SEMICONDUCTOR

DS180N15D7

180A 150V N-Channel Enhancement Mode Power MOSFET

Features

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

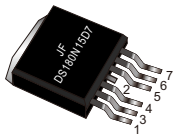
Product Summary			
V_{DS}	$R_{DS(on)}$ (mΩ) Typ	I_D (A)	Qg (Typ)
150V	3.2 @ 10V 90A	180	137nc

Mechanical Data

- Case: TO-263-7L Package

TO-263-7L

DS180N15D7



Application

- Motor control and drive
- Battery management
- UPS (Uninterrupible Power Supplies)

Ordering Information

Part No.	Package Type	Package	Quality(box)
DS180N15D7	TO-263-7L	Tape & Reel	800

Pin Definition:

1. Gate
2. Drain

3/4/5/6/7. Source

Block Diagram

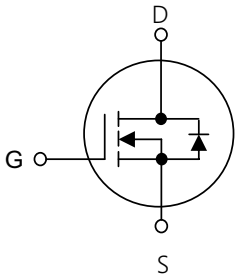


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C (Silicon limit)	I_D	218	A
	T_C=25°C (Package limit)		180	
	T_C=100°C (Silicon limit)		154	
Pulsed Drain Current (Note 1)		I_{DM}	720	A
Single Pulse Avalanche Energy(Note 2)		E_{AS}	1600	mJ
Power Dissipation T_C=25°C		P_D	375	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55~+175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	DS180N15D7	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	75	°C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	0.4	°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	150	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=150V,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	2.0	-	4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=90A	-	3.2	3.7	mΩ
Dynamic Characteristics(Note 4)							
Input Capacitance		C_{ISS}	V_{DS}=75V,V_{GS}=0V,f=1MHz	-	9848	-	pF
Output Capacitance		C_{OSS}		-	769	-	pF
Reverse Transfer Capacitance		C_{RSS}		-	52	-	pF
Switching Characteristics (Note 4)							
Turn-On Delay Time		td(on)	V_{DS}=75V,I_D=90A V_{GS}=10V,R_{GEN}=3Ω,	-	31	-	ns
Turn-On Rise Time		t_R		-	49	-	ns
Turn-Off Delay Time		td(off)		-	62	-	ns
Turn-Off Fall Time		tf		-	25	-	ns
Total Gate Charge		Q_G	V_{DS}=75V,I_D=90A, V_{GS}=10V	-	137	-	nC
Gate-Source Charge		Q_{GS}		-	51	-	nC
Gate-Drain Charge		Q_{GD}		-	25	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_S=90A	-	-	1.2	V
Maximum Continuous Drain-Source Diode Forward Current		I_S		-	-	180	A
Reverse Recovery Time		trr	V_{GS}=0V,I_F=75A dI_F/dt=100A/μs(Note 1)	-	114	-	ns
Reverse Recovery Charge		Q_{RR}		-	195	-	nC

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 L=0.5mH, I_D=56A,Rg=25Ω,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

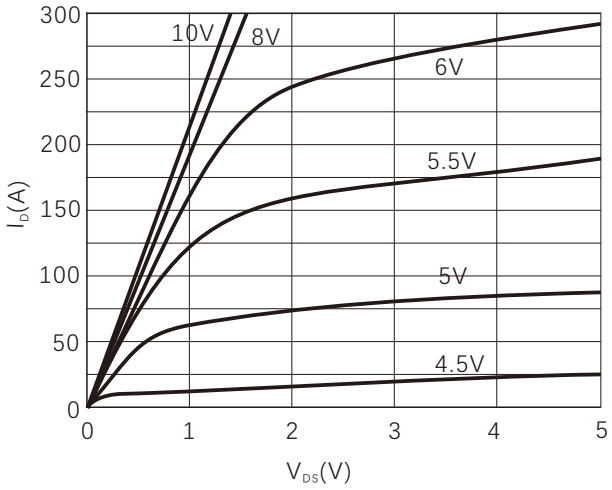


Figure 2. Transfer Characteristics

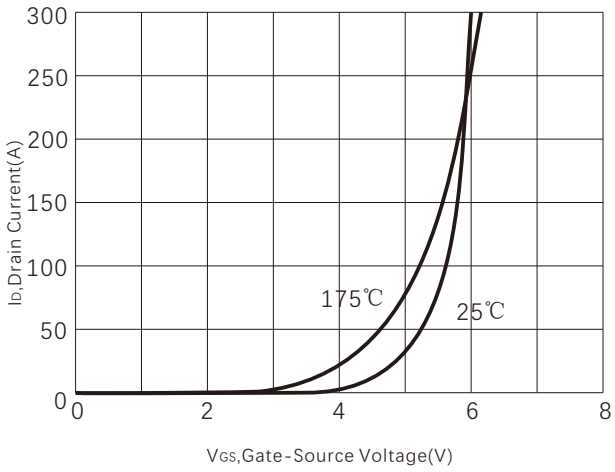


Figure 3.On-Resistance vs.Drain Current

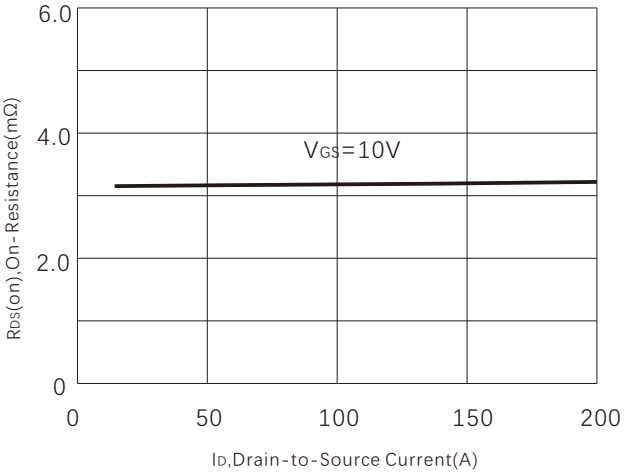


Figure 4. Capacitance

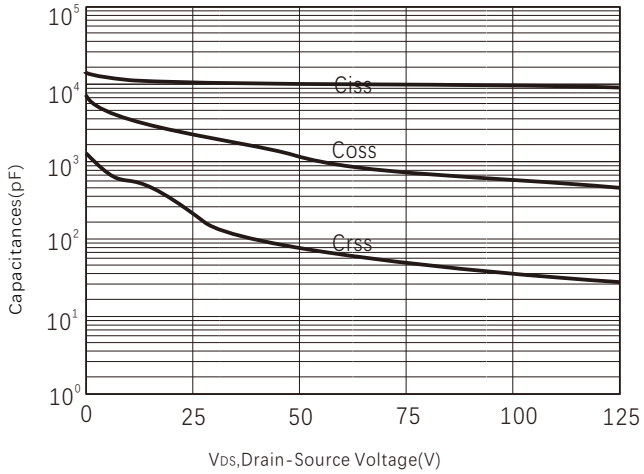


Figure 5. $R_{DS(ON)}$ vs V_{GS}

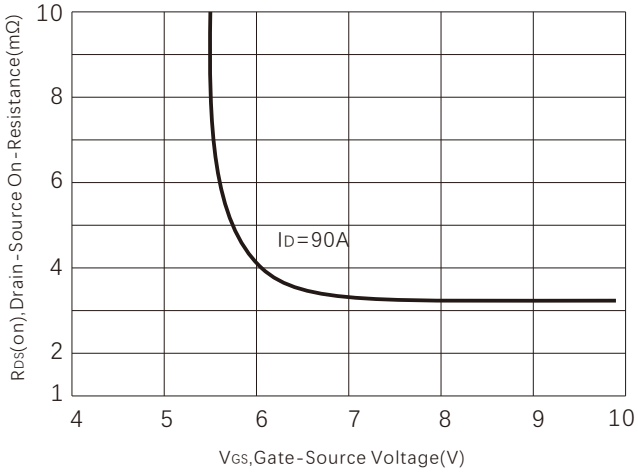


Figure 6.Source-Drain Diode Forward Voltage

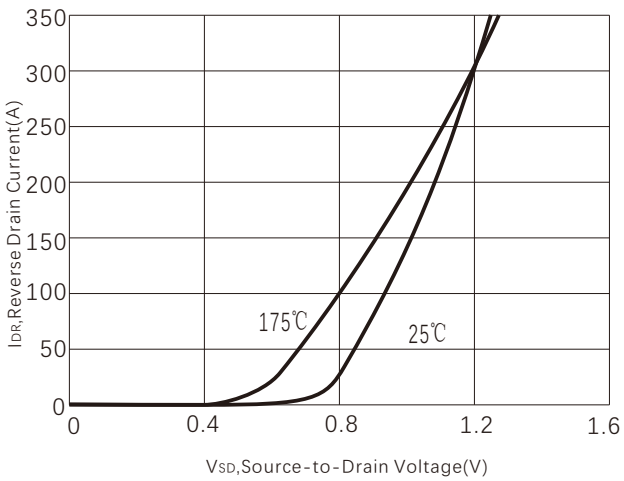


Figure7.Normalized $R_{DS(ON)}$ vs Temperature

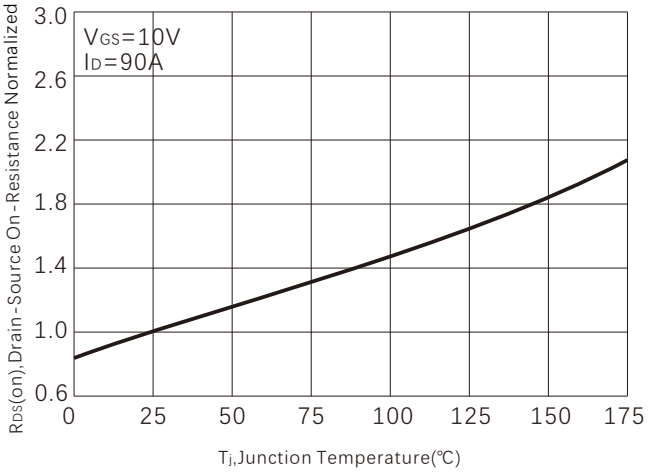


Figure 8.Gate charge

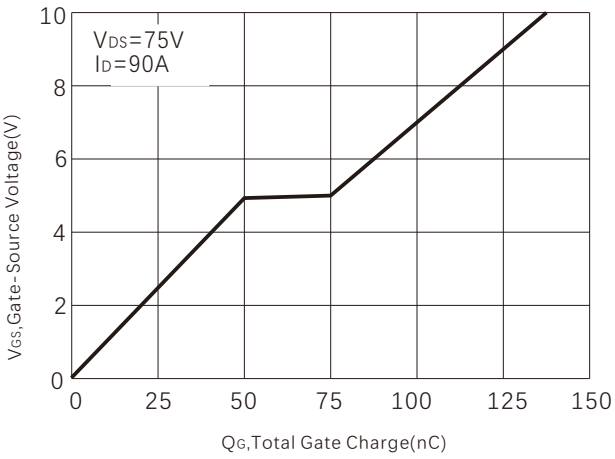


Figure9.Maximum Drain Current vs Temperature

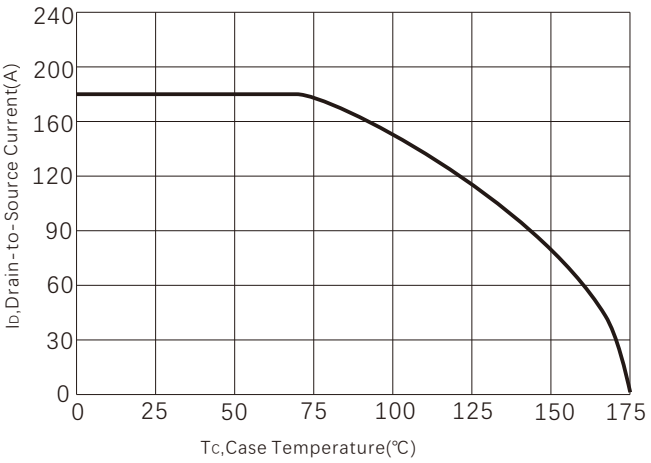


Figure 10. Power dissipation

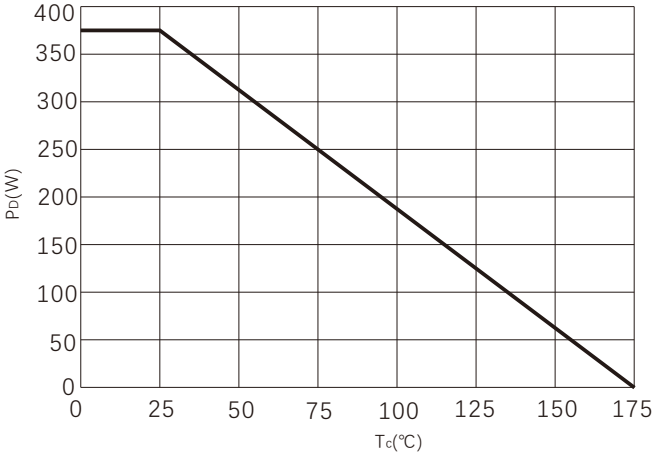


Figure 11.

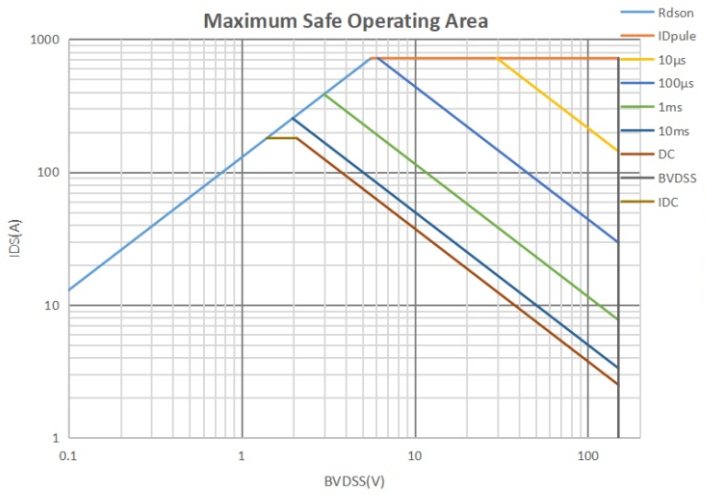
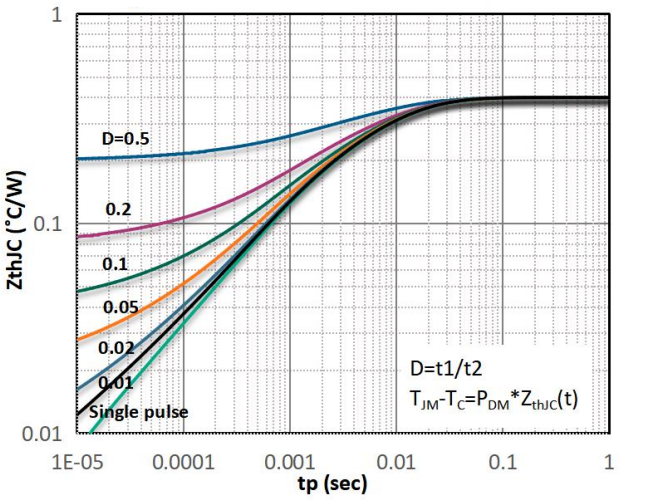
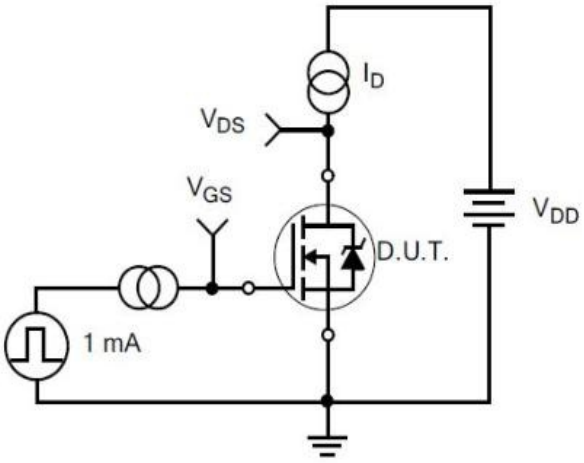


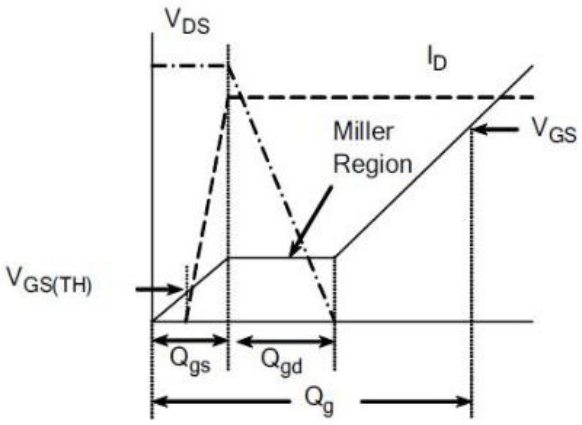
Figure 12. Maximum Transient Thermal Impedance



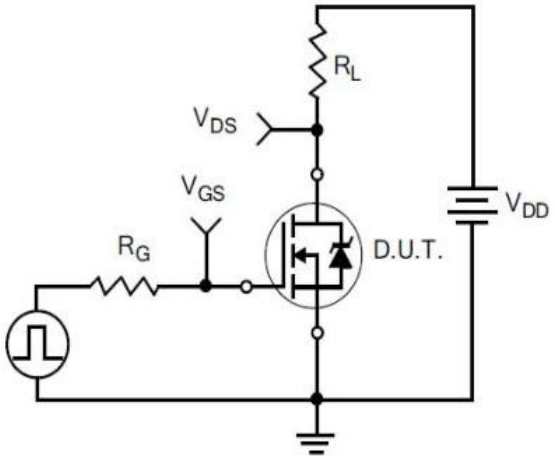
Typical Test Circuit



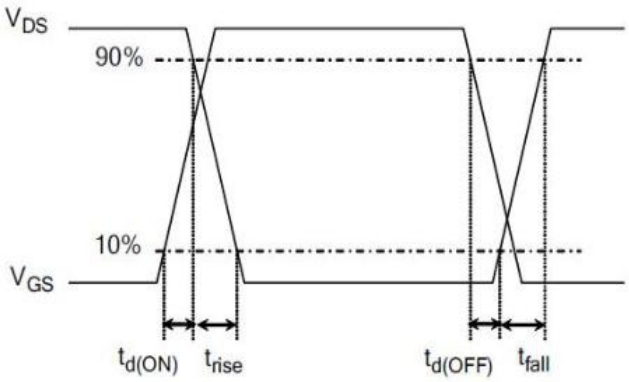
1) Gate Charge Test Circuit



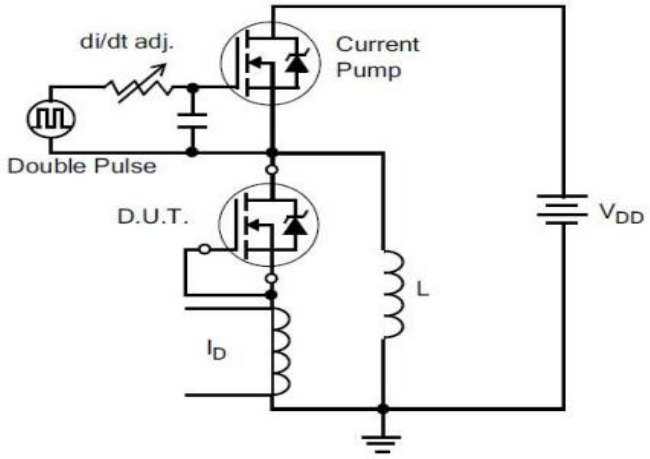
2) . Gate Charge Waveform



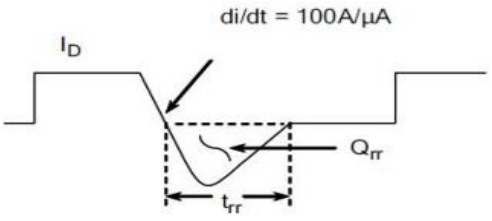
3) Resistive Switching Test Circuit



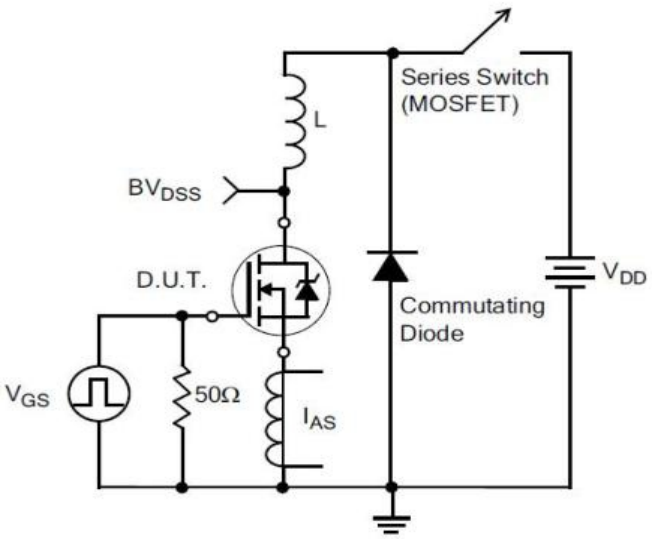
4) Resistive Switching Waveforms



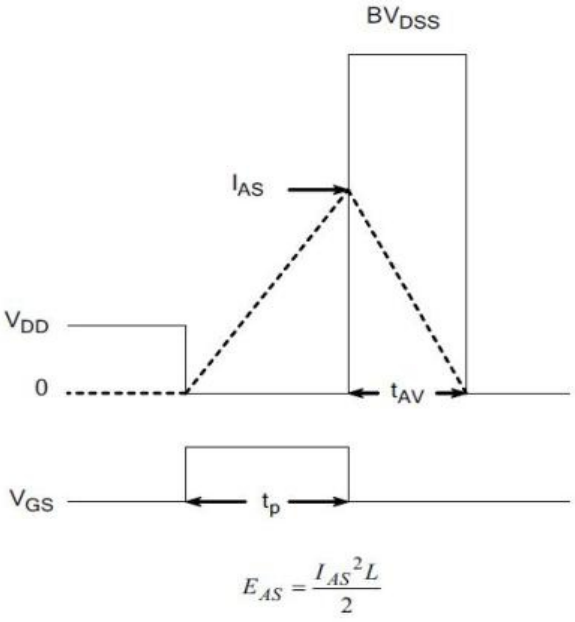
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



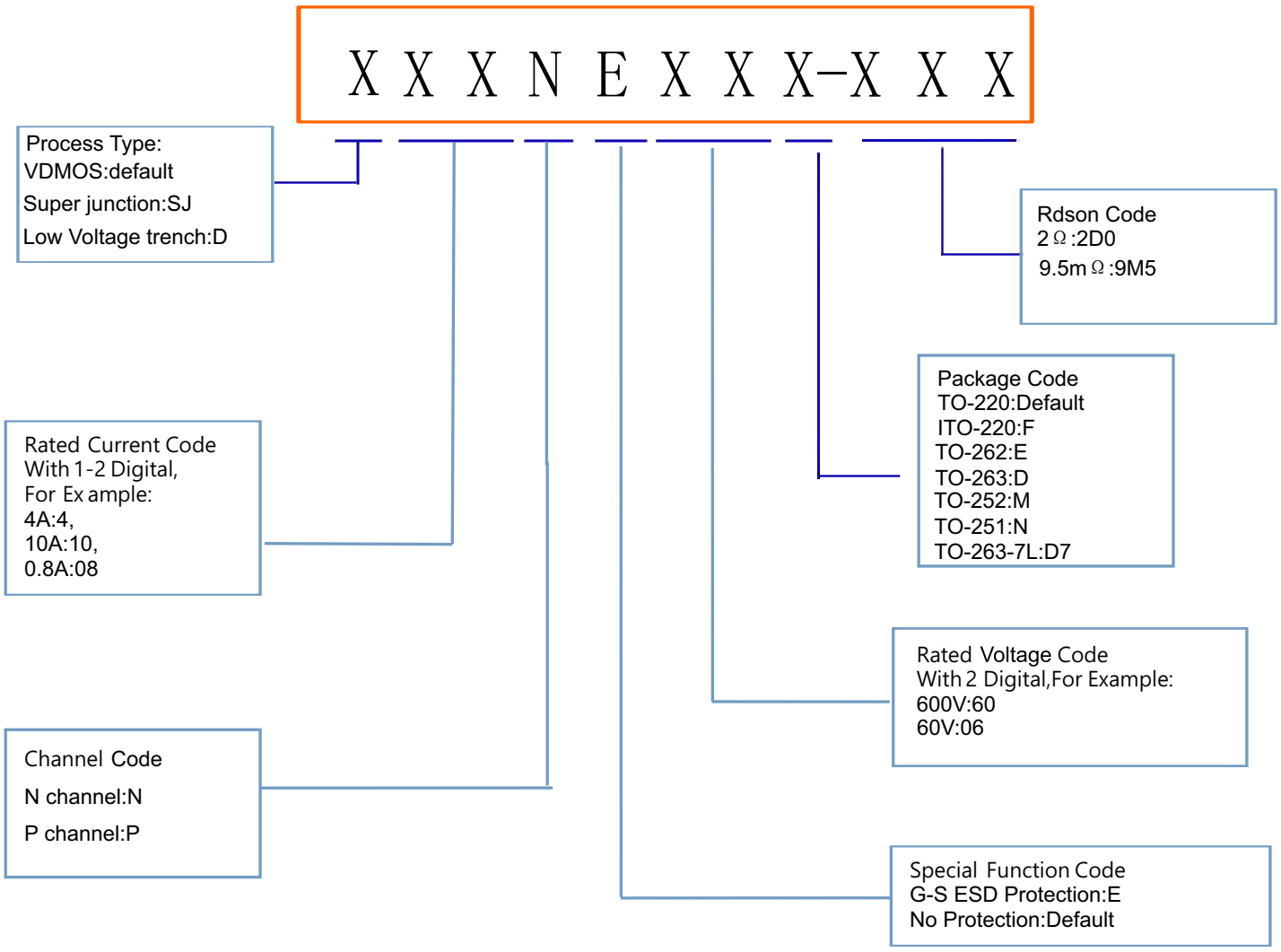
7) . Unclamped Inductive Switching Test Circuit



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

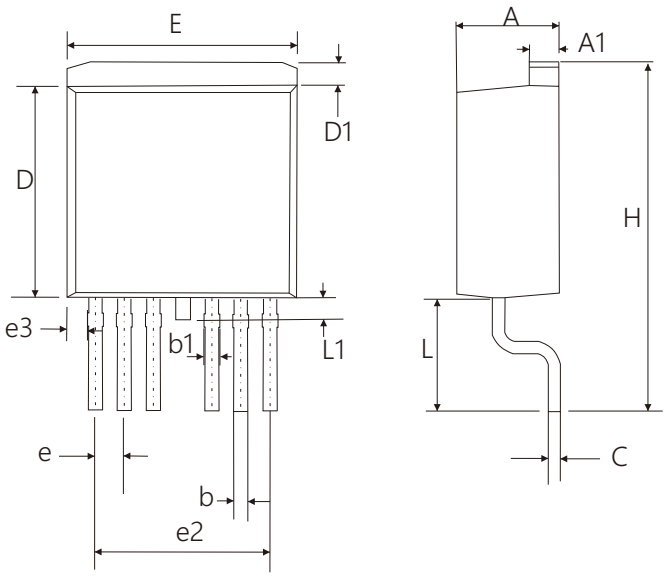
8) Unclamped Inductive Switching Waveforms

Product Names Rules



Dimensions

TO-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

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