SEMICONDUCTOR

D070N06 Series

116A 68V 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.

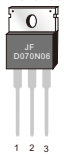
Product Summary			
V_{DS}	$R_{DS(on)}$ (mΩ) Typ	I_D (A)	Qg (Typ)
60V	6.6@10V 40A (TO-220) 6.4@10V 40A (TO-263)	116	82nc

Features

- Fast switching
- Low reverse transfer capacitances
- Low gate charge and Low on-resistance
- 100% avalanche tested

TO-220

D070N06



TO-263

D070N06D

Mechanical Data

- Case:TO-220,TO-263 Package

Application

- Power switching applications
- DC-DC converters
- Full bridge control

Ordering Information

Part No.	Package Type	Package	Quality(box)
D070N06	TO-220	Tube	1000
D070N06D	TO-263	Tape & Reel	800

Pin Definition:

1. Gate
2. Drain
3. Source

Block Diagram

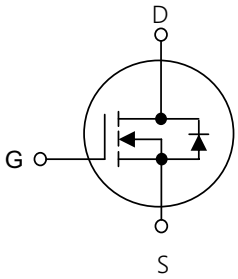


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	116	A
	T_C=100°C		81	
Pulsed Drain Current (Note 1)		I_{DM}	462	A
Single Pulse Avalanche Energy(Note 2)		E_{AS}	550	mJ
Avalanche Current(Note 2)		I_{AR}	47	A
Power Dissipation	T_C=25°C	P_D	214	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55~+150	°C

Table 2.Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	54.5	°C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	0.7	°C/W

Table 3. Electrical Characteristics (T_C=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	68	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=68V,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 3)							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250μA	2.5	3.0	3.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=40A (TO-220)	-	6.6	7.6	mΩ
			V_{GS}=10V,I_D=40A (TO-263)	-	6.4	7.4	
Dynamic Characteristics(Note 4)							
Input Capacitance		C_{ISS}	V_{DS}=34V,V_{GS}=0V,f=1MHz	-	4058	-	pF
Output Capacitance		C_{OSS}		-	270	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	227	-	pF
Switching Characteristics (Note 4)							
Turn-On Delay Time		td(on)	V_{DD}=34V,I_D=30A V_{GS}=10V,R_{GEN}=4.7Ω,	-	18	-	ns
Turn-On Rise Time		t_R		-	49	-	ns
Turn-Off Delay Time		td(off)		-	55	-	ns
Turn-Off Fall Time		tf		-	24	-	ns
Total Gate Charge		Q_G	V_{DD}=34V,I_D=30A, V_{GS}=10V	-	82	-	nC
Gate-Source Charge		Q_{GS}		-	22	-	nC
Gate-Drain Charge		Q_{GD}		-	26	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_S=30A	-	-	1.3	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		-	-	116	A
Reverse Recovery Time		trr	V_{GS}=0V,I_F=30A dI$_F$/dt=100A/μs(Note 1)	-	33	-	ns
Reverse Recovery Charge		Q_{RR}		-	47	-	nC

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 L=0.5mH, V_{DD}=50V,V_{GATE}=60V,Starting T_J=25°C
3 Pulse Test: Pulse width ≤300μS,Duty cycle≤2%
4 Guaranteed by design,not subject to production

Typical Characteristics Diagrams

Figure 1.Output Characteristics

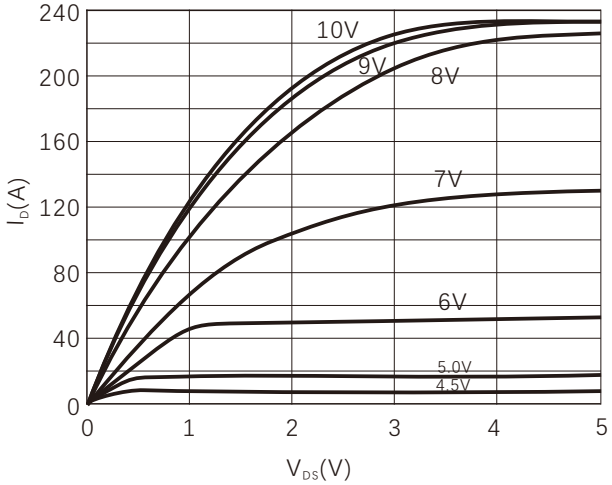


Figure 2. Transfer Characteristics

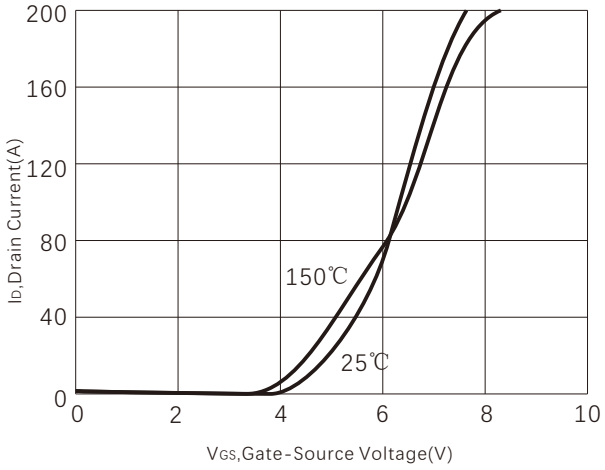


Figure 3. VTH vs Junction Temperature

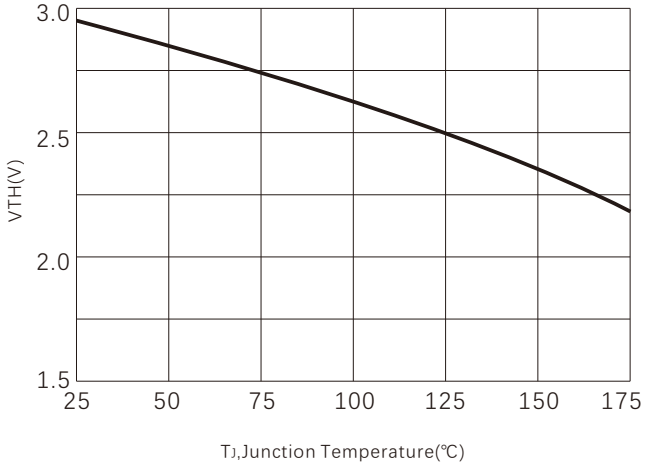


Figure 4. Capacitance

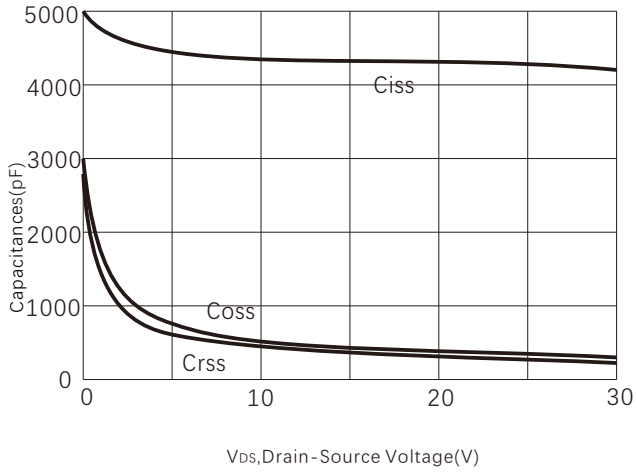


Figure 5.Gate charge

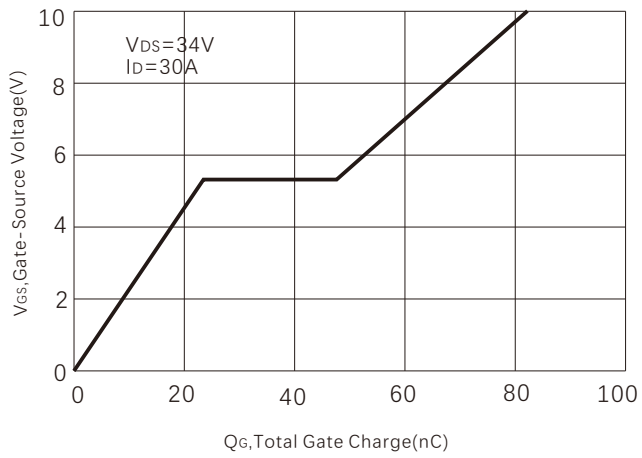


Figure 6. Drain Current

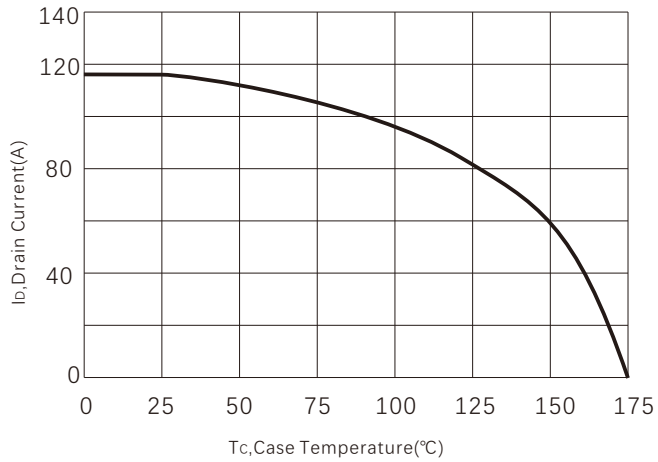


Figure7.$R_{DS(ON)}$ vs Junction Temperature

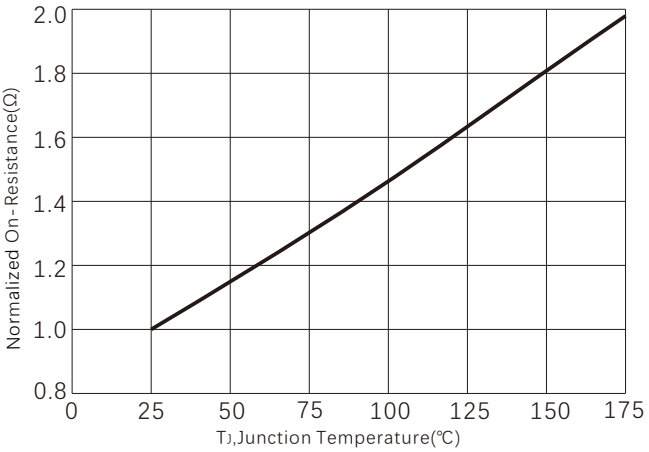


Figure 8. Power dissipation

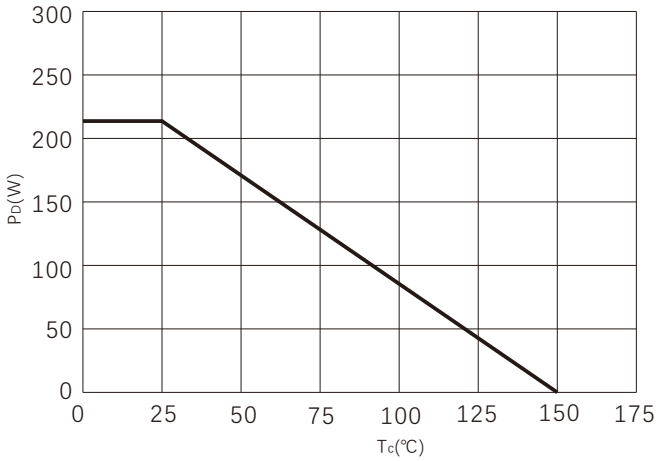


Figure 9. Safe operating area

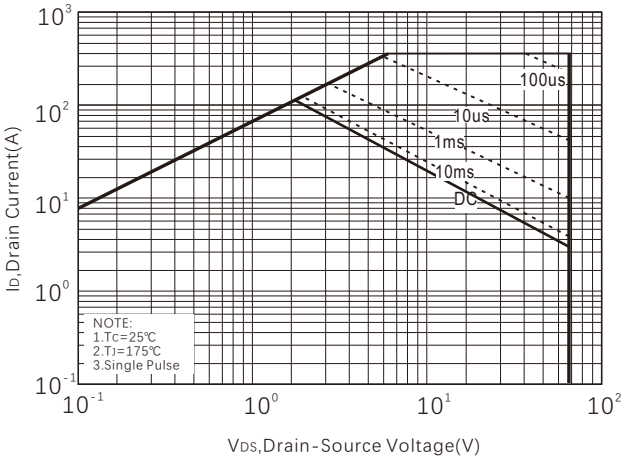
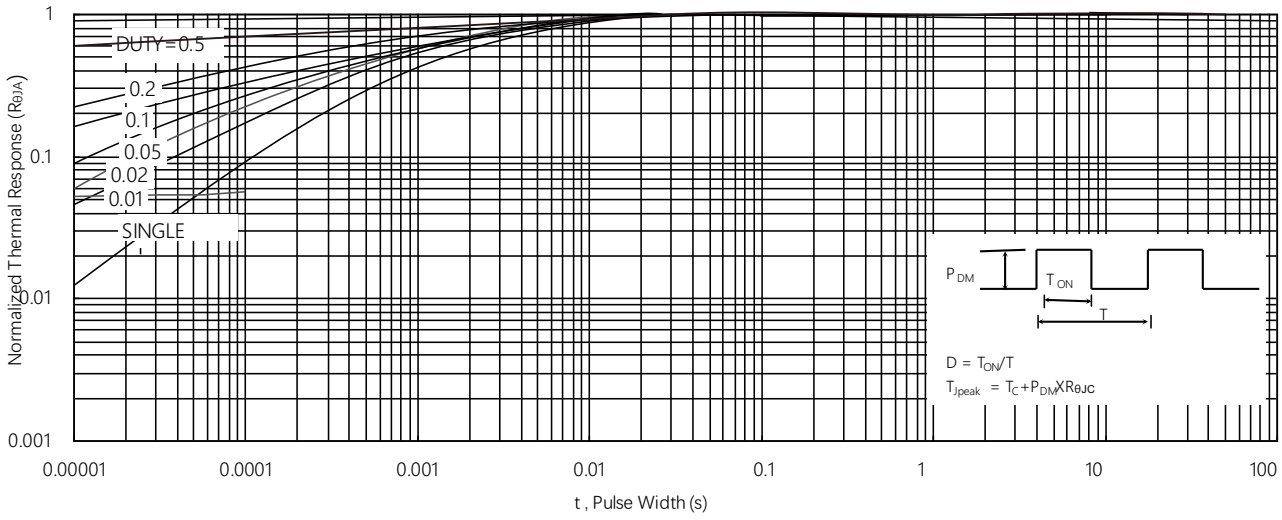
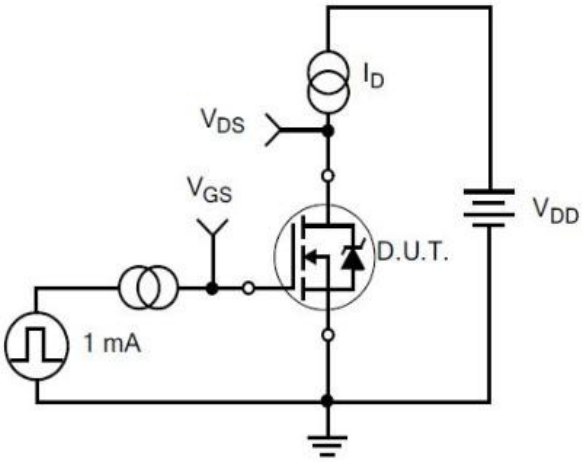


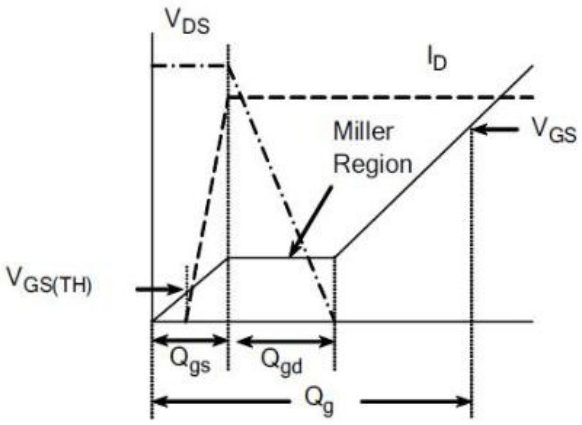
Figure 10.Normalized Maximum Transient Thermal Impedance



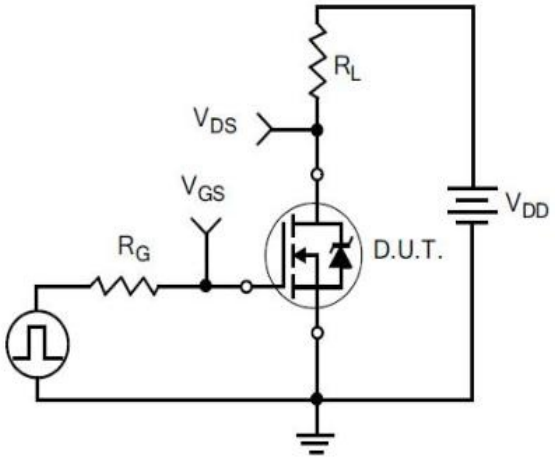
Typical Test Circuit



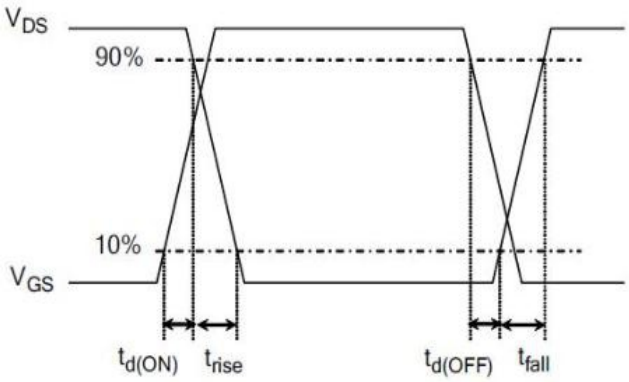
1) Gate Charge Test Circuit



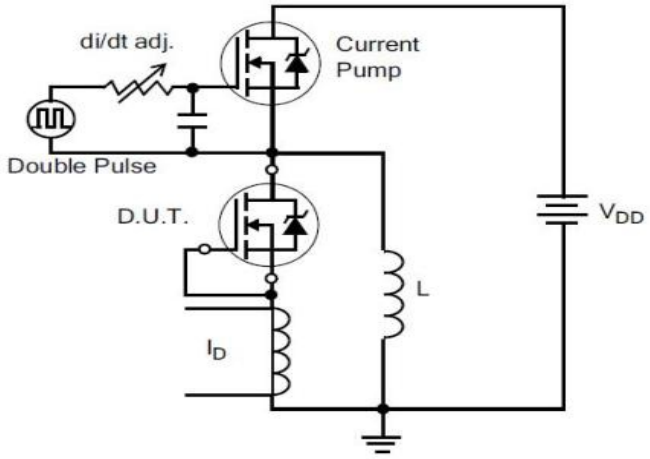
2) . Gate Charge Waveform



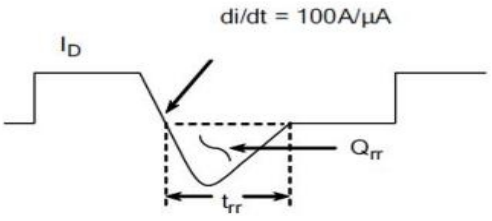
3) Resistive Switching Test Circuit



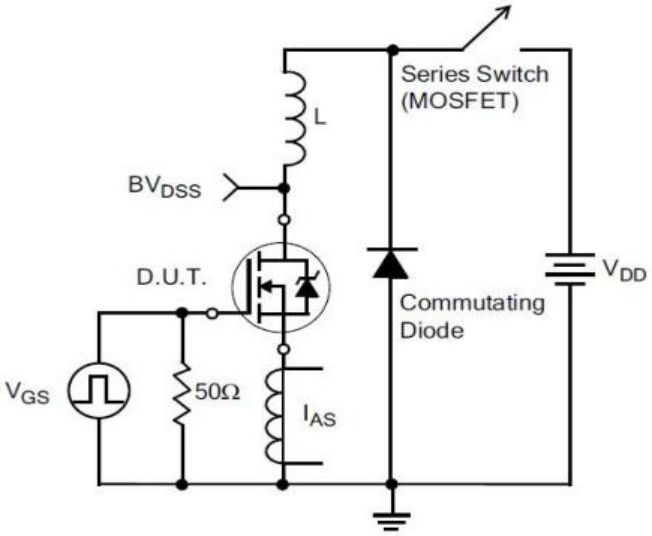
4) Resistive Switching Waveforms



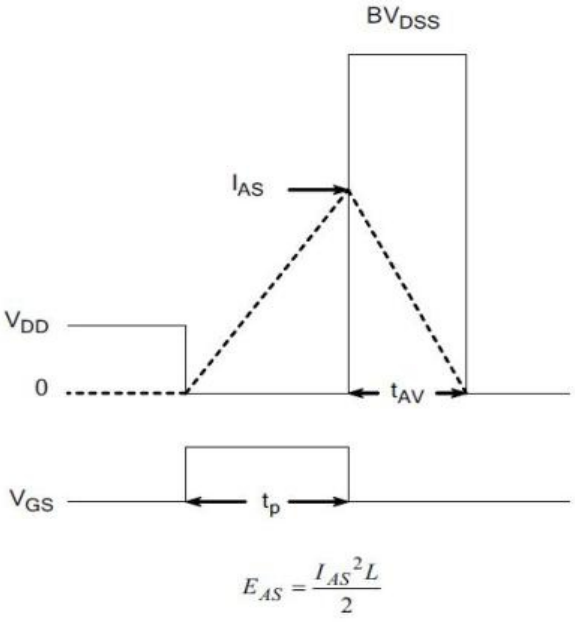
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



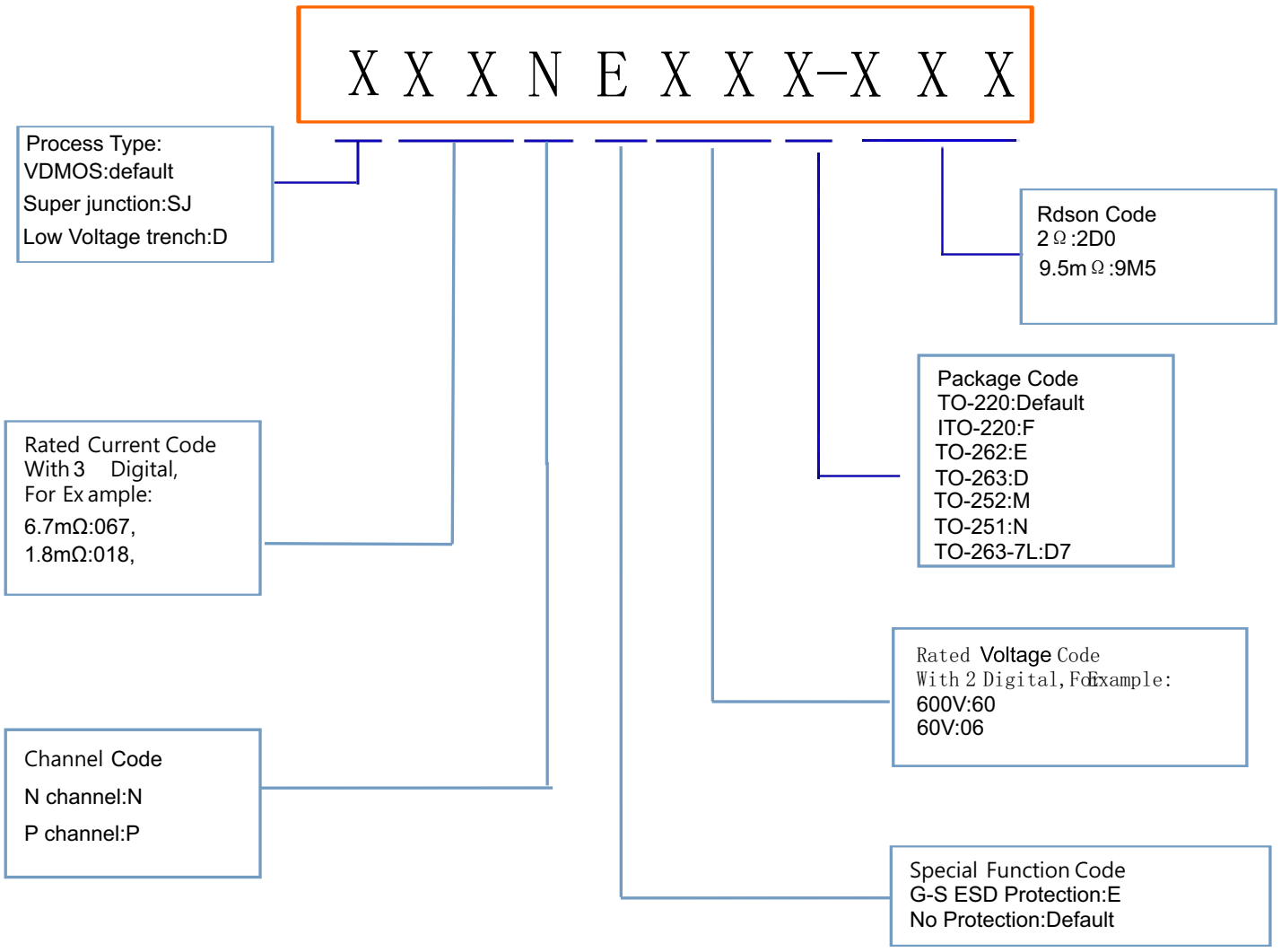
7) . Unclamped Inductive Switching Test Circuit



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

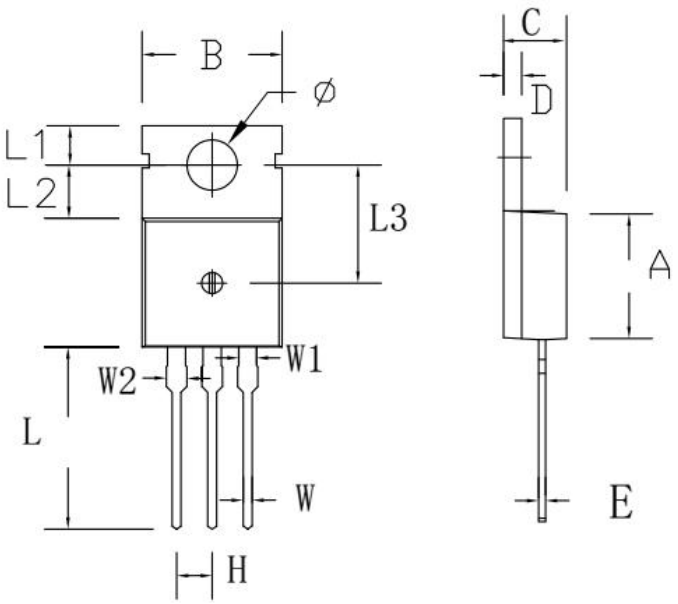
8) Unclamped Inductive Switching Waveforms

Product Names Rules



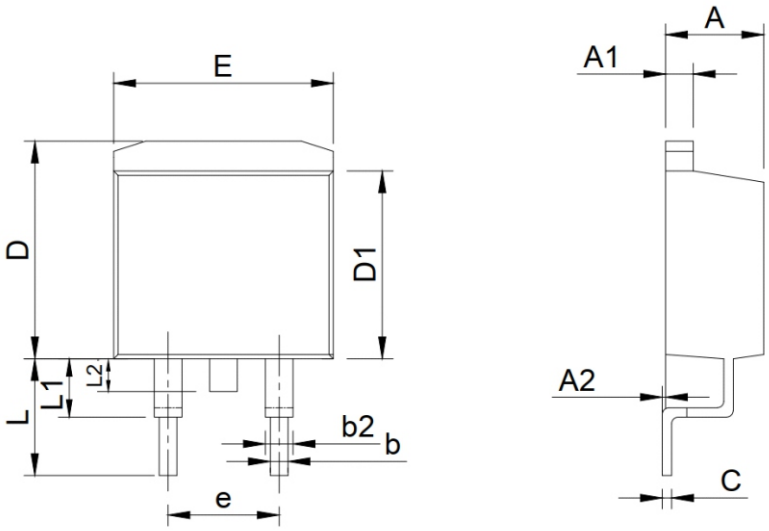
Dimensions

TO-220 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
H	2.54 TYP		0.100 TYP	
W	0.60	0.95	0.024	0.037
W1	1.05	1.45	0.041	0.057
W2	1.20	1.60	0.047	0.063
L	12.60	13.40	0.496	0.528
L1	2.45	2.95	0.096	0.116
L2	3.45	3.95	0.136	0.156
L3	8.15	8.65	0.321	0.341
Φ	3.50	3.90	0.138	0.154

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

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