SEMICONDUCTOR

D120N06-6M8 Series

120A 60V N-Channel Enhancement Mode Power MOSFET

Genaral Description

These N-channel enhancement mode power mosfets used advanced trench technology design, provided excellent Rdson and low gate charge. Which accords with the RoHS standard.

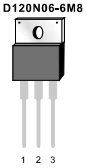
Product Summary			
V_{DS}	$R_{DS(on)}$ (mΩ) Typ	I_D (A)	Qg (Typ)
60V	6. 8@ 10V	120	80nc

Features

- Fast switching
- Low on-resistance
- Low gate charge
- 100% Single Pulse Avalanche Energy Test

TO-220

D120N06-6M8



TO-263

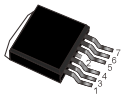
D120N06D-6M8

TO-252

D120N06M-6M8

TO-263-7L

D120N06D7-6M8



Mechanical Data

- Case:TO-220,TO-263-7L,TO-263,TO-252 Package

Ordering Information

Part No.	Package Type	Package	Quality(box)
D120N06-6M8	TO-220	Tube	1000
D120N06D7-6M8	TO-263-7L	Tape & Reel	800
D120N06D-6M8	TO-263	Tape & Reel	800
D120N06M-6M8	TO-252	Tape & Reel	3000

Pin Definition:

1. Gate
2. Drain

3/4/5/6/7. Source

Block Diagram

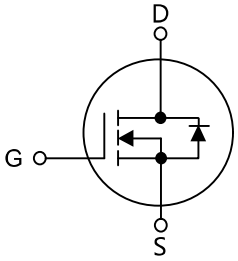


Table1 Absolute Maximum Ratings(T_C=25°C, unless otherwise specified)

Parameter		Symbol	TO-220/TO-263/TO-252/TO-263-7L	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	120	A
	T_C=100°C		75	
Pulsed Drain Current (Note 1)		I_{DM}	350	A
Single Pulse Avalanche Energy(Note 2)		E_{AS}	600	mJ
Power Dissipation T_C=25°C		P_D	230	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55 ~ +175	°C
Maximum Temperature for soldering		T_L	300	°C

Table 2.Thermal Characteristics

Parameter	Symbol	TO-220/TO-263/TO-252/TO-263-7L	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	75	°C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	0. 65	°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	60	--	--	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V,V_{GS}=0V	--	--	1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V,V_{DS}=0V	--	--	100	nA
	Reverse		V_{GS}=-20V,V_{DS}=0V	--	--	-100	nA
On Characteristics(Note 4)							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250μA	2.0	2.8	4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=62A	--	6.8	8.0	mΩ
Dynamic Characteristics(Note 5)							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1MHz	--	4100	--	pF
Output Capacitance		C_{OSS}		--	323	--	pF
Reverse Transfer Capacitance		C_{RSS}		--	242	--	pF
Switching Characteristics (Note 5)							
Turn-On Delay Time		td(on)	V_{DD}=30V,I_D=30A, V_{GS}=10V,R_{GEN}=6.0Ω	--	25	--	ns
Turn-On Rise Time		t_R		--	93	--	ns
Turn-Off Delay Time		td(off)		--	74	--	ns
Turn-Off Fall Time		tf		--	70	--	ns
Total Gate Charge		Q_G	V_{DS}=30V,I_D=75A, V_{GS}=10V	--	80	--	nC
Gate-Source Charge		Q_{GS}		--	126	--	nC
Gate-Drain Charge		Q_{GD}		--	23	--	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Volatage		V_{SD}	V_{GS}=0V, I_S=75A	--	--	1.3	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		--	--	120	A
Reverse Recovery Time		trr	V_{GS}=0V, I_F=75A dI$_F$/dt=100A/μs (Note 1)	--	34	--	ns
Reverse Recovery Charge		Q_{RR}		--	100	--	nC

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 L=0.5mH, I_D=50A,V_{DD}=50V,V_G=10V,Starting T_J=25°C
3 The data is theoretically the same as ID, in real applications , should be limited by total power dissipation.
4 Pulse Test: Pulse width ≤300μS,Duty cycle≤2%
5 Guaranteed by design,not subject to production

Typical characteristics diagrams

Fig1 Output Characteristics

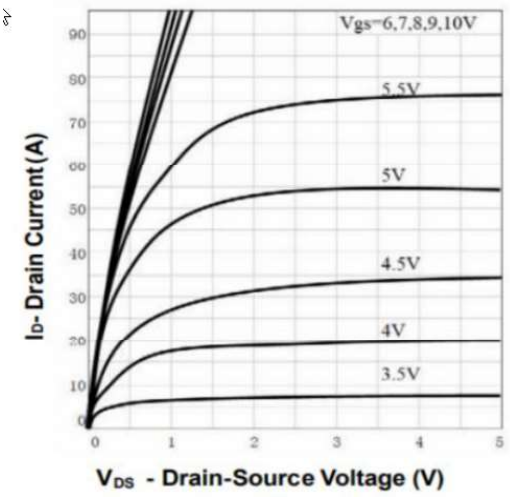


Fig2 Drain Current vs temperature

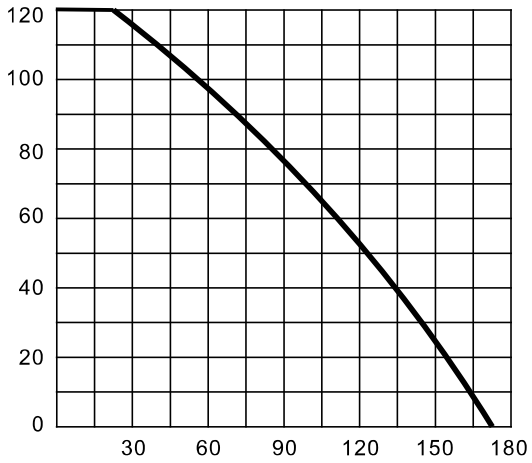


Fig3 BVDSS vs Junction Temperature

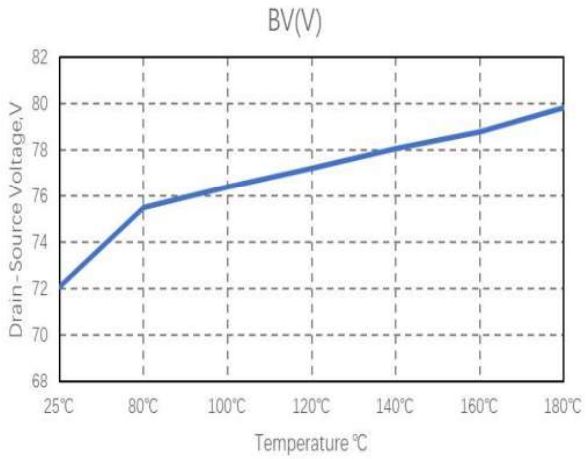


Fig4 Rds(on) vs Junction Temperature

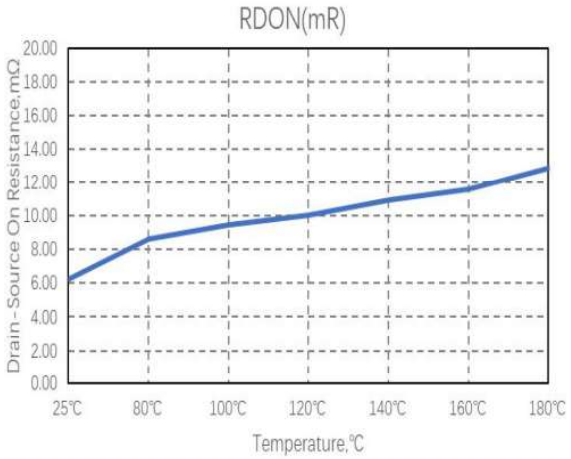


Fig5 $V_{GS(th)}$ vs Junction Temperature

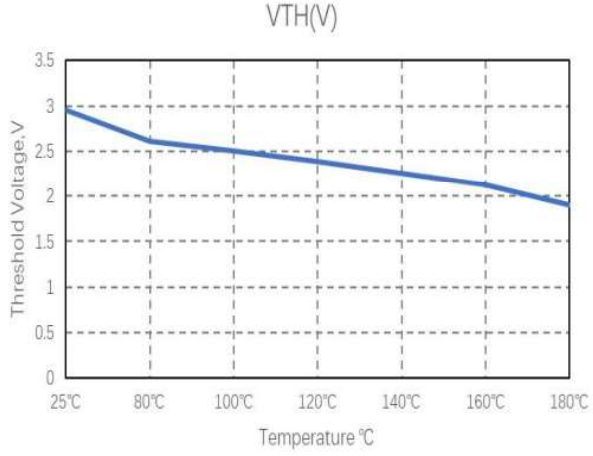
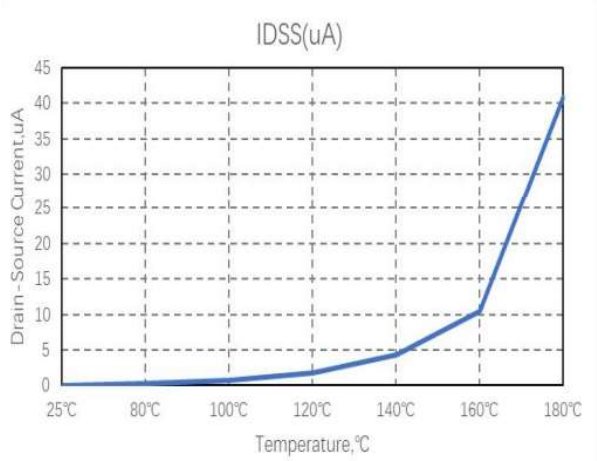


Fig6 I_{DSS} vs Junction Temperature



Typical characteristics diagrams

Fig7 Capacitances vs Vds

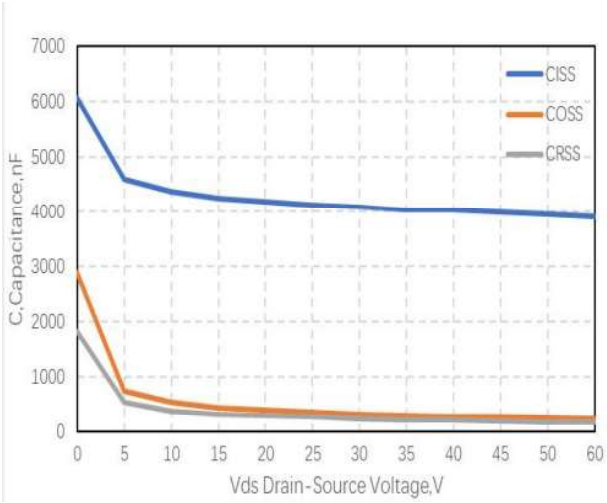


Fig8 Gate Charge

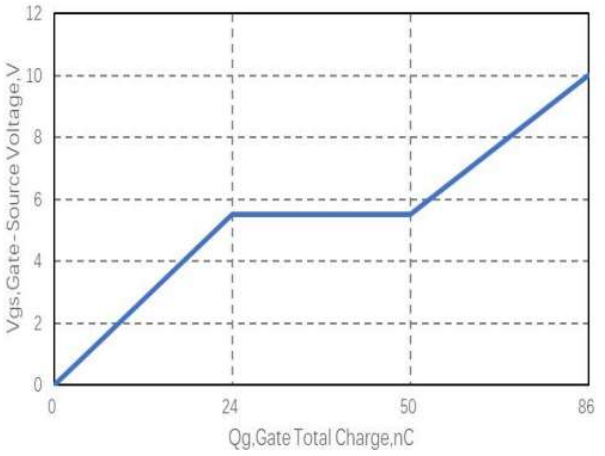


Fig9 Power Dissipation

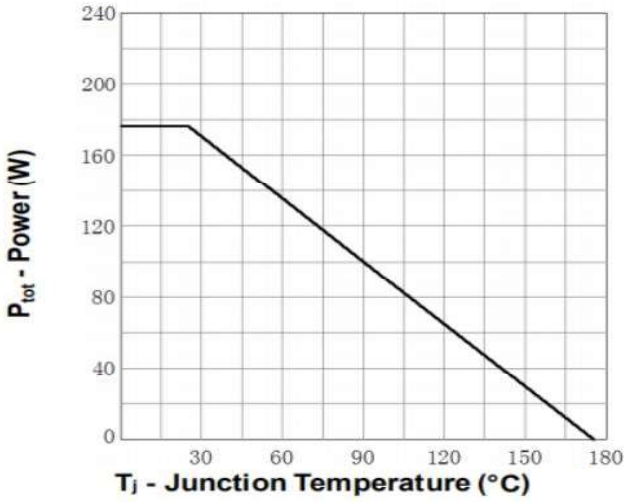


Fig10 Drain-Source On Resistance

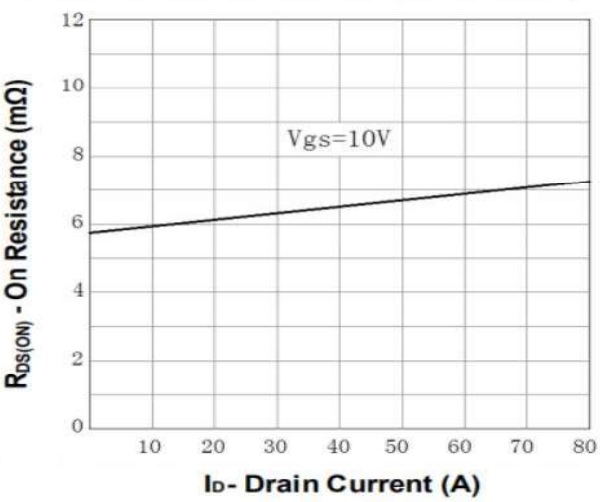


Fig11 Safe Operation Area

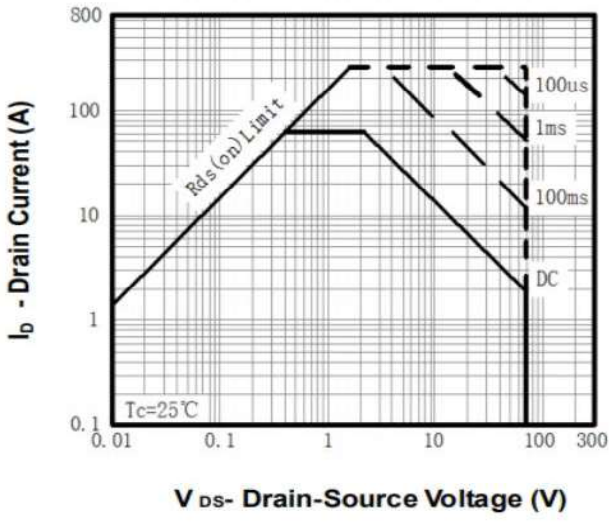
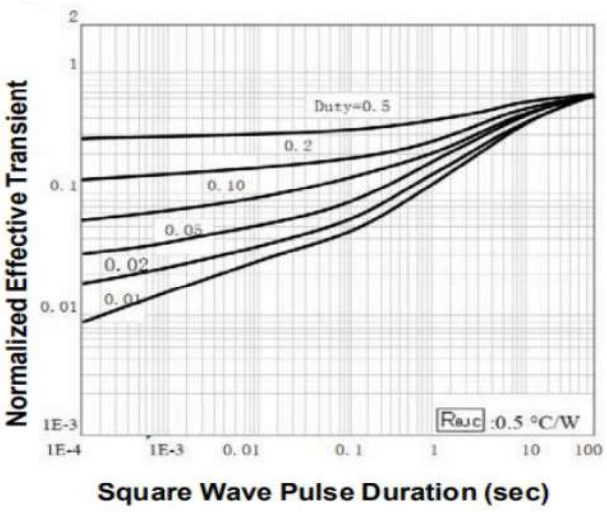
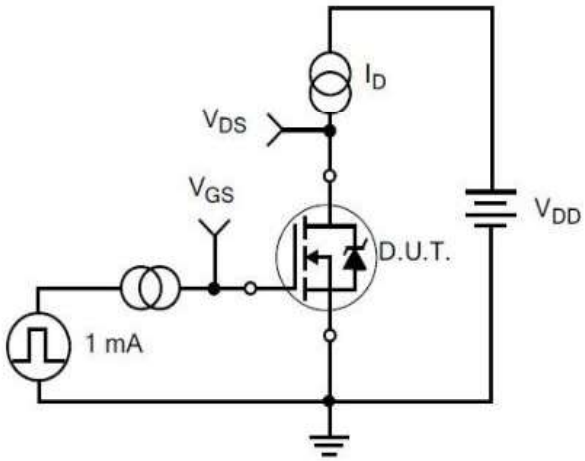


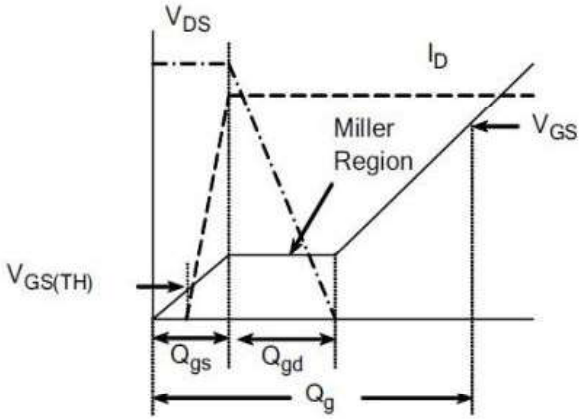
Fig12 Thermal Transient Impedance



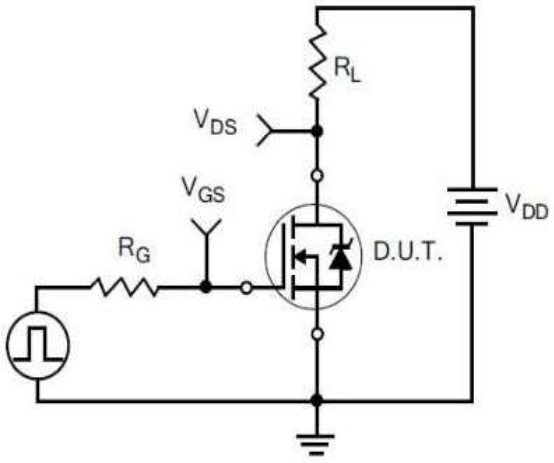
Typical Test Circuit



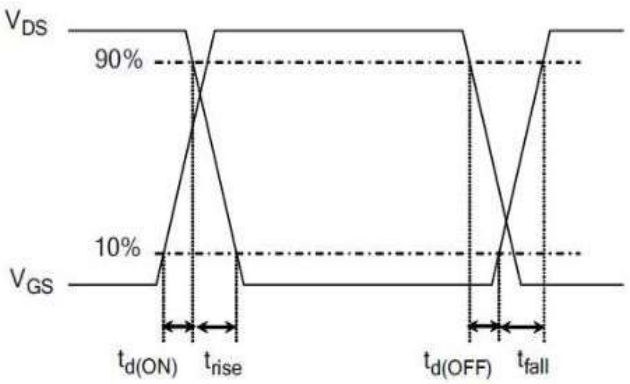
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

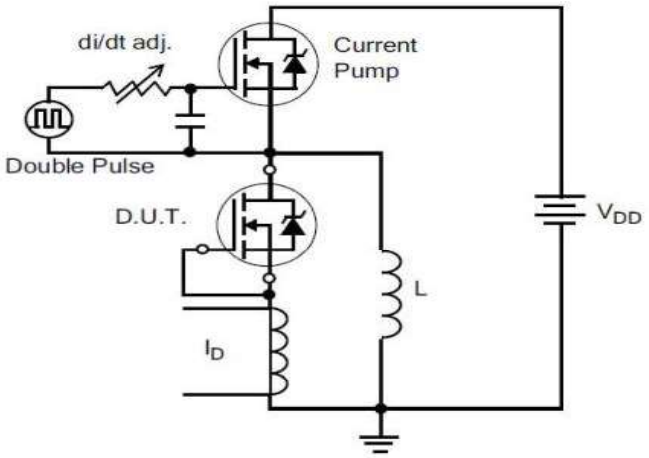


3) Resistive Switching Test Circuit

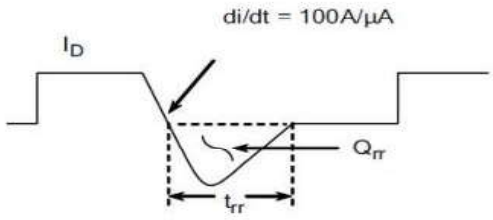


4) Resistive Switching Waveforms

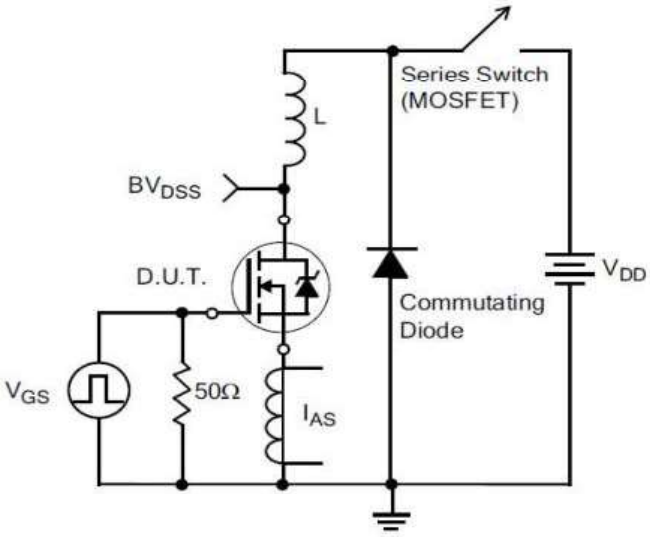
Typical Test Circuit



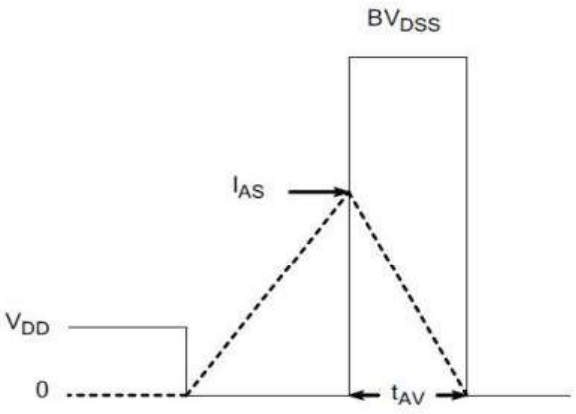
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



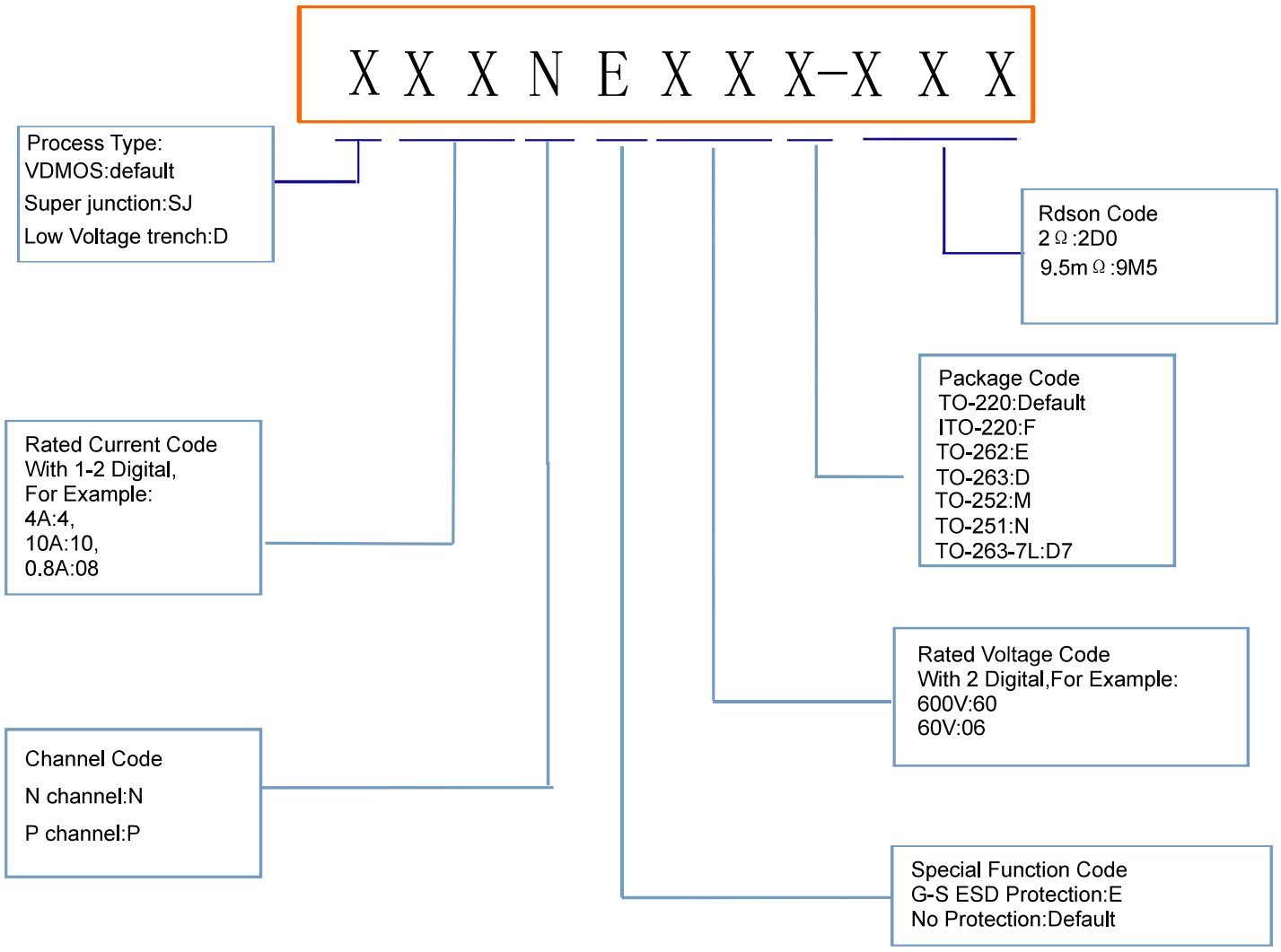
7) . Unclamped Inductive Switching Test Circuit



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

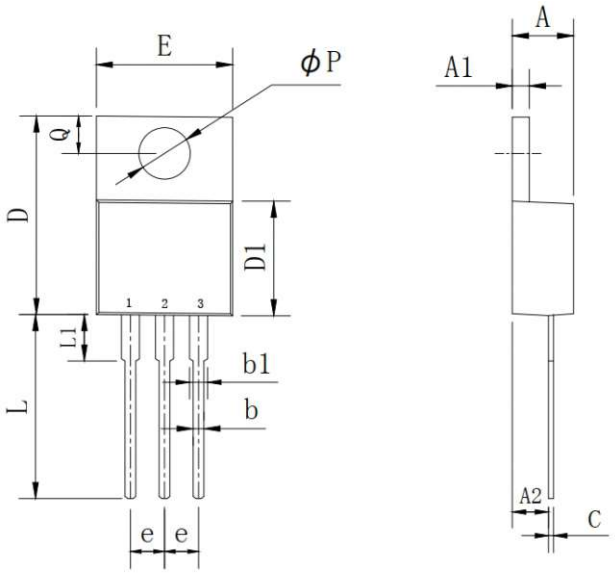
8) Unclamped Inductive Switching Waveforms

Product Names Rules



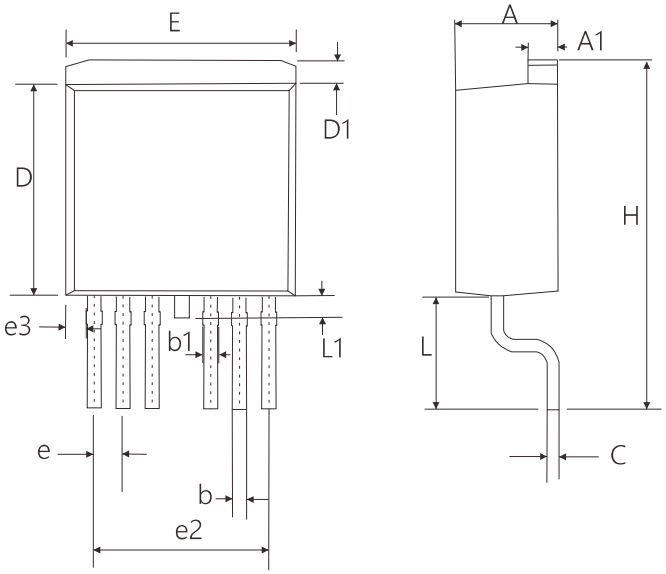
Dimensions

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

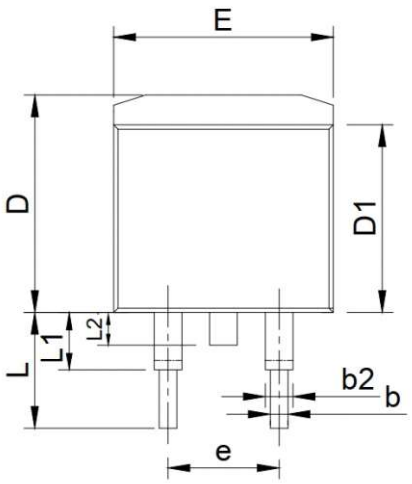
TO-263-7L PACKAGE OUTLINE DIMENSIONS

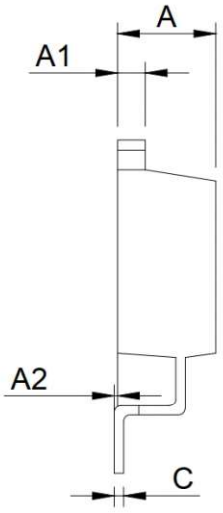


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.75	0.167	0.187
A1	1.2	1.4	0.047	0.055
b	0.5	0.7	0.020	0.028
b1	0.5	0.9	0.020	0.035
C	0.4	0.6	0.016	0.024
D	9.05	9.45	0.356	0.372
D1	0.7	1.3	0.028	0.051
E	9.8	10.2	0.386	0.402
e	1.07	1.47	0.042	0.058
e2	7.32	7.92	0.288	0.312
e3	0.64	1.04	0.025	0.041
H	14.65	15.65	0.577	0.616
L	4.47	5.47	0.176	0.215
L1	0.90	1.50	0.035	0.059

Dimensions

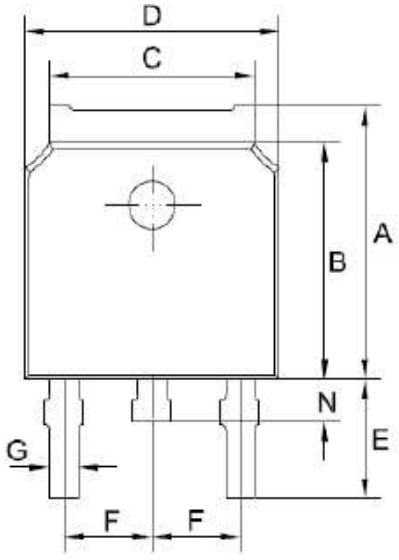
TO-263 PACKAGE OUTLINE DIMENSIONS

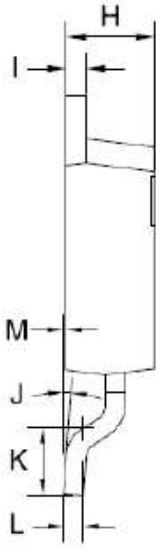




Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	0	0.25	0.000	0.010
b	0.61	1.01	0.024	0.040
b1	1.2	1.34	0.047	0.053
C	0.3	0.6	0.012	0.024
D	9.48	10.84	0.373	0.427
D1	8.49	9.3	0.334	0.366
E	9.7	10.31	0.382	0.406
e	4.88	5.28	0.192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

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.