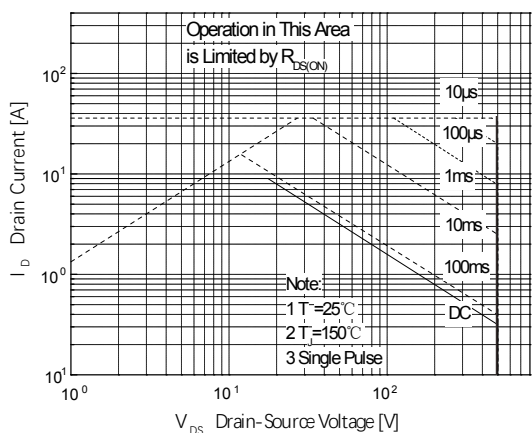


Figure 10. Safe operating area-8N50F

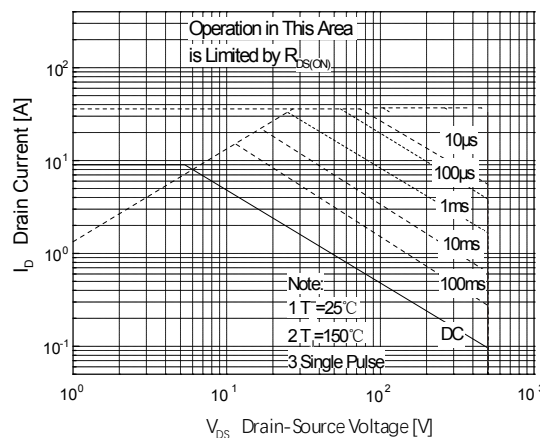


Figure 11. Maximum Transient Thermal Impedance 8N50/D/N/E/M

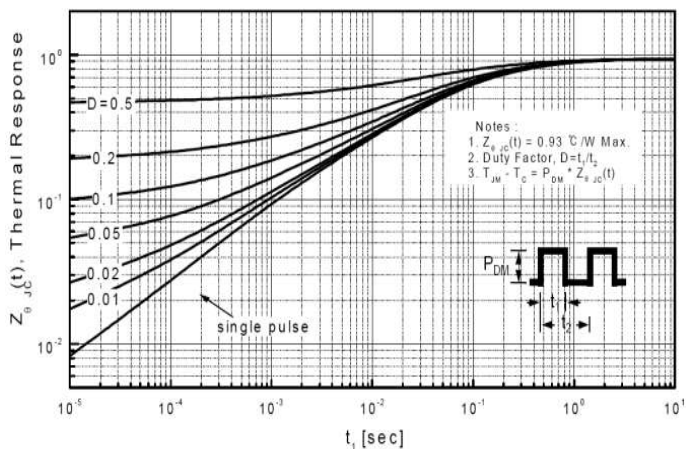
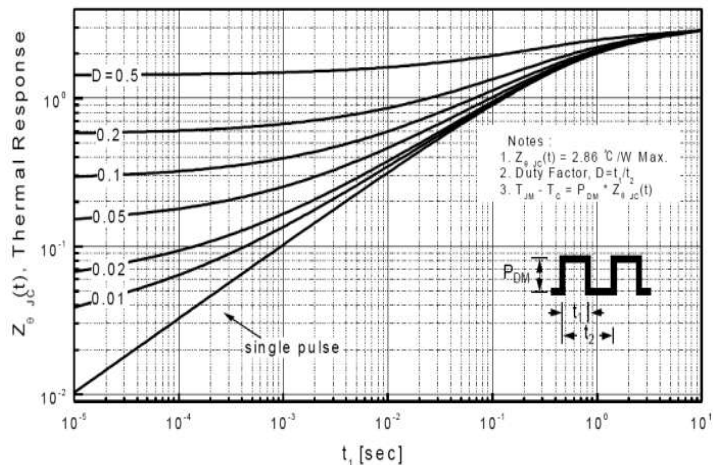
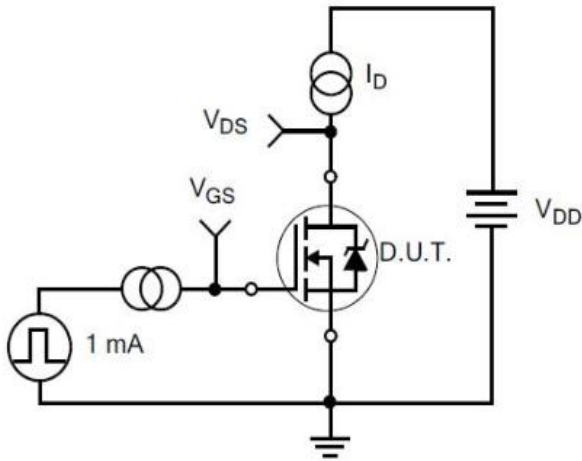


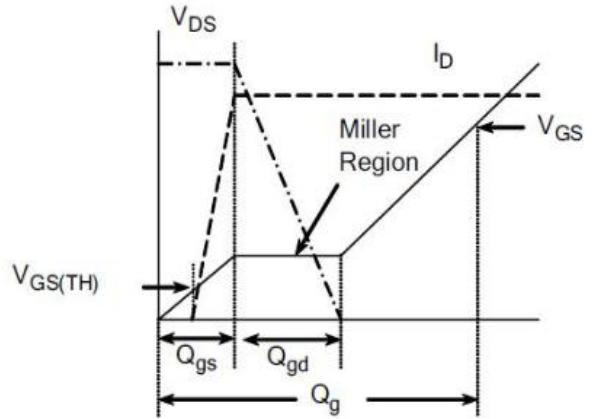
Figure 12. Maximum Transient Thermal Impedance 8N50F



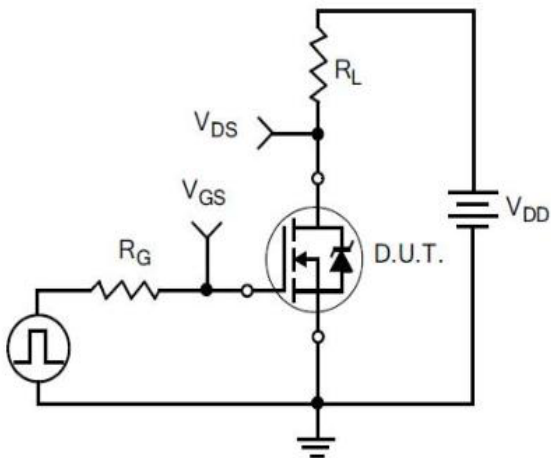
Typical Test Circuit



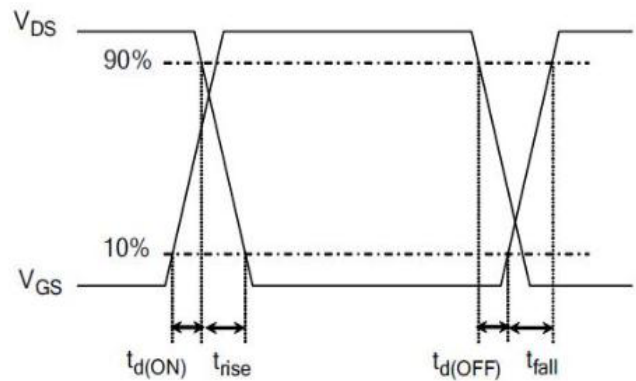
1) Gate Charge Test Circuit



2) Gate Charge Waveform

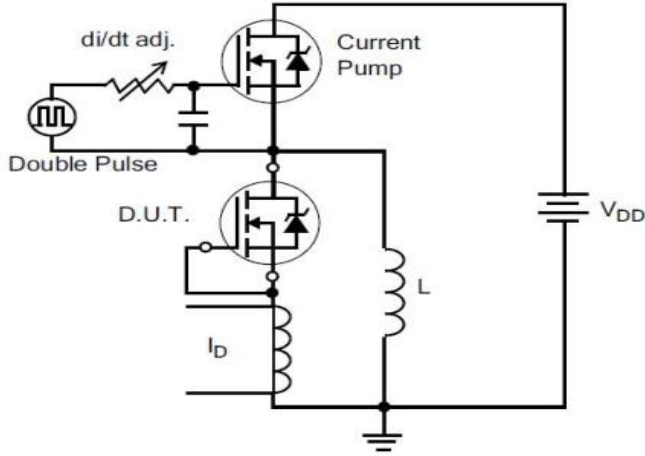


3) Resistive Switching Test Circuit

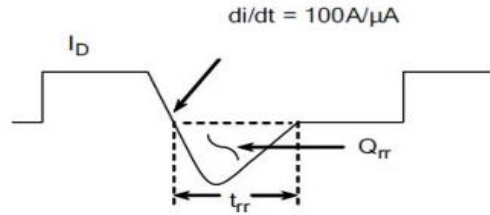


4) Resistive Switching Waveforms

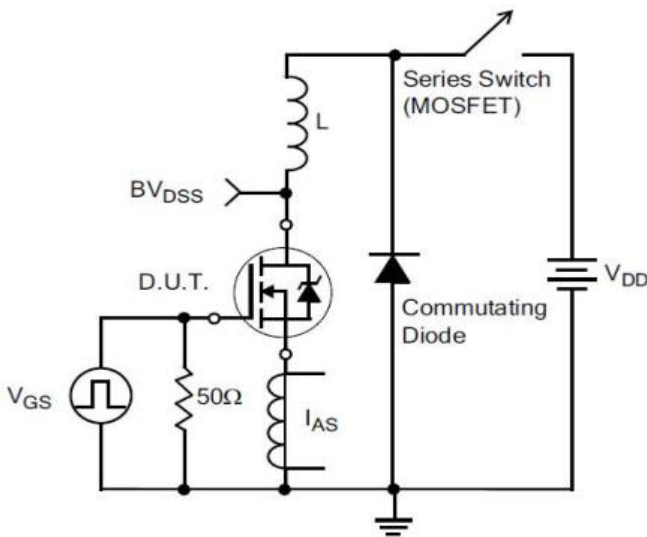
Typical Test Circuit



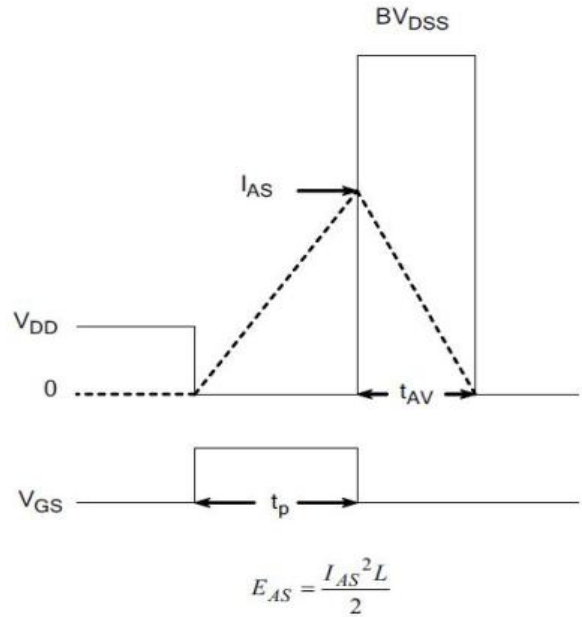
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

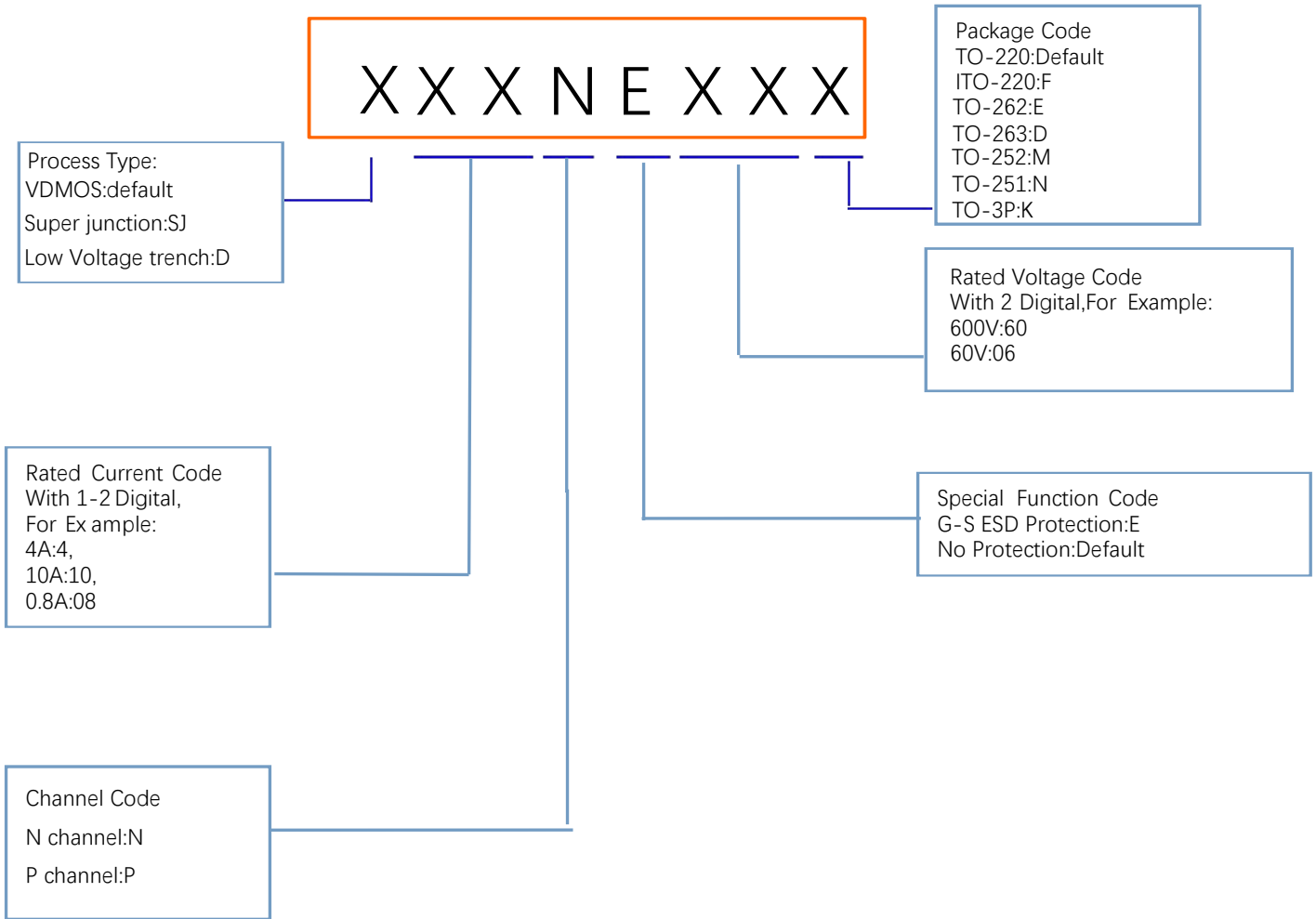


7) . Unclamped Inductive Switching Test Circuit



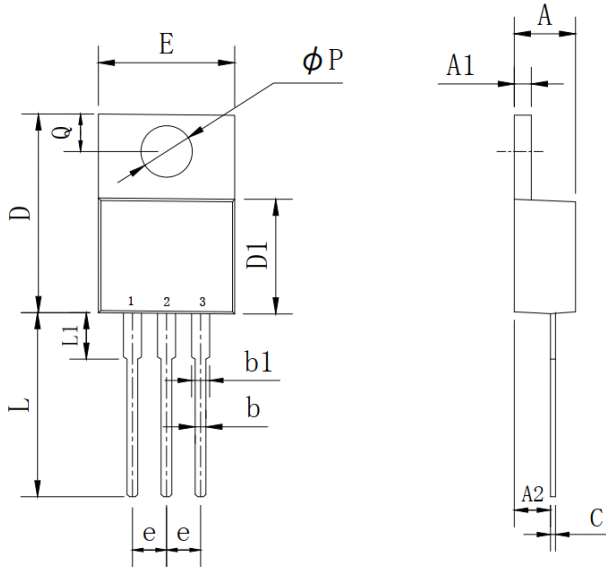
8) Unclamped Inductive Switching Waveforms

Product Names Rules



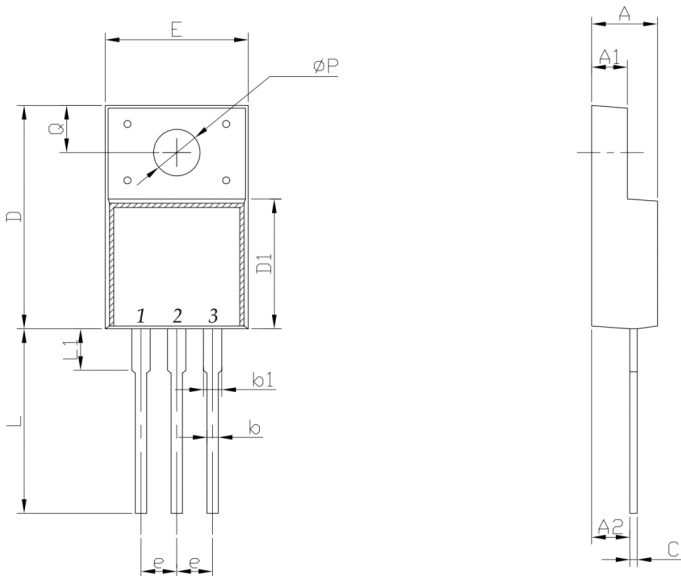
Dimensions

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

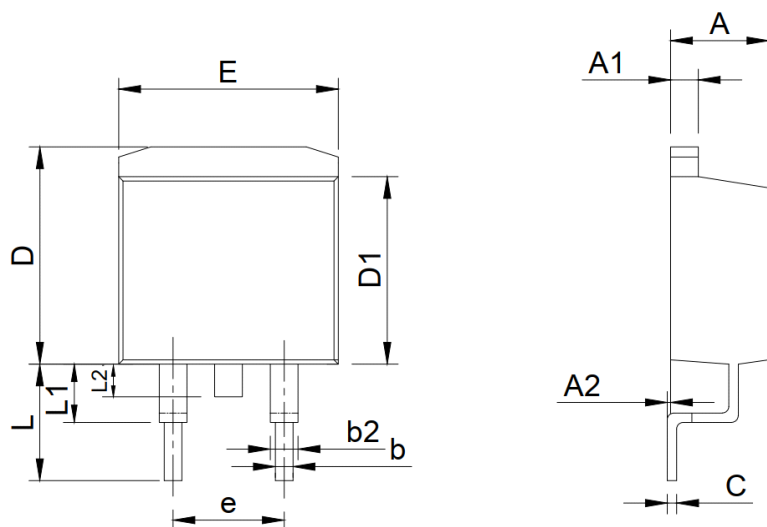
ITO-220 PACKAGE OUTLINE DIMENSIONS



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

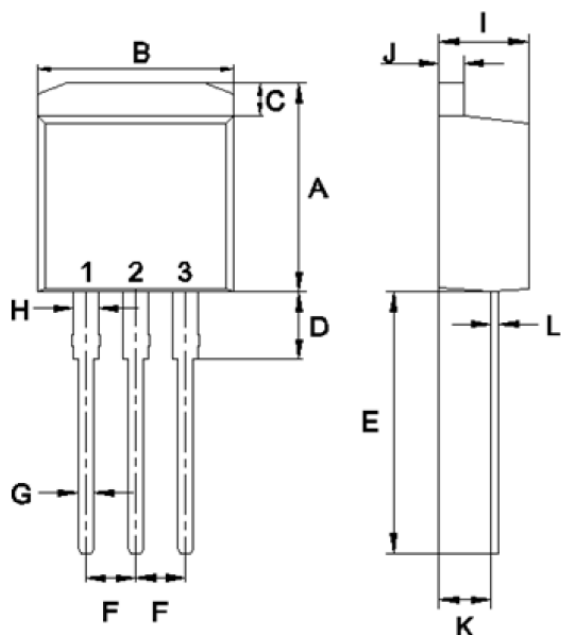
Dimensions

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

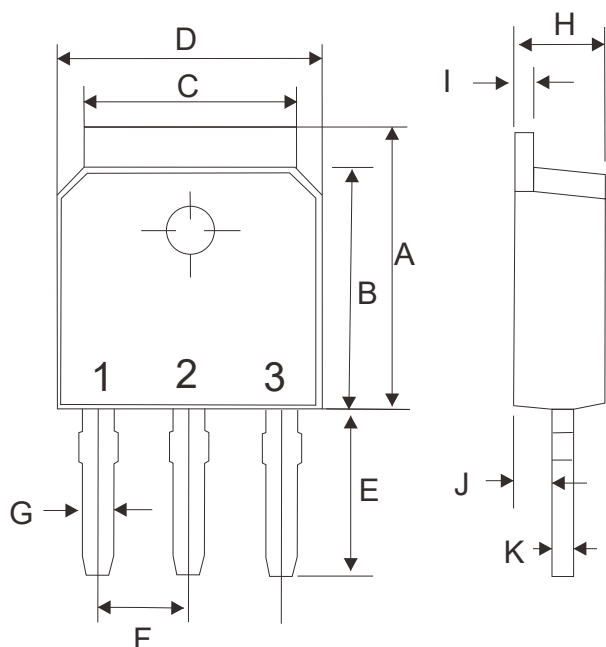
TO-262 PACKAGE OUTLINE DIMENSIONS



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

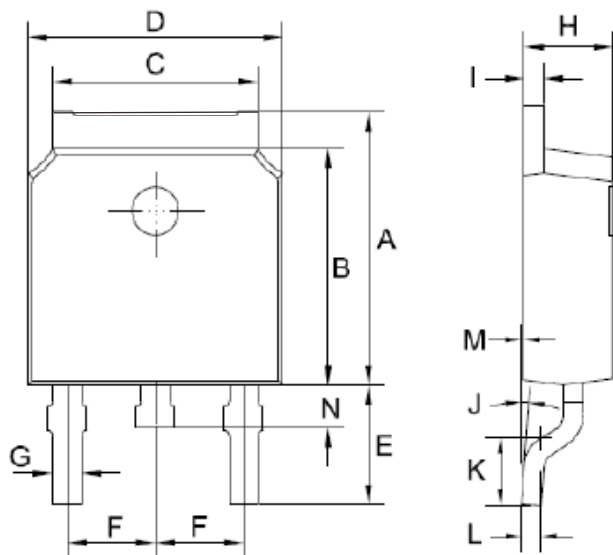
Dimensions

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	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

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	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

Friendship Reminder

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