SEMICONDUCTOR

SJ104N65PR

650V N-Channel Super Junction Power MOSFET

Features

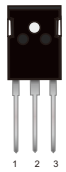
- Low on-resistance
- Ultra low gate charge and input capacitance
- 100% avalanche tested
- Rohs compliant

Product Summary			
V_{DS}	$R_{DS(on)}$(mΩ)Typ	I_D(A)	Qg(Typ)
650V	20 @ 10V,40.8A	104	264nc

Mechanical Data

- Case:TO-247 Package

TO-247
SJ104N65PR



Application

- Switching applications
  SMPS
  UPS
  Solar
  Lighting

Ordering Information

Part No.	Marking.	Package Type	Package	Quality(box)
SJ104N65PR	SJ104N65PR	TO-247	Tube	360

Pin Definition:

1. Gate
2. Drain
3. Source

Block Diagram

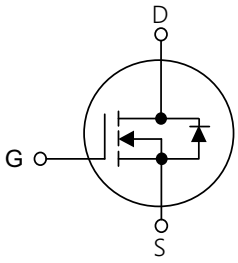


Table1 Absolute Maximum Ratings (T_C=25℃,unless otherwise specified)

Parameters		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Contionous Drain Current	T_C=25°C	I_D	104	A
	T_C=100°C		65	
Pulsed Drain Current (Note 1)		I_{DM}	300	A
Single Pulse Avalanche Energy(Note 2)		E_{AS}	245	mJ
Avalanche Current(Note 1)		I_{AR}	7	A
Power Dissipation T_C=25°C		P_D	320	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55 ~ +150	℃

Table 2.Thermal Characteristics

Parameters	Symbol	Value	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62	℃/W
Thermal resistance Junction to Case	$R_{\theta JC}$	0.39	℃/W

Table 3. Electrical Chatacteristics (T_J=25℃, unless otherwise specified)

Parameters		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V,I_D=250μA	650			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=650V,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	3.5		4.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=40.8A		20	23	mΩ
Dynamic Characteristics(Note 4)							
Input Capacitance		C_{ISS}	V_{DS}=400V,V_{GS}=0V,f=1MHz		11515		pF
Output Capacitance		C_{OSS}			158		pF
Reverse Transfer Capacitance		C_{RSS}			23		pF
Switching Characteristics (Note 4)							
Turn-On Delay Time		td(on)	V_{DS}=480V,I_D=40.8A, V_{GS}=18V,R_G=2.2Ω		13.4		ns
Turn-On Rise Time		tr			36.8		ns
Turn-Off Delay Time		td(off)			376.6		ns
Turn-Off Fall Time		tf			16.5		ns
Total Gate Charge		Q_G	V_{DS}=400V,I_D=40.8A, V_{GS}=10V		264		nC
Gate-Source Charge		Q_{GS}			69		nC
Gate-Drain Charge		Q_{GD}			85		nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_S=40.8A		0.9	1.4	V
Reverse Recovery Time		trr	V_{GS}=0V,I_S=30A,V_{DS}=400V dI$_F$/dt=100A/μs(Note 3)		223		ns
Reverse Recovery Charge		Qrr			2.11		μC
Peak Reverse Recovery Charge		Irrm			16		A

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 I_{AS}=7A, V_{DD} = 50V,L=10mH,V_{GS} = 10 V,Starting TJ=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

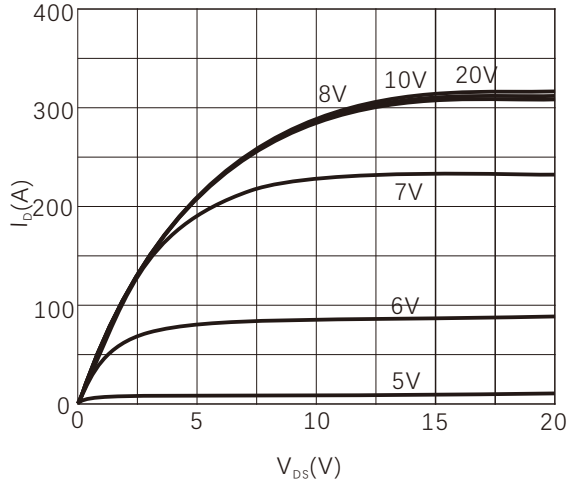


Figure 2. Transfer Characteristics

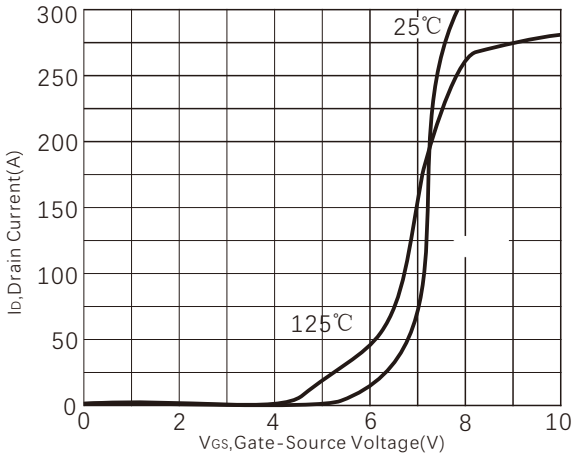


Figure 3.On-Resistance vs.Drain Current

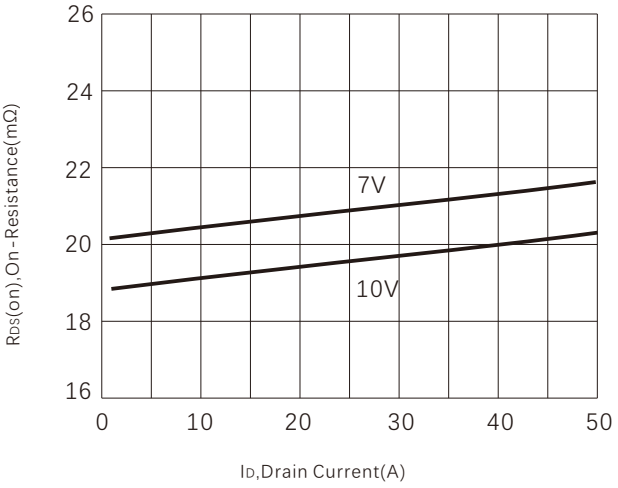


Figure 4. Capacitance

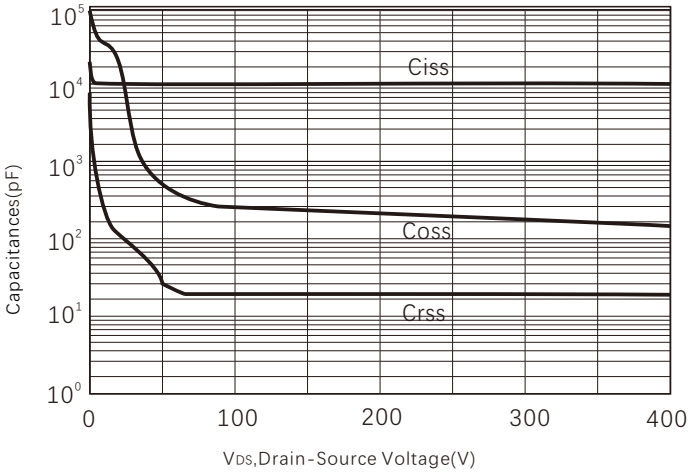


Figure 5.Gate charge

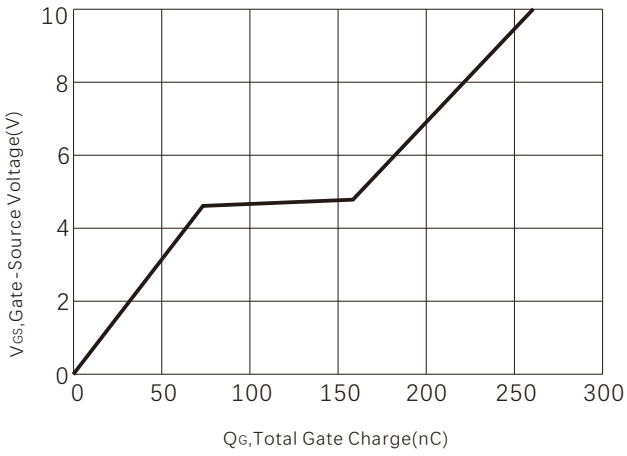


Figure 6.Source-Drain Diode Forward Voltage

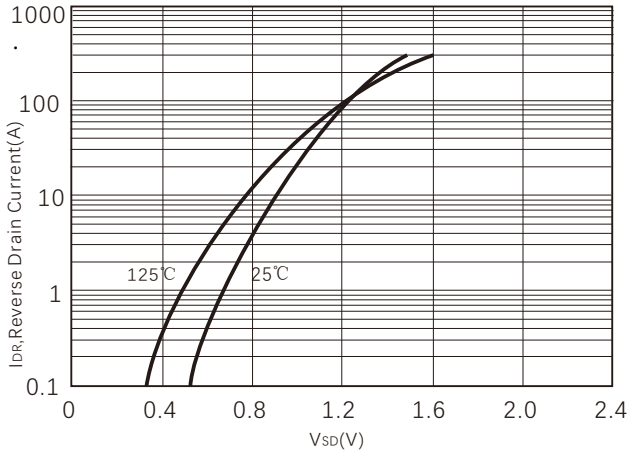


Figure7. $R_{DS(ON)}$ vs Junction Temperature

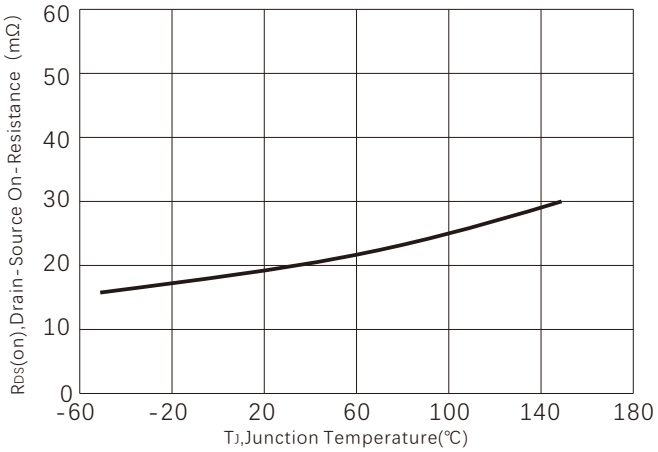


Figure 8. Power dissipation

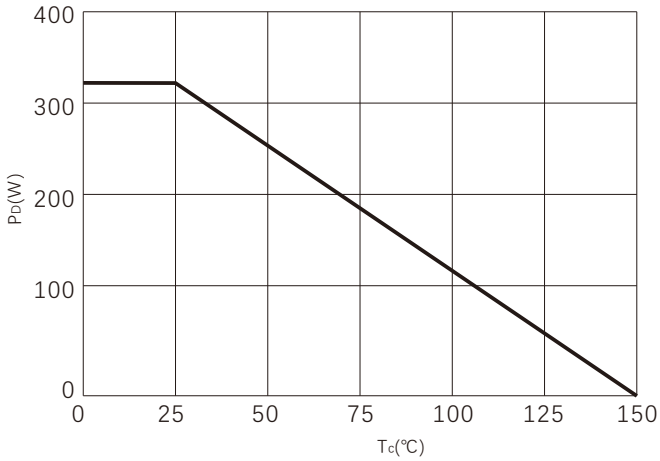


Figure 9.

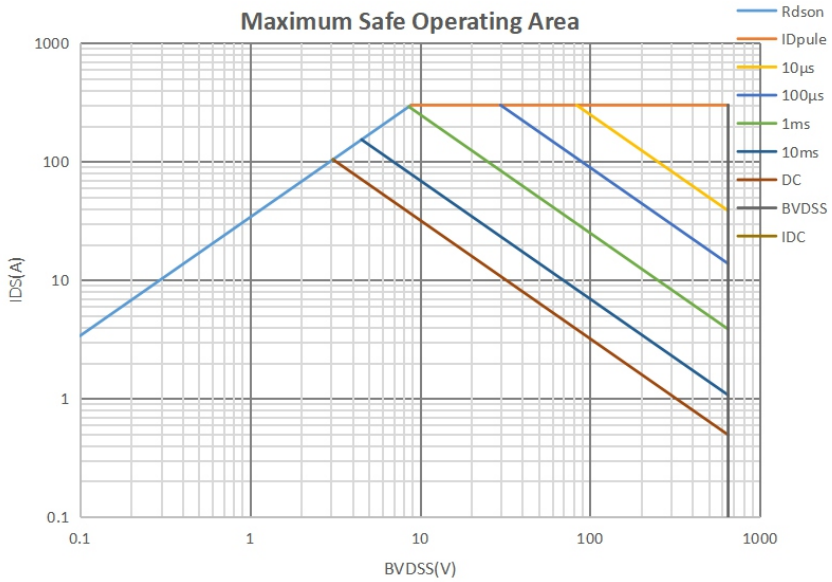
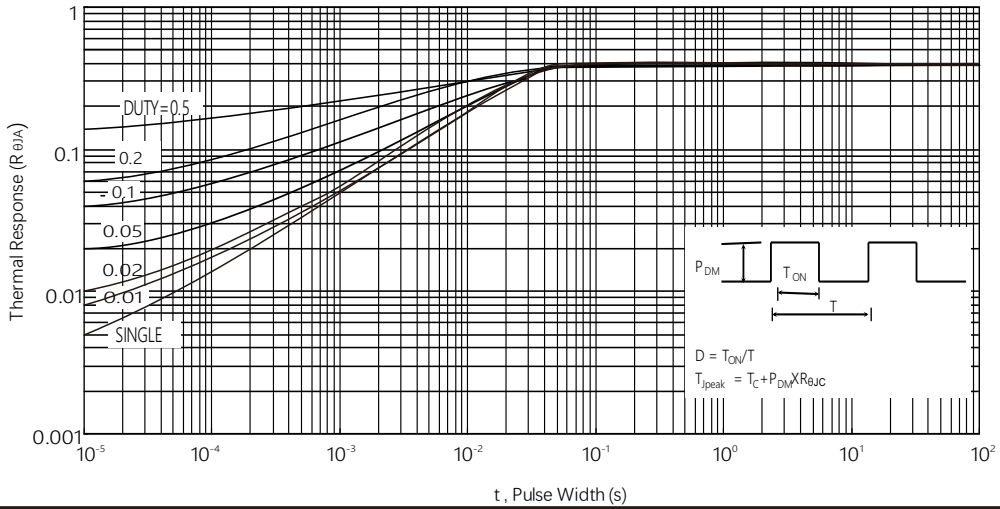
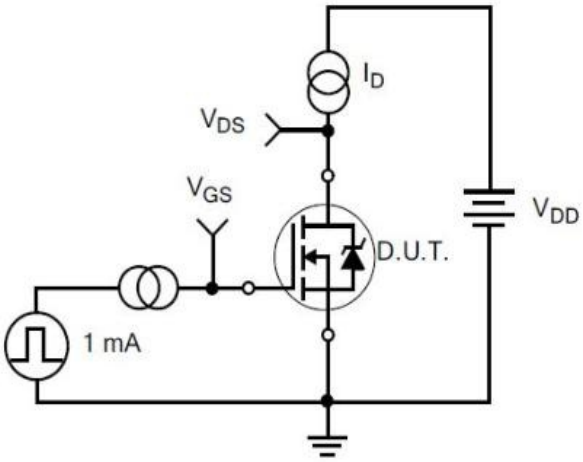


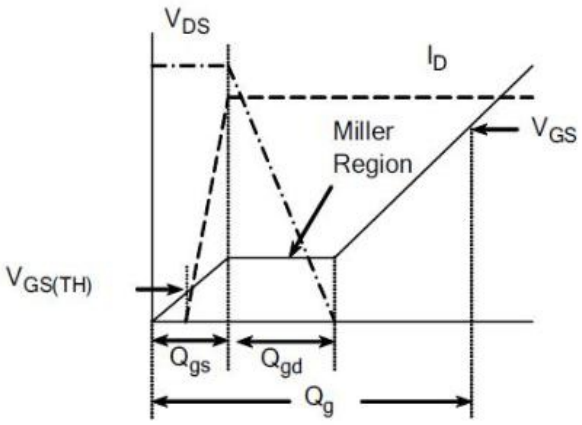
Figure 10. Maximum Transient Thermal Impedance



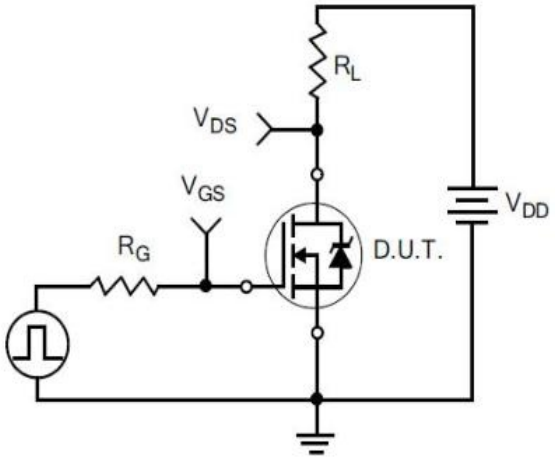
Typical Test Circuit



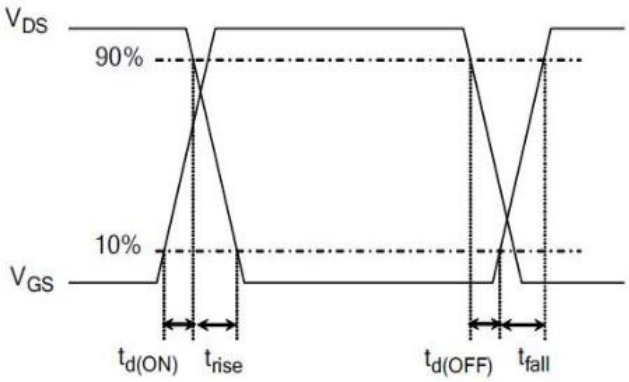
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

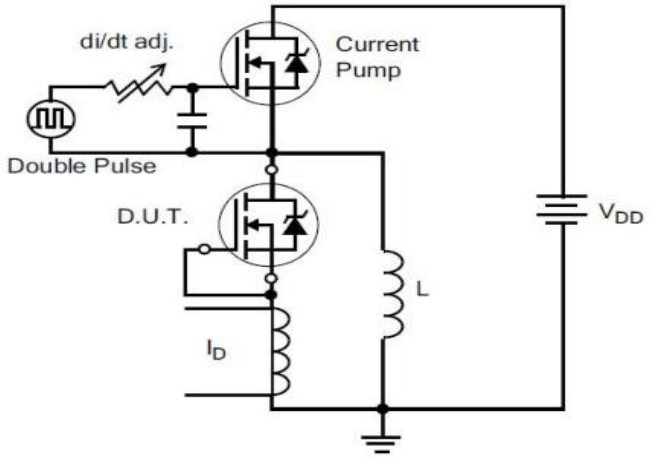


3) Resistive Switching Test Circuit

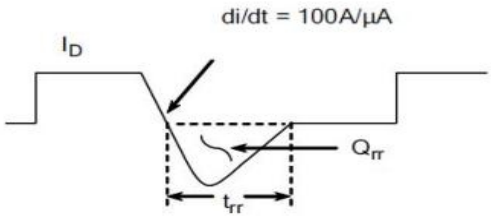


4) Resistive Switching Waveforms

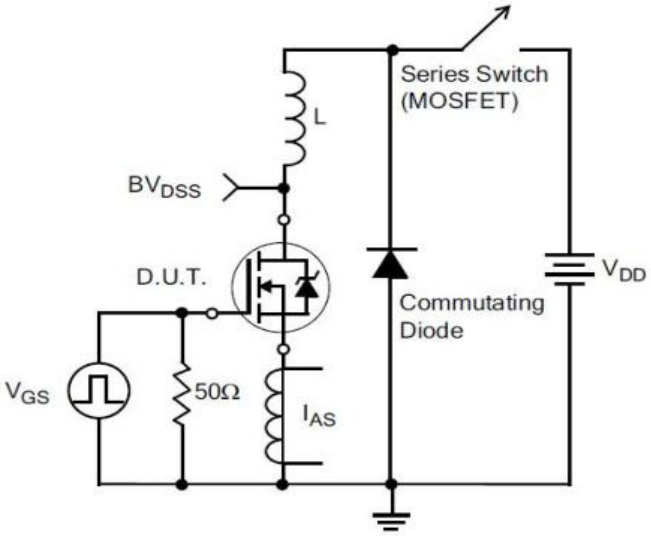
Typical Test Circuit



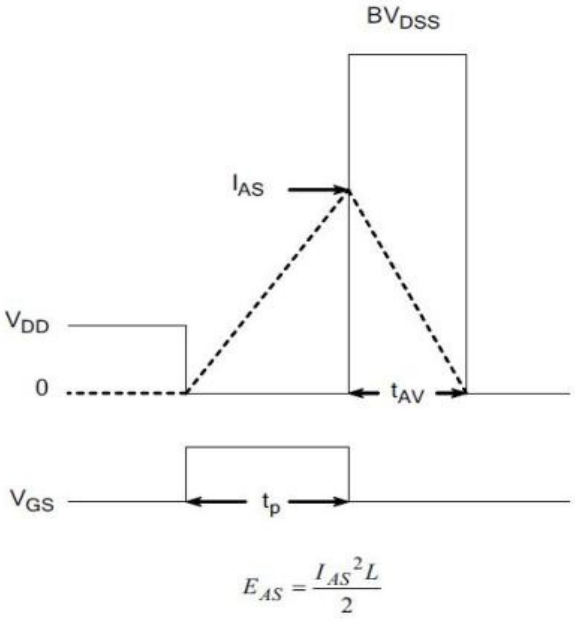
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

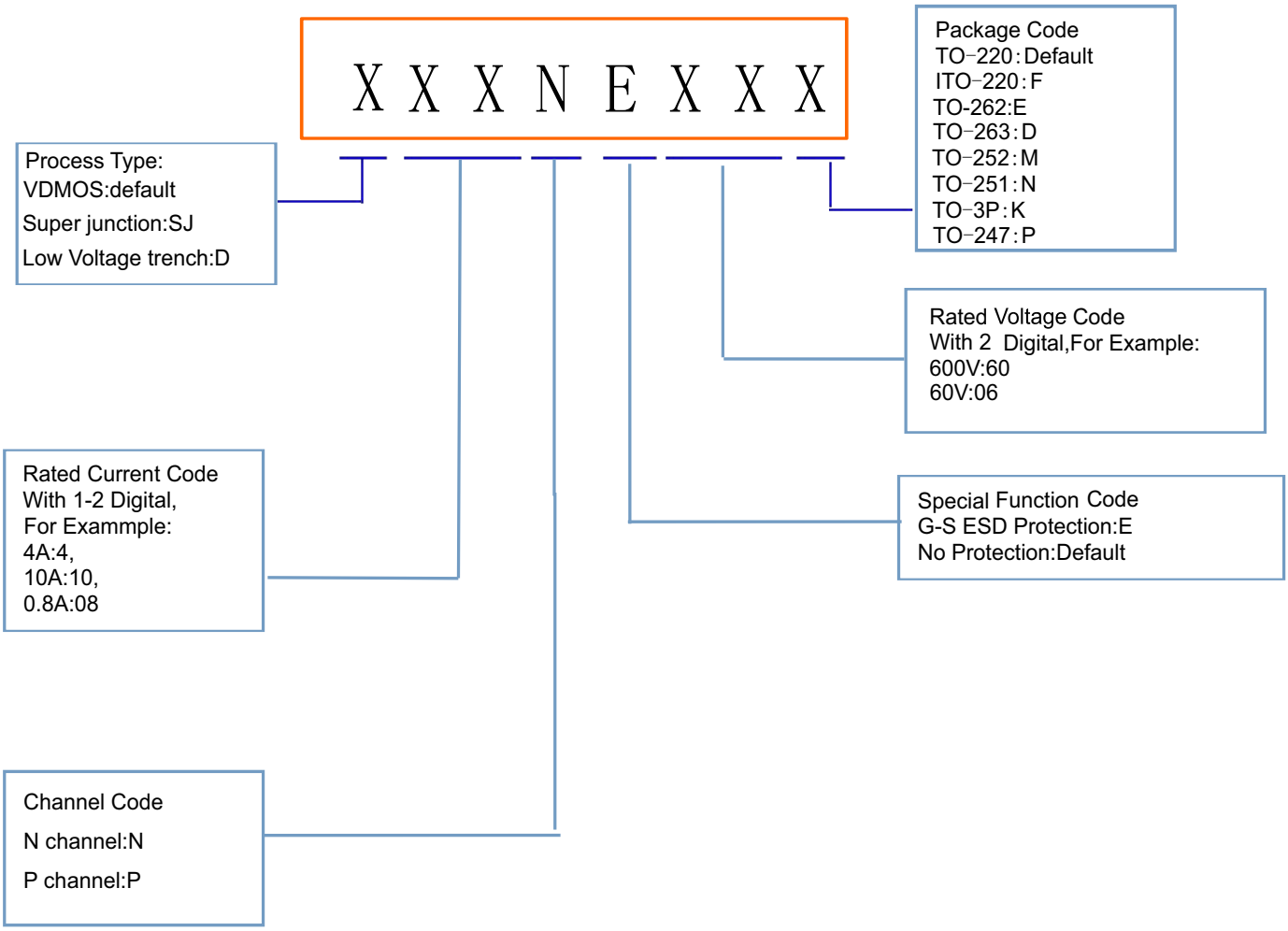


7) . Unclamped Inductive Switching Test Circuit



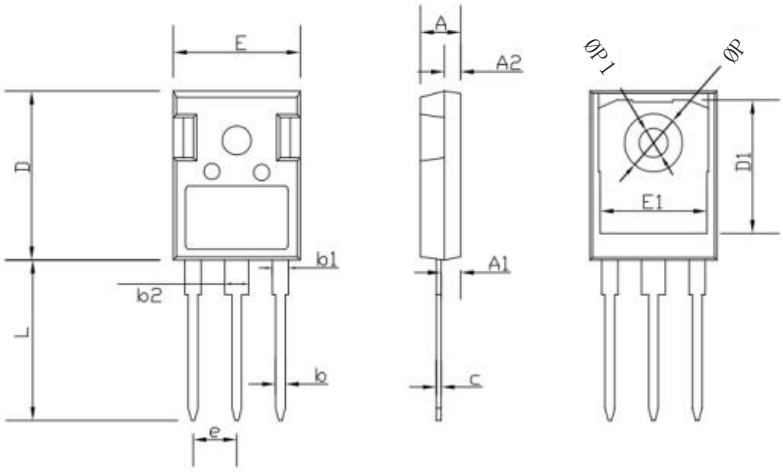
8) Unclamped Inductive Switching Waveforms

Product Names Rules



Dimensions

TO-247 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	4.90	5.10	0.193	0.201
A1	2.31	2.51	0.091	0.099
A2	1.90	2.10	0.075	0.083
b	1.16	1.26	0.046	0.050
b1	1.96	2.06	0.0772	0.0812
b2	2.96	3.06	0.117	0.121
c	0.59	0.66	0.0232	0.0260
D	20.90	21.10	0.8235	0.8313
D1	16.25	16.85	0.6403	0.6639
E	15.70	15.90	0.6186	0.6265
E1	13.10	13.50	0.5161	0.5319
e	5.44		0.2143	
L	19.80	20.10	0.7801	0.7919
ΦP	3.50	3.70	0.1379	0.1458
ΦP1	0	7.30	0	0.2876

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