SEMICONDUCTOR

DS70N10M

70A 100V N-Channel Enhancement Mode Power MOSFET

Features

- Fast switching
- Uses advanced SGT technology
- Low gate charge and Low on-resistance
- 100% avalanche tested

Product Summary			
V_{DS}	$R_{DS(on)}$ (mΩ) Typ	I_D (A)	Qg (Typ)
100V	8 @ 10V 30A	70	31nc

TO-220

DS70N10M

Mechanical Data

- Case:TO-252 Package

Application

- Motor control and drives
- DC-DC converters
- Battery management
- General purpose applications

Ordering Information

Part No.	Package Type	Package	Quality(box)
DS70N10M	TO-252	Tape & Reel	2500

Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

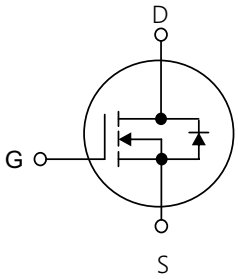


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	D70N10M	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (Note 5)	T_C=25°C	I_D	70	A
	T_C=100°C		48	
Pulsed Drain Current (Note 1)		I_{DM}	272	A
Single Pulse Avalanche Energy(Note 2)		E_{AS}	156	mJ
Power Dissipation T_C=25°C		P_D	86	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55~+150	°C

※ limited by maximum junction temperature

Table 2.Thermal Characteristics

Parameter	Symbol	DS70N10M	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	75	°C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	1.45	°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	100	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=100V,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	1.3	-	2.3	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=30A	-	8	9.5	mΩ
			V_{GS}=4.5V,I_D=30A	-	11	13.5	
Dynamic Characteristics(Note 4)							
Input Capacitance		C_{ISS}	V_{DS}=50V,V_{GS}=0V,f=1MHz	-	1700	-	pF
Output Capacitance		C_{OSS}		-	454	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	26	-	pF
Switching Characteristics (Note 4)							
Turn-On Delay Time		td(on)	V_{DD}=50V,I_D=30A V_{GS}=10V,R_G=3Ω,	-	8	-	ns
Turn-On Rise Time		t_R		-	23	-	ns
Turn-Off Delay Time		td(off)		-	26	-	ns
Turn-Off Fall Time		tf		-	8	-	ns
Total Gate Charge		Q_G	V_{DD}=50V,I_D=30A, V_{GS}=10V	-	31	-	nC
Gate-Source Charge		Q_{GS}		-	6	-	nC
Gate-Drain Charge		Q_{GD}		-	7	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_S=30A	-	-	1.2	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		-	-	70	A
Reverse Recovery Time		trr	V_{GS}=0V,I_F=30A dI$_F$/dt=100A/μs(Note 1)	-	48	-	ns
Reverse Recovery Charge		Q_{RR}		-	76	-	nC

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 L=0.5mH, R_G=25Ω,Starting T_J=25°C
3 Pulse Test: Pulse width ≤300μS,Duty cycle≤2%
4 Guaranteed by design,not subject to production
5 The maximum current is limited by the package.

Typical Characteristics Diagrams

Figure 1.Output Characteristics

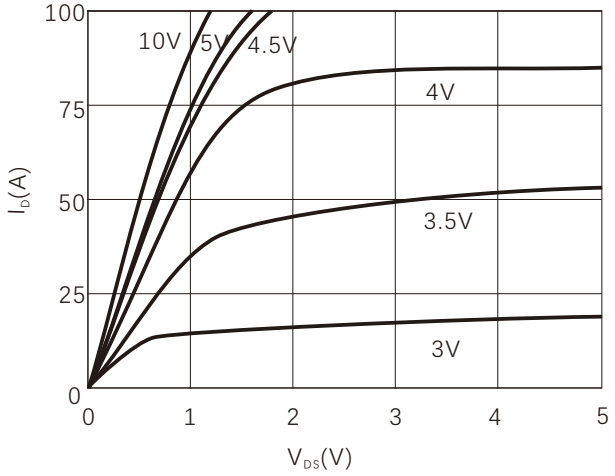


Figure 2. Transfer Characteristics

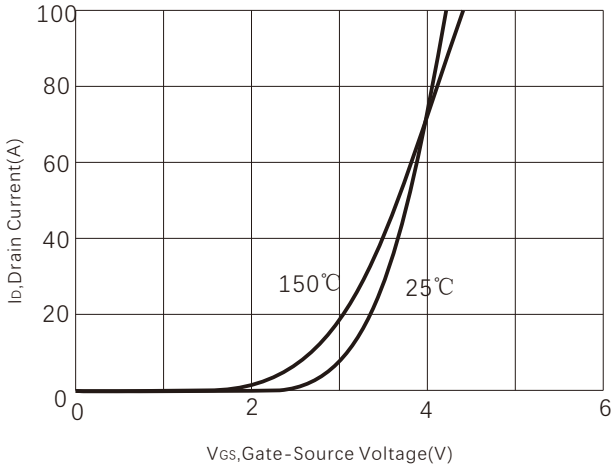


Figure3.Normalized $R_{DS(ON)}$ vs Temperature

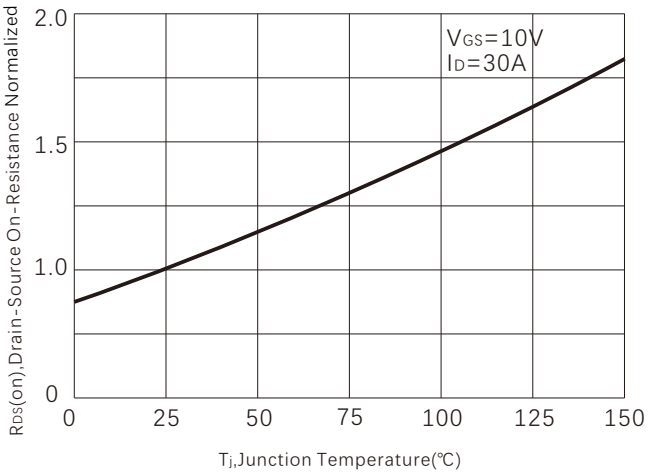


Figure 4. Capacitance

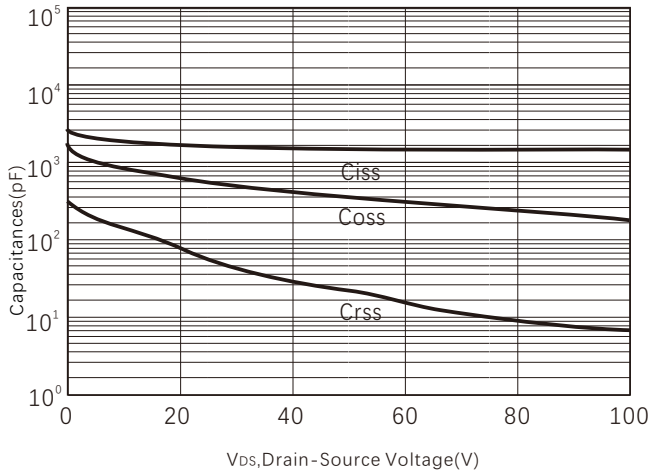


Figure 5.Gate charge

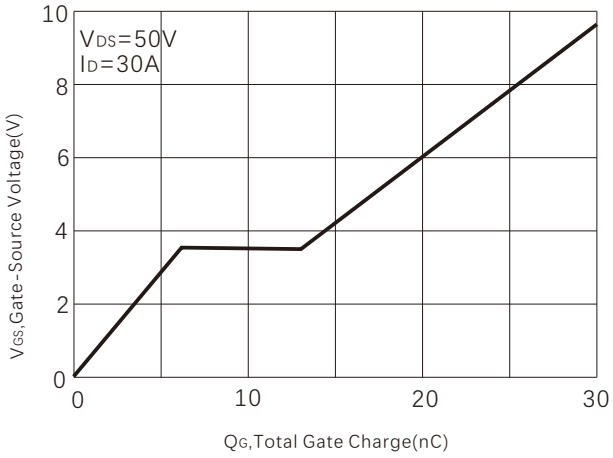


Figure 6.Source-Drain Diode Forward Voltage

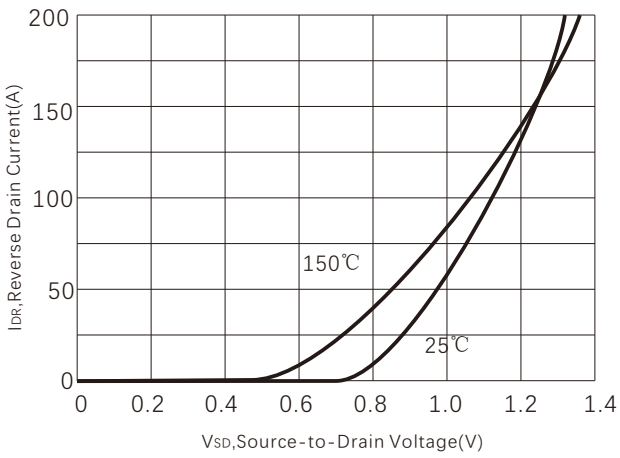


Figure7.Maximum Drain Current vs Temperature

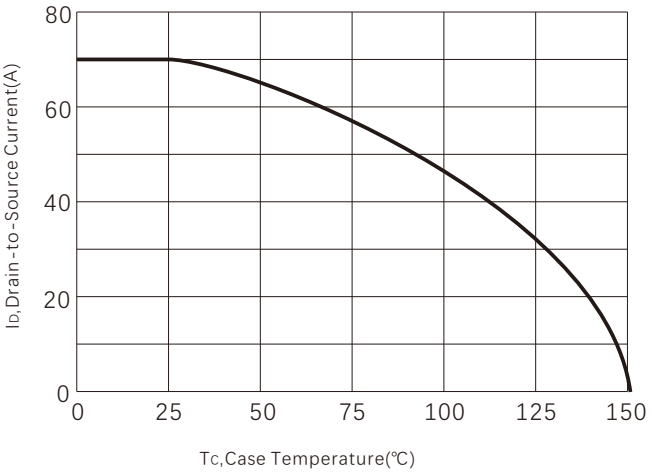


Figure 8. Power dissipation

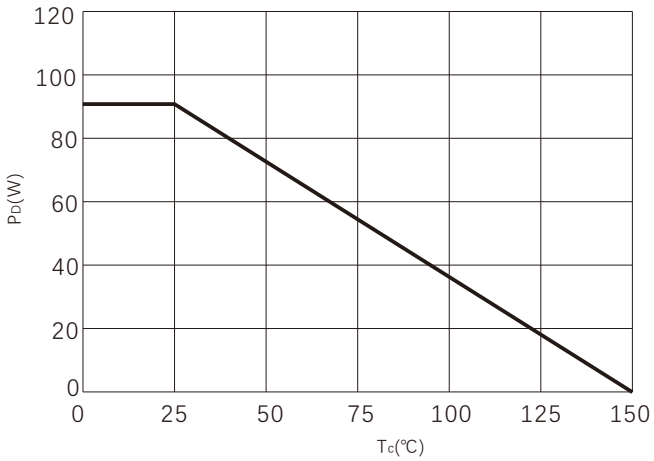


Figure 9.

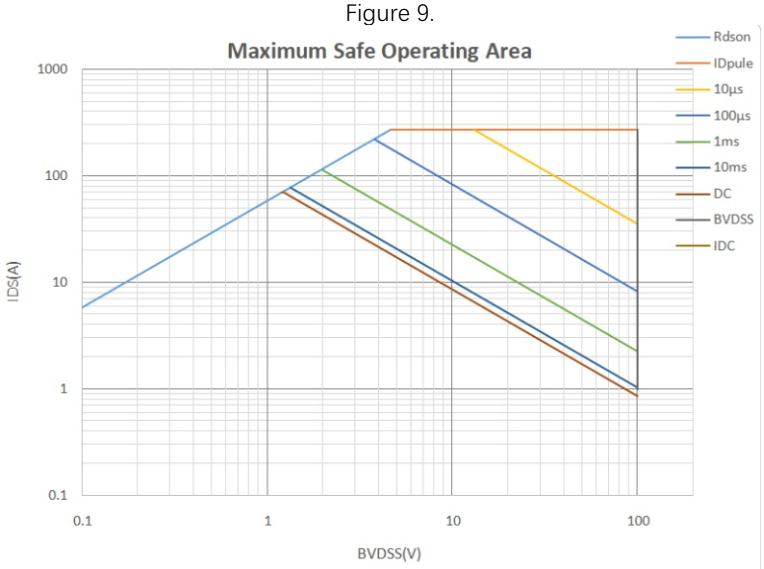
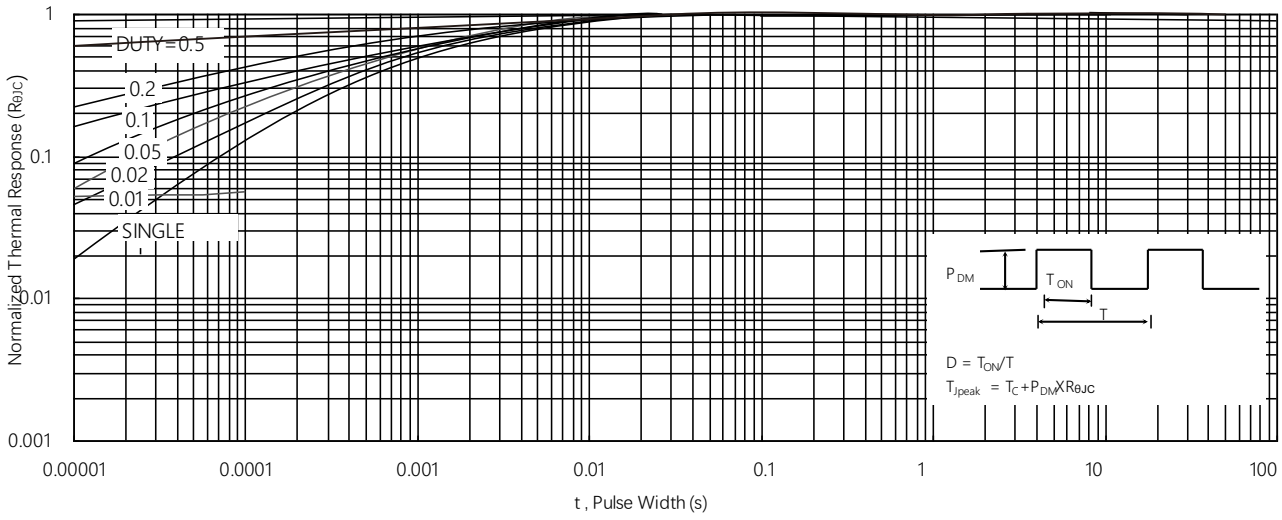
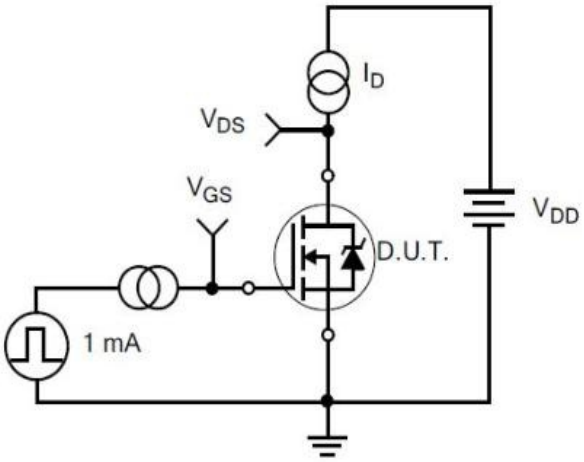


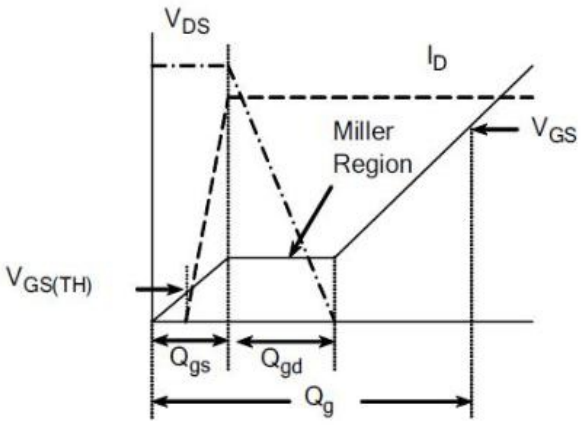
Figure 10.Normalized Maximum Transient Thermal Impedance



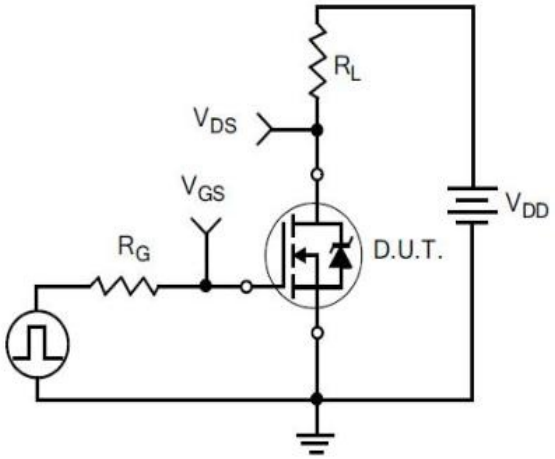
Typical Test Circuit



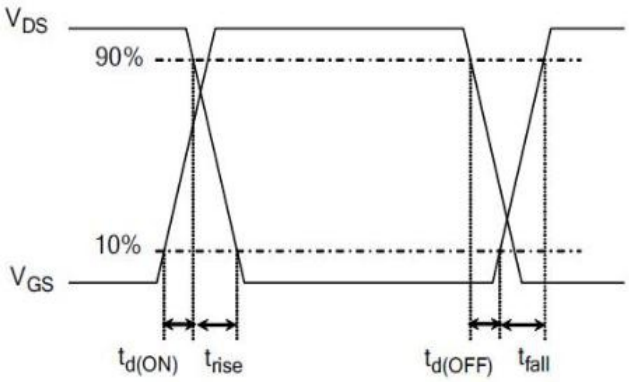
1) Gate Charge Test Circuit



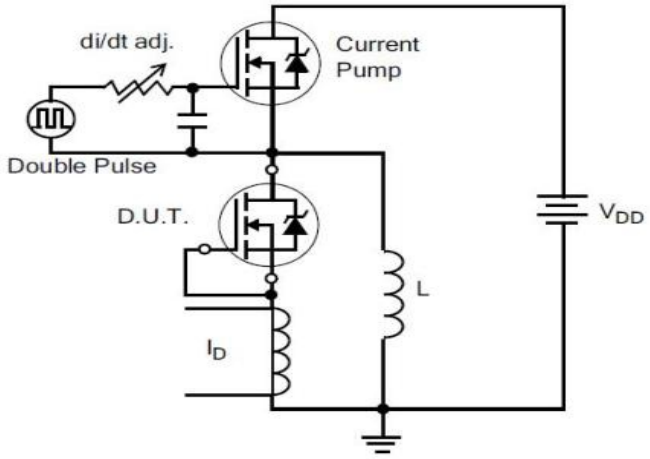
2) . Gate Charge Waveform



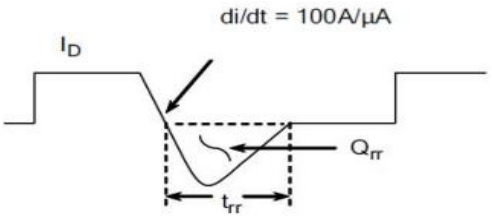
3) Resistive Switching Test Circuit



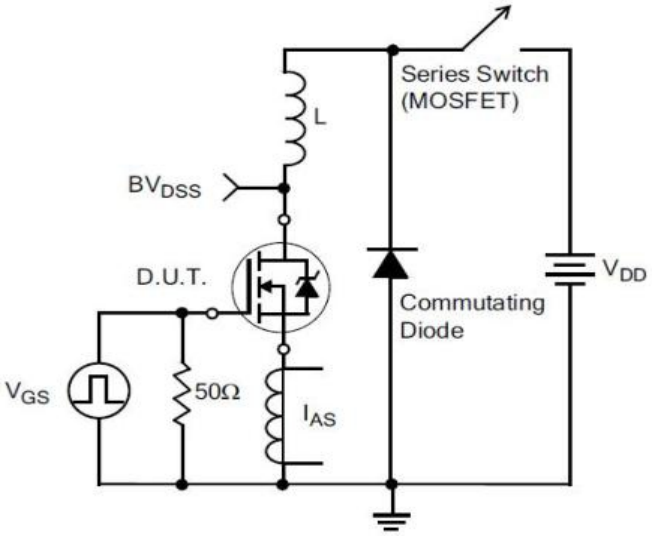
4) Resistive Switching Waveforms



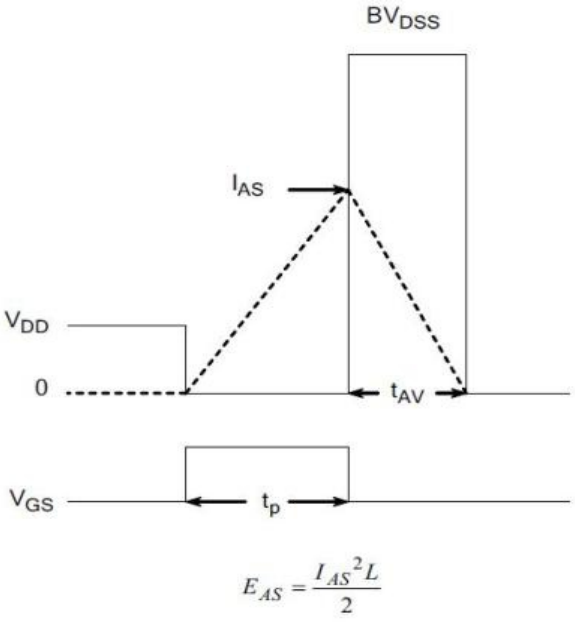
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



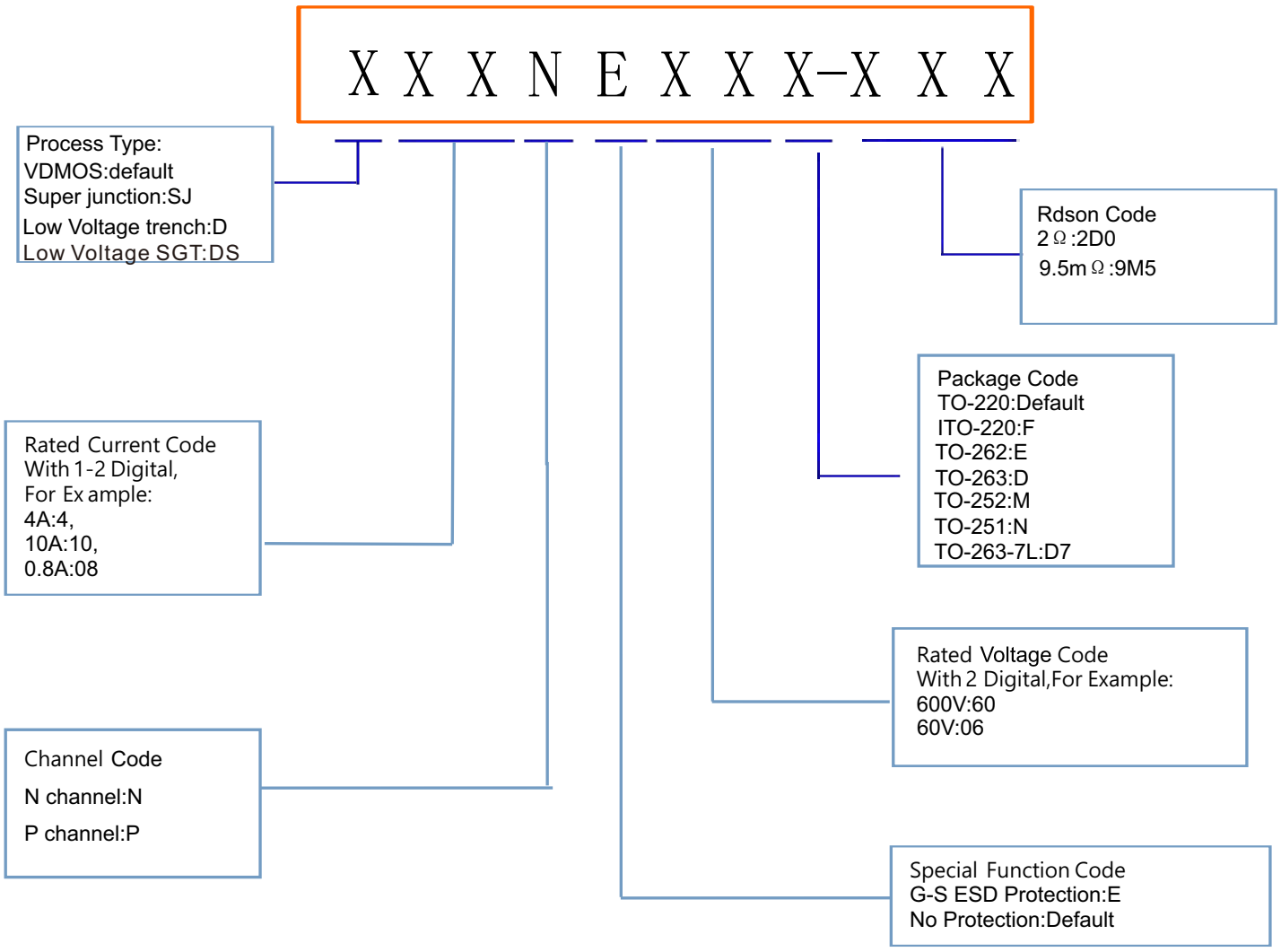
7) . Unclamped Inductive Switching Test Circuit



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

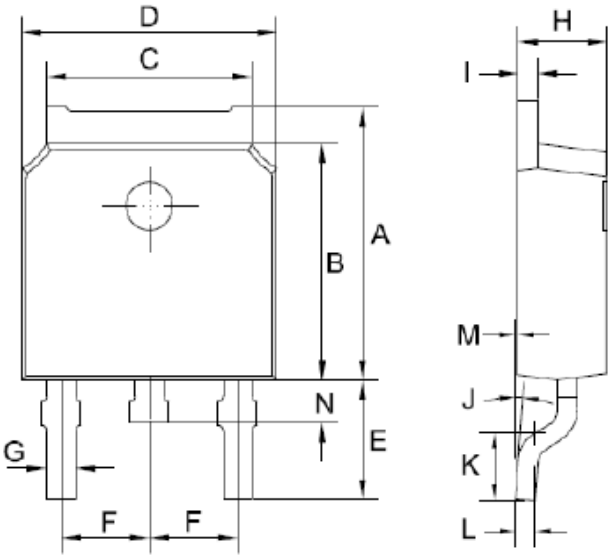
8) Unclamped Inductive Switching Waveforms

Product Names Rules



Dimensions

TO-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
N	0.6	1	0.024	0.039

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