SEMICONDUCTOR

30N20

30A 200V Silicon N-Channel Power MOSFET

Genaral Description

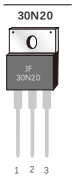
The 30N20 uses advanced technology and design to provide excellent $R_{DS(ON)}$. It can be used in a wide variety of applications.

Product Summary			
V_{DS}	$R_{DS(on)}$ Typ.	I_D	Qg(Typ)
200V	0.082Ω @ 10V,15A	30A	41nc

Features

- Low on-resistance
- Low reverse transfer capacitance
- 100% avalanche tested

TO-220



Mechanical Data

- Case:TO-220 Package

Application

- Power switching application
- Adapter and charger

Ordering Information

Part No.	Package Type	Package	Quality(box)
30N20	TO-220	Tube	1000

Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

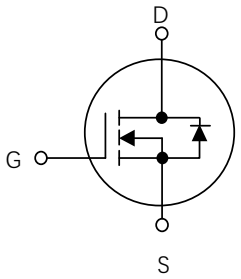


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current T_C=25°C	I_D	30	A
Pulsed Drain Current (Note 1)	I_{DM}	120	A
Single Pulse Avalanche Energy(Note 2)	E_{AS}	160	mJ
Power Dissipation T_C=25°C	P_D	140	W
Operating Junction and Storage Temperature	T_J/T_{STG}	-55~+175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	Typ.	Unit
Thermal resistance Junction to Case	$R_{\theta JC}$	1.07	°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	200	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=200V,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 3)							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250μA	2.0	-	4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=15A	-	0.082	0.095	Ω
Dynamic Characteristics(Note 4)							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1MHz	-	2200	-	pF
Output Capacitance		C_{OSS}		-	275	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	16	-	pF
Switching Characteristics (Note 4)							
Turn-On Delay Time		td(on)	V_{DD}=100V ,I_D=30A R_G=6.2Ω,R_L=3.2Ω	-		-	ns
Turn-On Rise Time		t_R		-		-	ns
Turn-Off Delay Time		td(off)		-		-	ns
Turn-Off Fall Time		tf		-		-	ns
Total Gate Charge		Q_G	V_{DS}=160V,I_D=15A, V_{GS}=10V	-	-	41	nC
Gate-Source Charge		Q_{GS}		-	-	10	nC
Gate-Drain Charge		Q_{GD}		-	-	12	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_S=30A	-	-	1.25	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		-	-	30	A
Reverse Recovery Time		trr	V_{GS}=0V, I_F=30A dI$_F$/dt=100A/μs(Note 4)	-	170	-	ns
Reverse Recovery Charge		Q_{RR}		-	1.1	-	μC

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 V_{DD}=50V,starting T_J=25°C,L=0.5mH, Rg=25Ω, I_{AS}=25A
3 Pulse Test: Pulse width≤300μS,Duty cycle≤2%
4 Guaranteedby design,not subject to production

Typical Characteristics Diagrams

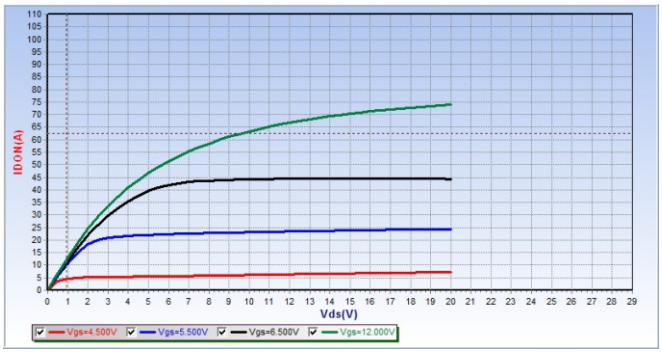


Fig1. Output Characteristics

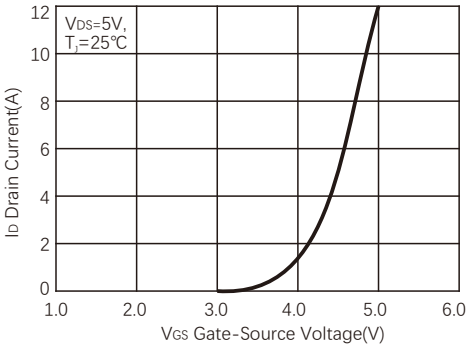


Fig2. Transfer Characteristics

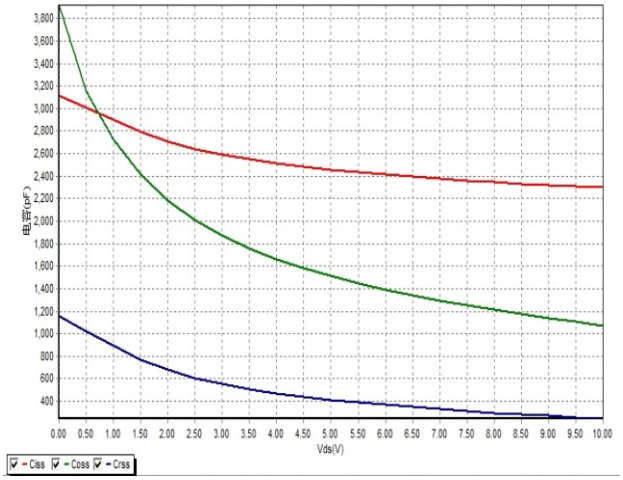


Fig3. Capacitance Characteristics

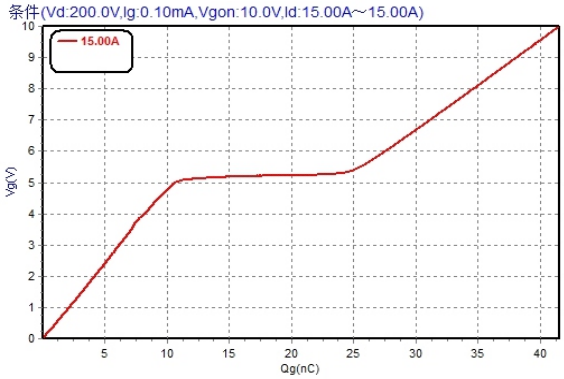


Fig4. Gate Charge

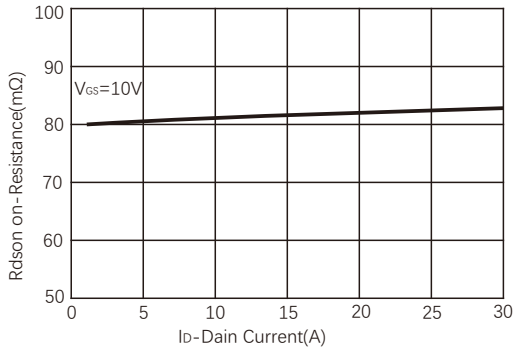


Fig5. Drain-Source on Resistance

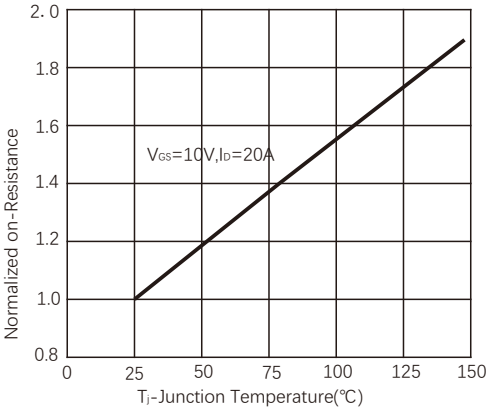


Fig6. Drain-Source on Resistance

Typical Characteristics Diagrams

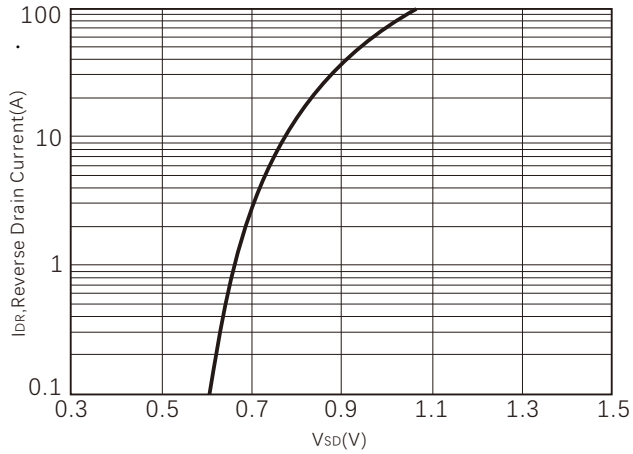


Fig 7.Source-Drain Diode Forward Voltage

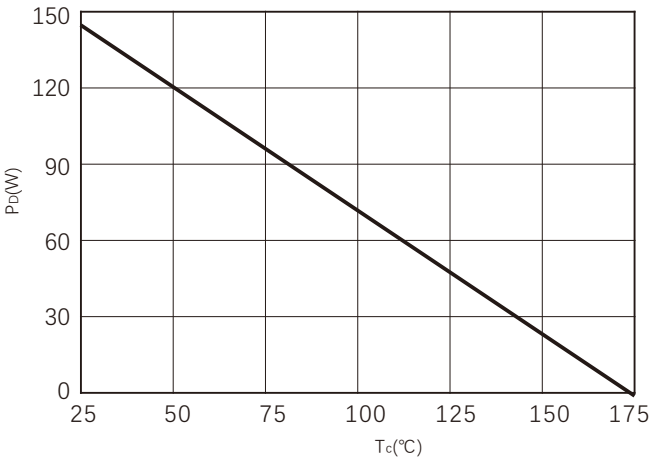


Fig.8 Power dissipation

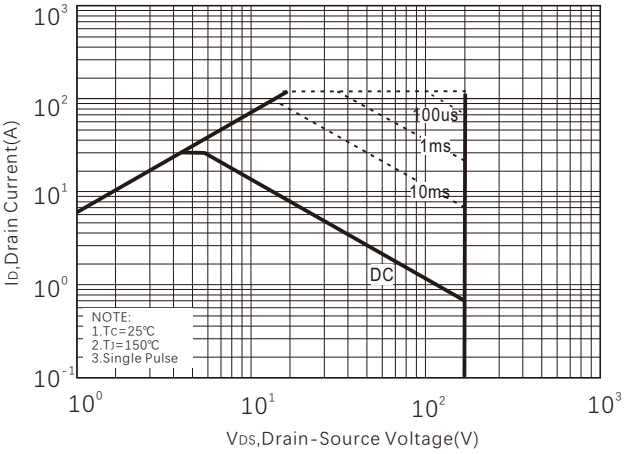


Fig9. Safe operating area

Fig10.Normalized Maximum Transient Thermal Impedance

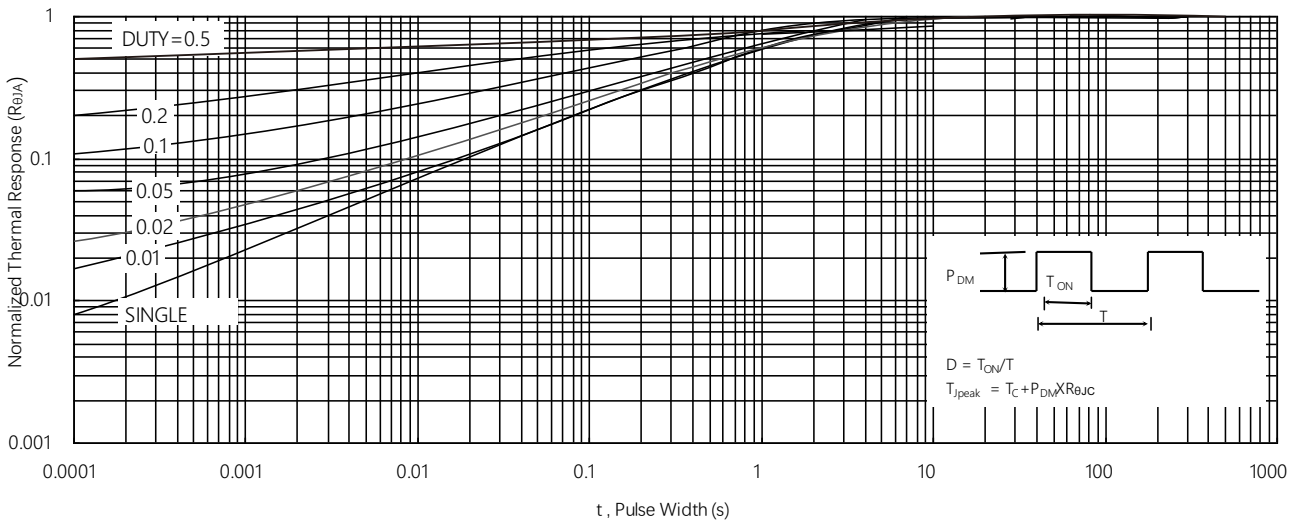
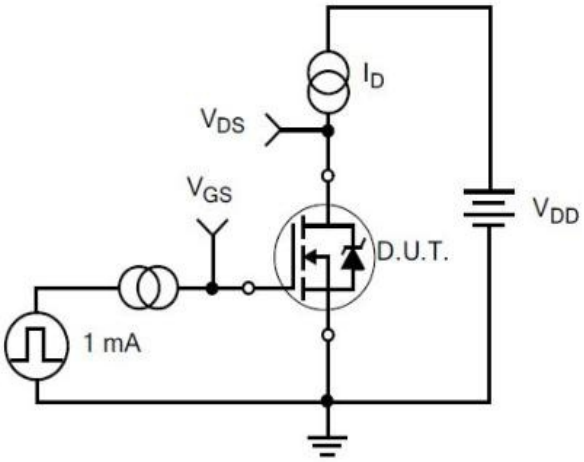
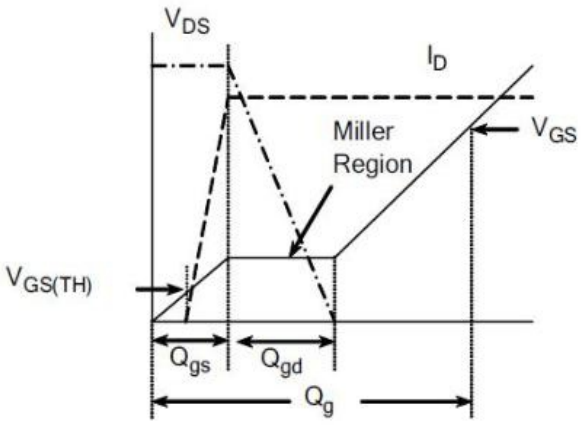


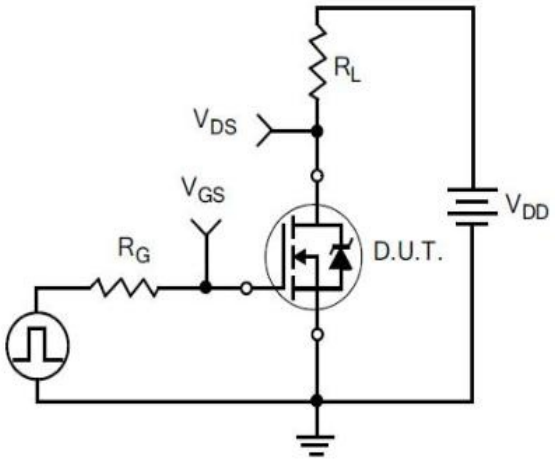
Fig.11 Typical Test Circuit



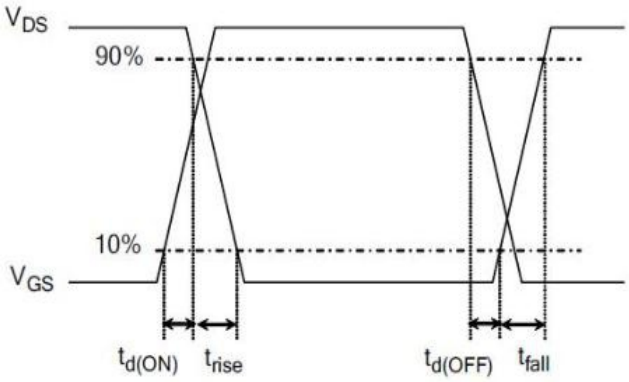
1) Gate Charge Test Circuit



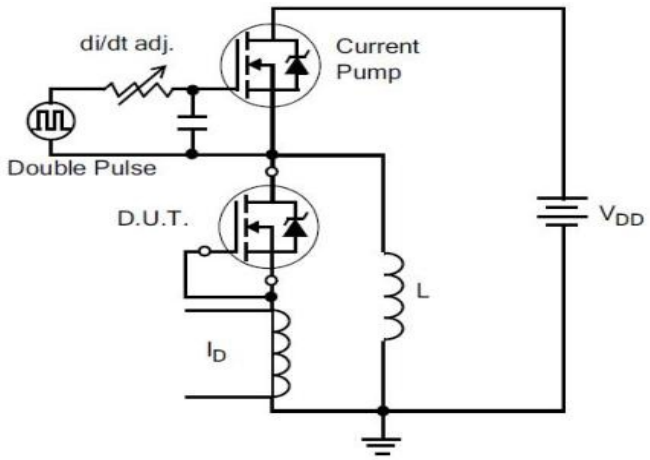
2) . Gate Charge Waveform



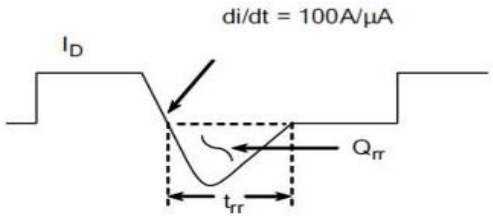
3) Resistive Switching Test Circuit



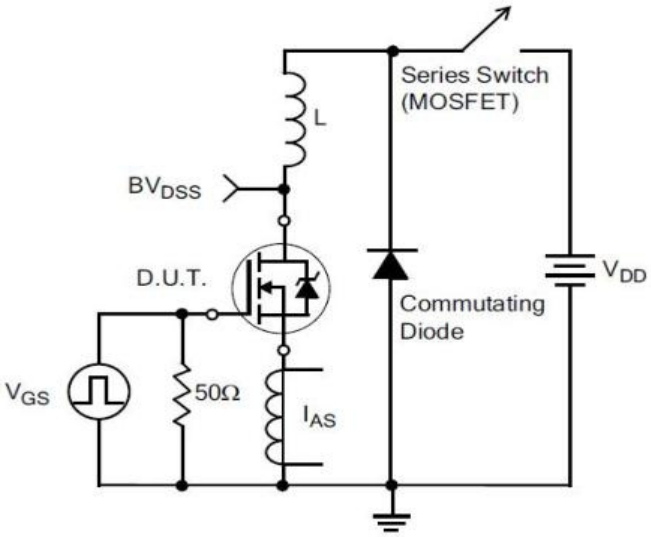
4) Resistive Switching Waveforms



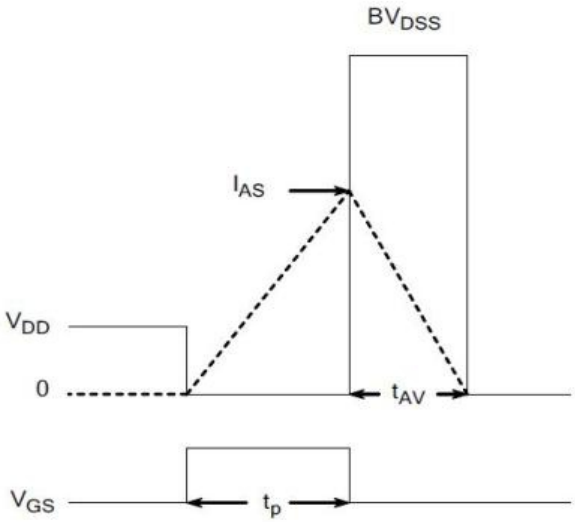
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



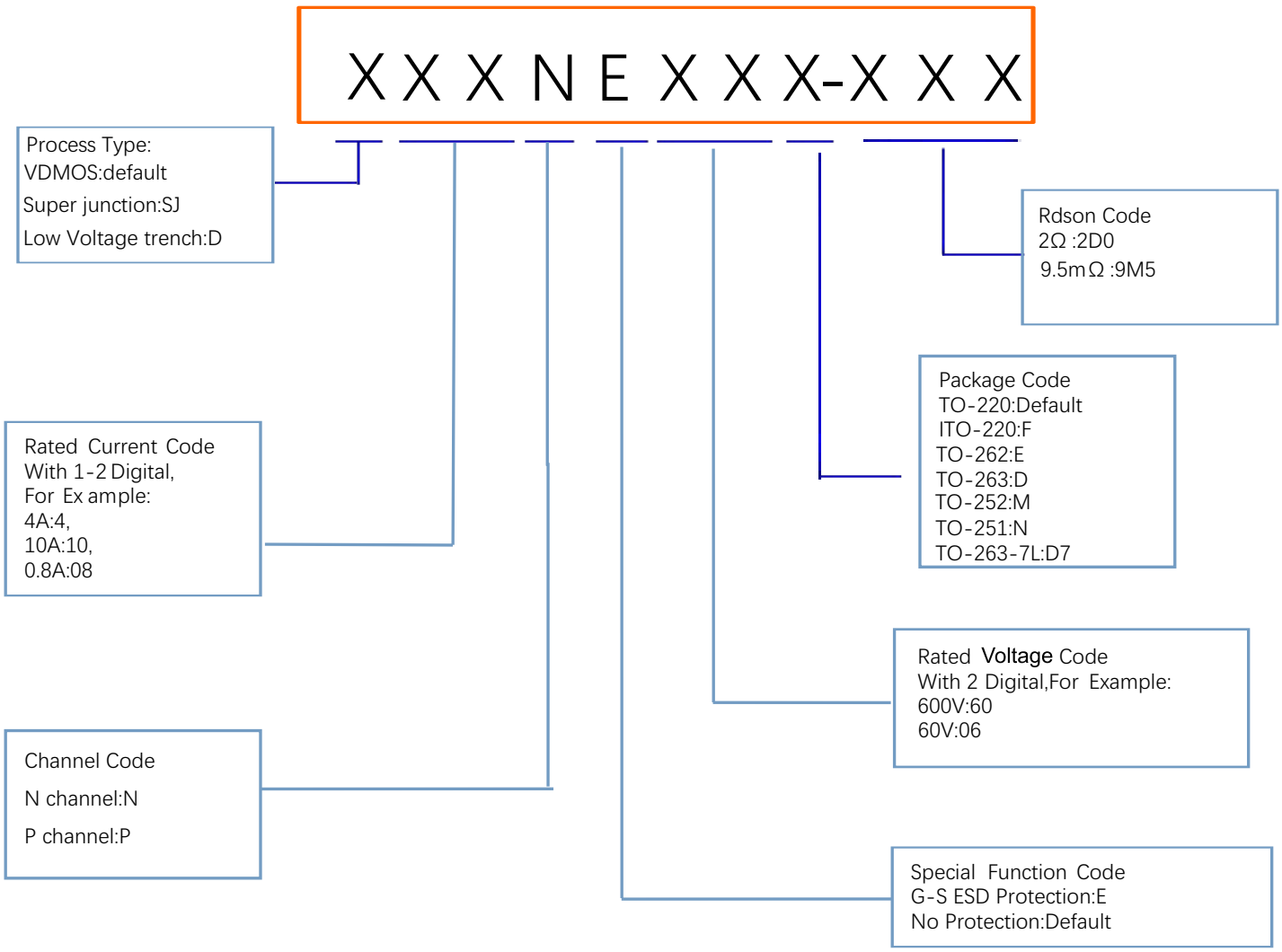
7) . Unclamped Inductive Switching Test Circuit



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

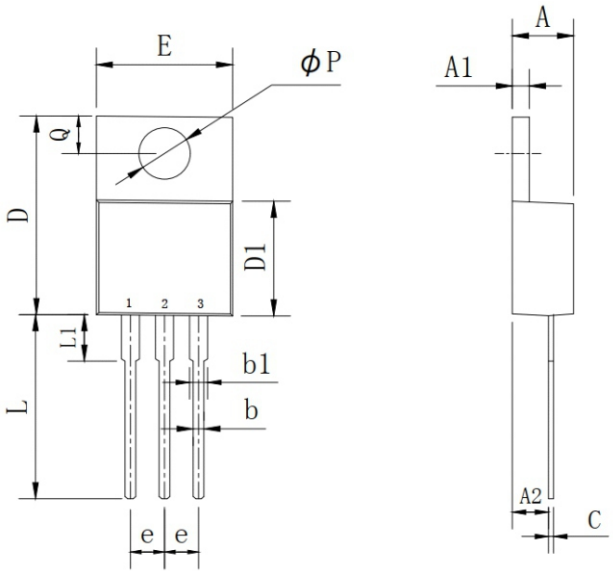
8) Unclamped Inductive Switching Waveforms

Product Names Rules



Dimensions

TO-220



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

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