

### General Description

The 25N50 uses advanced technology and design to provide excellent  $R_{DS(ON)}$ . It can be used in a wide variety of applications.

### Features

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

### Mechanical Data

- Case:TO-247 Package

### Application

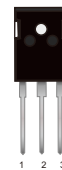
- Power switching application
- Adapter and charger

### Ordering Information

Part No.	Package Type	Package	Quality(box)
25N50P	TO-247	Tube	360

Product Summary			
$V_{DS}$	$R_{DS(ON)}$ Typ.	$I_D$	$Q_g$ (Typ)
500V	0.18 $\Omega$ @ 10V,12.5A	25A	41nc

TO-247  
25N50P



### Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

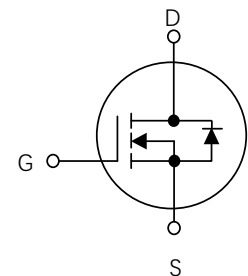


Table1 Absolute Maximum Ratings (Tc=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	500	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current Tc=25°C	$I_D$	25	A
Pulsed Drain Current (Note 1)	$I_{DM}$	100	A
Single Pulse Avalanche Energy(Note 2)	$E_{AS}$	324	mJ
Power Dissipation Tc=25°C	$P_D$	300	W
Operating Junction and Storage Temperature	$T_J/T_{STG}$	-55~+150	°C

Table 2. Thermal Characteristics

Parameter	Symbol	Typ.	Unit
Thermal resistance Junction to Case	$R_{\theta JC}$	0.42	$^{\circ}\text{C}/\text{W}$

Table 3. Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Off Characteristics							
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu\text{A}$	500	-	-	V	
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=500V, V_{GS}=0V$	-	-	1	$\mu\text{A}$	
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	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2.0	-	4.0	V	
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=12.5\text{A}$	-	0.18	0.22	$\Omega$	
Dynamic Characteristics(Note 4)							
Input Capacitance	$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	-	4180	-	pF	
Output Capacitance	$C_{OSS}$		-	370	-	pF	
Reverse Transfer Capacitance	$C_{RSS}$		-	16	-	pF	
Switching Characteristics (Note 4)							
Turn-On Delay Time	$t_d(\text{on})$	$V_{DD}=250V, I_D=25\text{A}$ $R_G=10\Omega$	-	37	-	ns	
Turn-On Rise Time	$t_r$		-	64	-	ns	
Turn-Off Delay Time	$t_d(\text{off})$		-	86	-	ns	
Turn-Off Fall Time	$t_f$	$V_{DS}=400V, I_D=25\text{A}$ $V_{GS}=10V$	-	46	-	ns	
Total Gate Charge	$Q_G$		-	72	-	nC	
Gate-Source Charge	$Q_{GS}$		-	18	-	nC	
Gate-Drain Charge	$Q_{GD}$		-	23	-	nC	
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=25\text{A}$	-	-	1.25	V	
Maximum Continuous Drain-Source Diode Forward Current	$I_S$		-	-	25	A	
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_F=25\text{A}$	-	360	-	ns	
Reverse Recovery Charge	$Q_{RR}$	$dI_F/dt=100\text{A}/\mu\text{s}$ (Note 4)	-	5.3	-	$\mu\text{C}$	

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature

2  $V_{DD}=50V$ , starting  $T_J=25^{\circ}\text{C}$ ,  $L=0.5\text{mH}$ ,  $R_G=25\Omega$ ,  $I_{AS}=36\text{A}$

3 Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$

4 Guaranteed by design, not subject to production

Typical Characteristics Diagrams

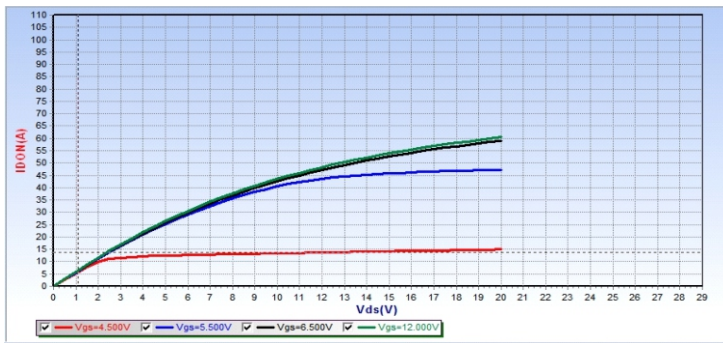


Fig1. Output Characteristics

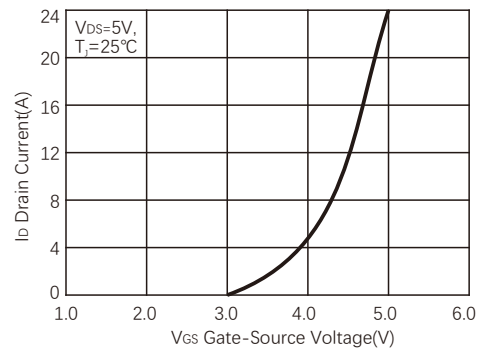


Fig2. Transfer Characteristics

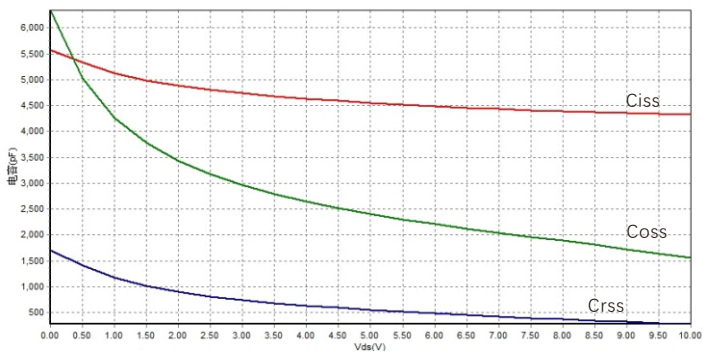


Fig3. Capacitance Characteristics

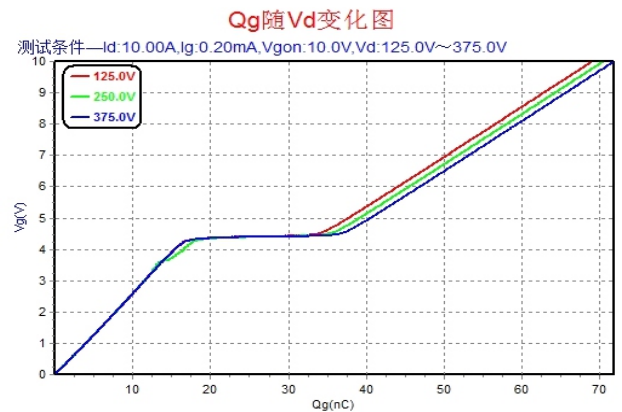


Fig4. Gate Charge

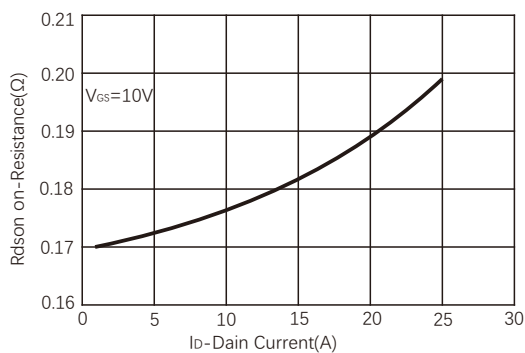


Fig5. Drain-Source on Resistance

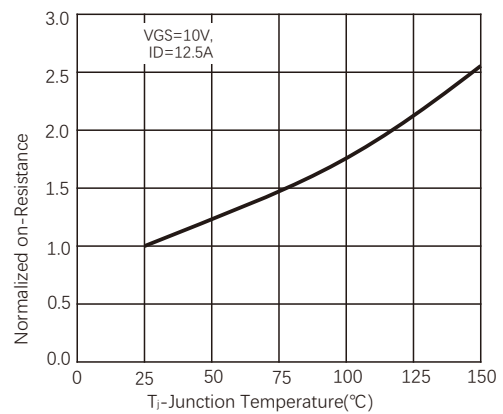


Fig6. Drain-Source on Resistance

Typical Characteristics Diagrams

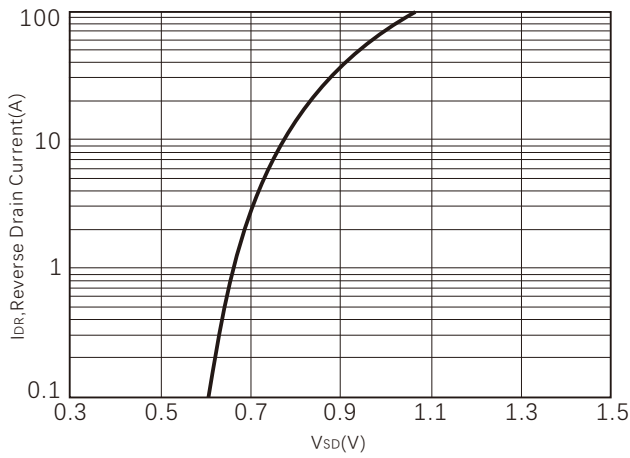


Fig 7.Source-Drain Diode Forward Voltage

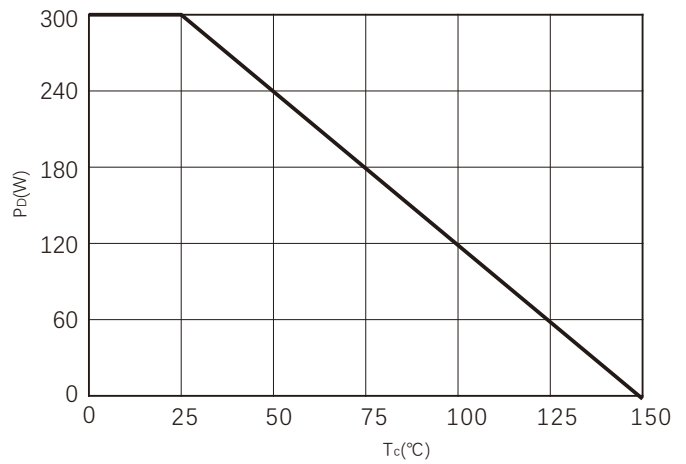


Fig.8 Power dissipation

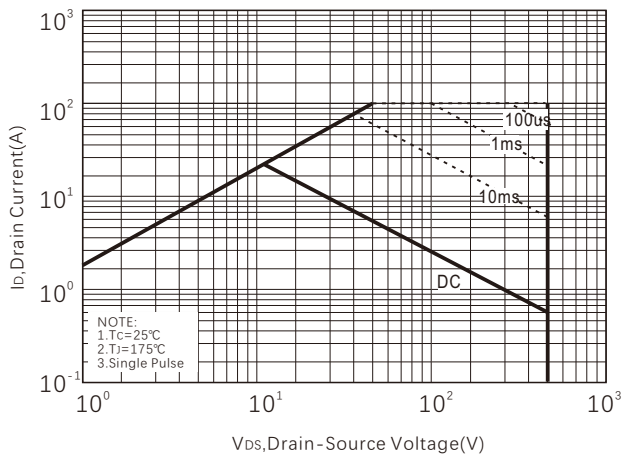


Fig9. Safe operating area

Fig10.Normalized Maximum Transient Thermal Impedance

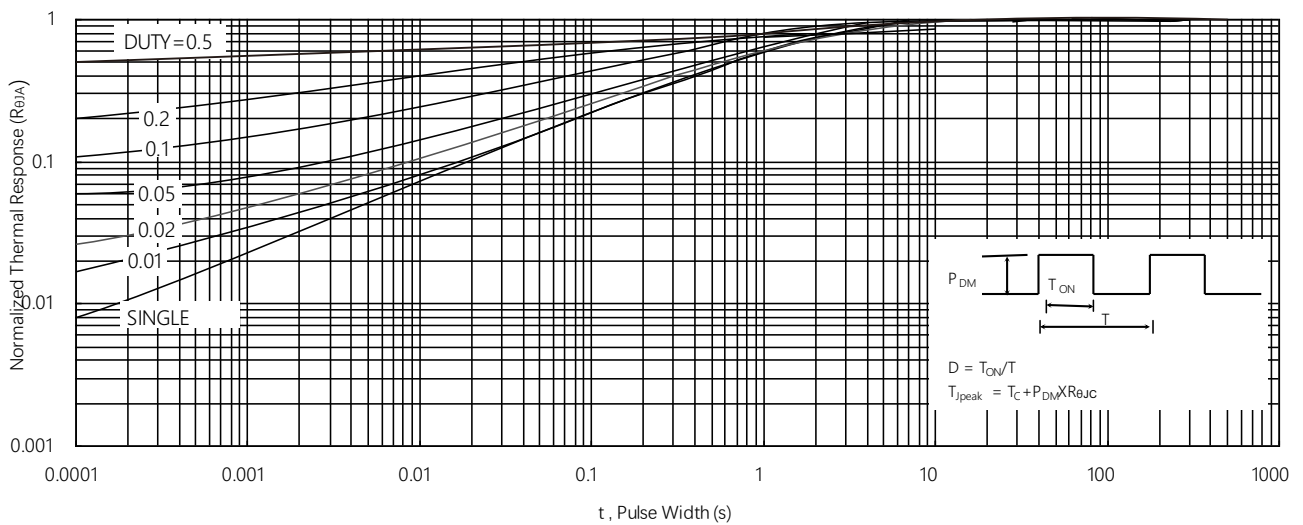
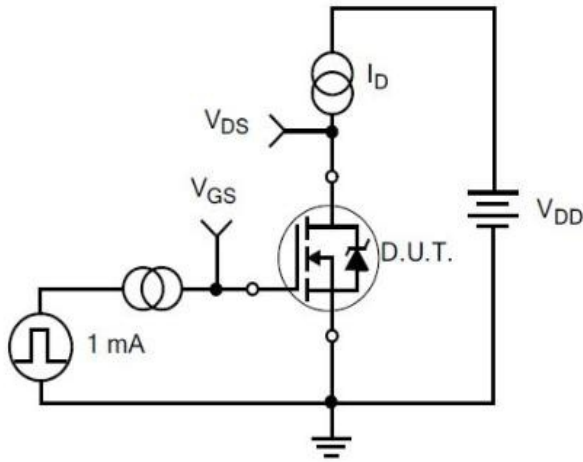
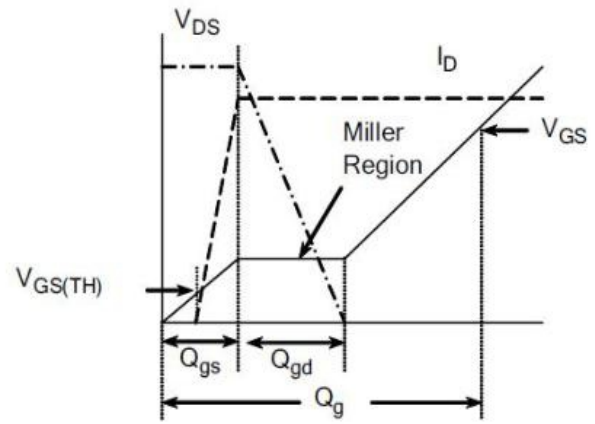


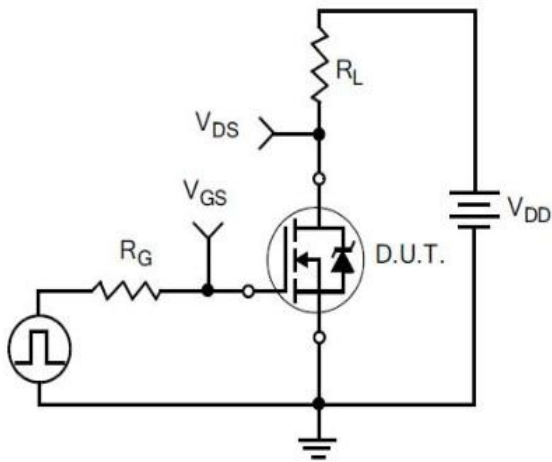
Fig.11 Typical Test Circuit



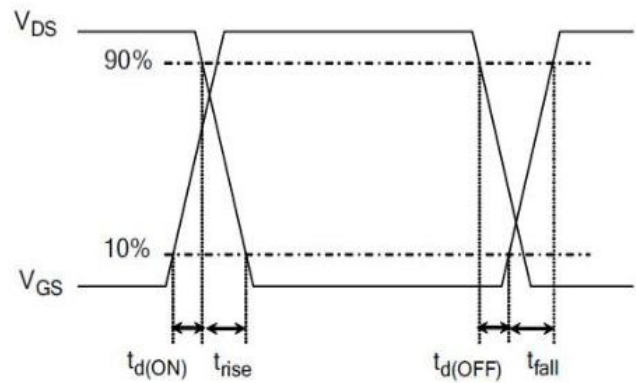
1) Gate Charge Test Circuit



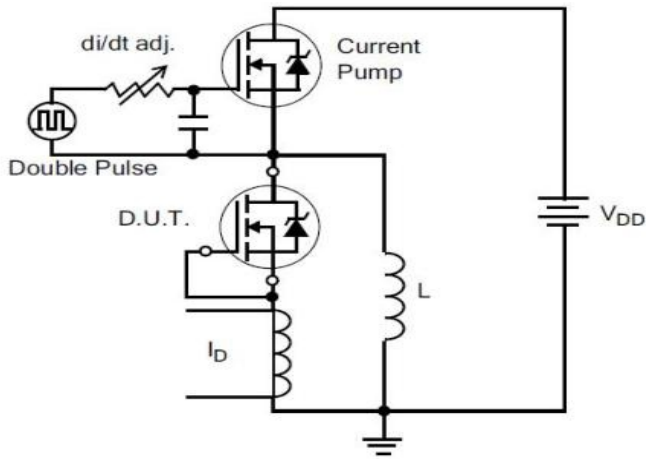
2) Gate Charge Waveform



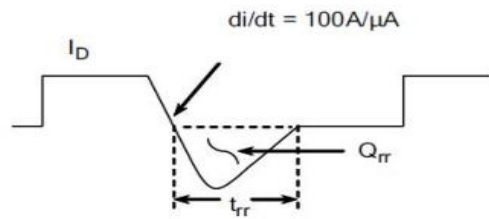
3) Resistive Switching Test Circuit



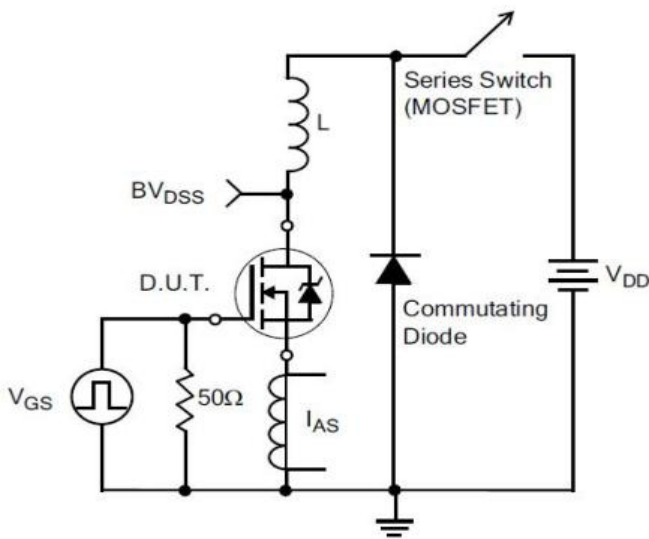
4) Resistive Switching Waveforms



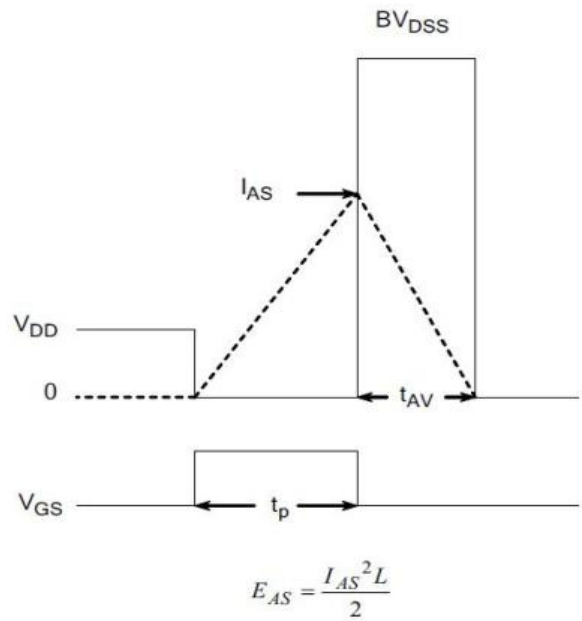
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



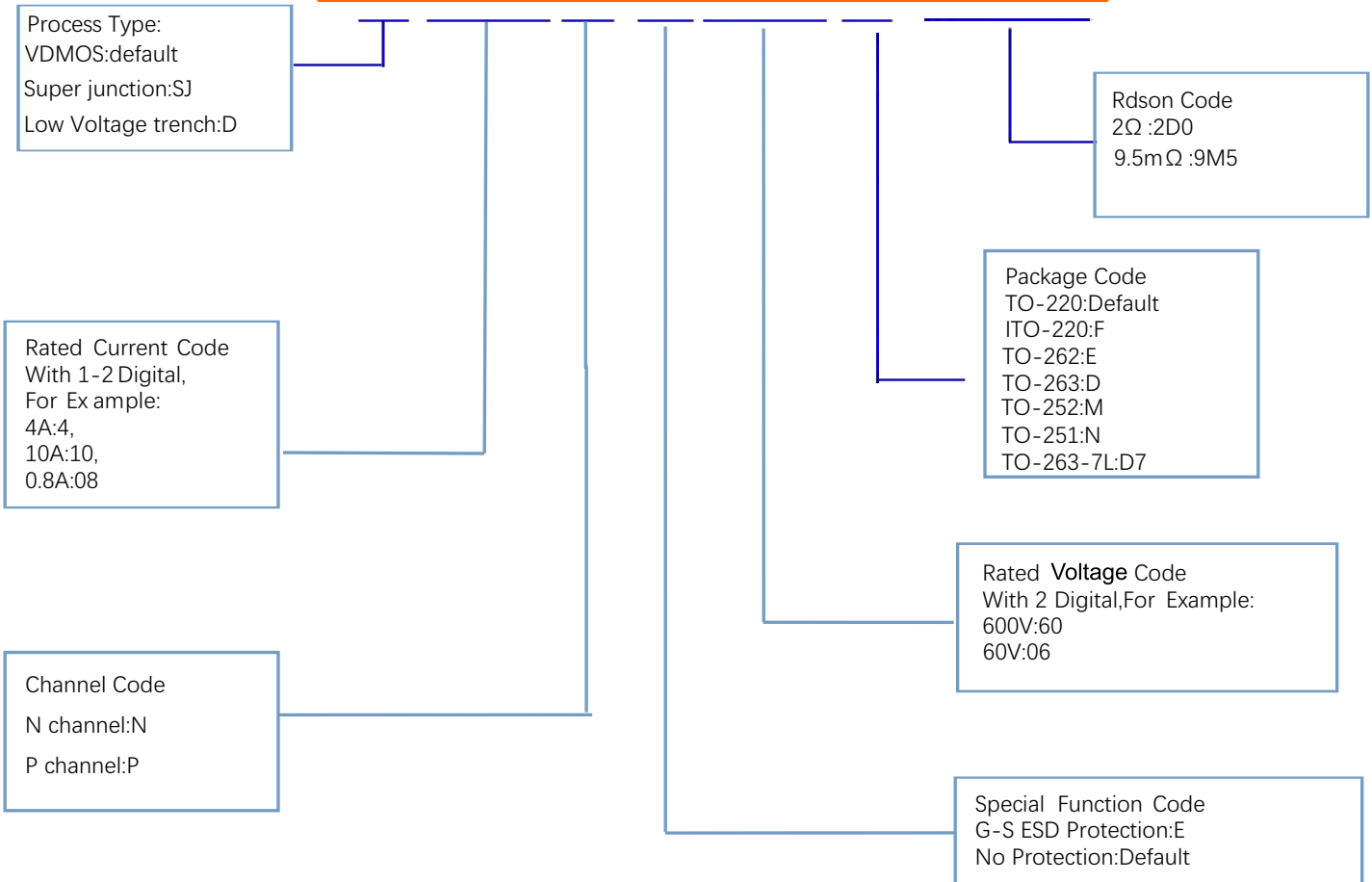
7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

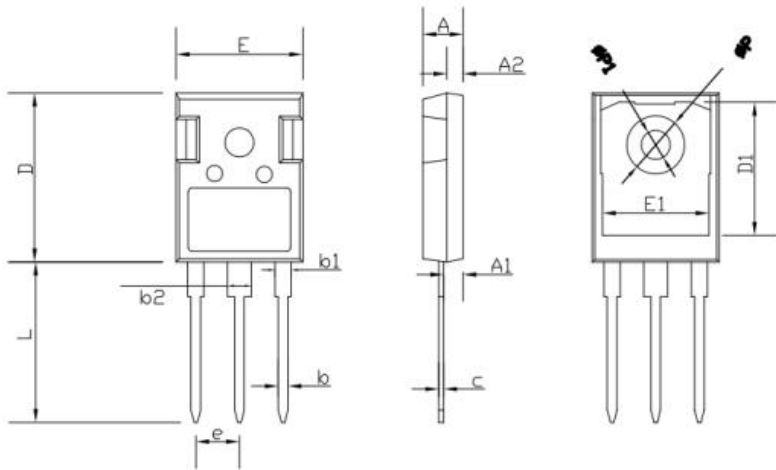
Product Names Rules

XXXNEXXX-XXX



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	2.15	0.0772	0.085
b2	2.96	3.16	0.117	0.124
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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