SCE900N1200ED

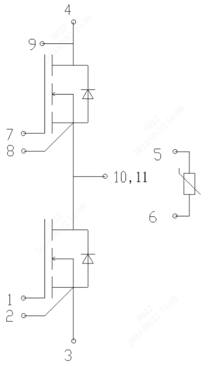
1200V, 900A, 1.8mΩ, Half-Bridge, Silicon Carbide MOSFET Module

沃德颐通
— WORLD E TO —

Product Data Sheet

General Description

The SCE-ED module incorporates SCE's 1200V Gen3 N-channel SiC MOSFET. NTC temperature sensor inside.



Features

- High Temperature, Humidity, and Bias Operation
- Ultra Low Loss
- High-frequency Operation
- Zero Turn-off Tail Current from MOSFET
- Normally-off, Fail-safe Device Operation
- Copper Baseplate and Aluminum Nitride Insulator

Applications

- High Power Converters
- Motor Drives
- Servo Drives
- UPS Systems
- Wind Turbines

Ordering Informations

Order Number / Marking	SCE900N1200ED
Package Type	ED

Key Parameters

Symbol	Parameter	Values			Unit	Test Conditions
Absolute maximum rating						
V_{DS}	Drain-source Voltage	1200			V	T_C=25°C
I_D	Drain Current (continuous)	900			A	T_C=25°C
T_J	Junction Temperature	175			°C	
Symbol	**Parameter**	**Min.**	**Typ.**	**Max.**	**Unit**	**Test Conditions**
Static characteristics						
$R_{DS(on)}$	Static Drain-source on Resistance	-	1.8	2.5	mΩ	V_{GS}=18V; I_D=450A; T_C=25°C
Dynamic characteristics						
Q_G	Total Gate Charge	-	2142	-	nC	V_{DD}=800V; V_{GS}=-5/+18V; I_D=450A; T_C=25°C
Q_{GD}	Gate-drain Charge	-	705	-		
Source-drain diode						
Q_{RR}	Reverse Recovery Charge	-	5517	-	nC	V_{GS}=-5/+18V; I_F=500A; V_R=900V; Load=100μH; T_J=25°C

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

Symbol	Parameter	Values	Unit
V_{DS}	Drain-source Voltage	1200	V
V_{GS}	Gate-source Voltage (dynamic)	-10/+22	V
I_D	Drain Current (continuous)	900	A
I_{DM}	Drain Current (pulsed)	1800	A
T_{op}; T_{stg}	Operating and Storage Temperature Range	-40 to +175	°C
T_J	Junction Temperature	175	°C
L_{Stray}	Stray Inductance	20	nH
V_{isol}	Isolation Test Voltage (DC; 2mA; t=10s)	4.2	kV
$R_{th\ Jh}$	Thermal Resistance, Junction-to-heatsink	0.12	°C/W

MOSFET Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
Static characteristics (at T_C=25°C unless otherwise specified)						
BV_{DS}	Drain-source Breakdown Voltage	1200	-	-	V	V_{GS}=0V
I_{DSS}	Zero Gate Voltage Drain Current	-	-	450	μA	V_{DS}=1200V; V_{GS}=0V
I_{GSS}	Gate-body Leakage Current	-	-	4.5	μA	V_{GS}=-10/20V; V_{DS}=0V
$V_{GS(th)}$	Gate Threshold Voltage	2.0	-	4.0	V	V_{DS}=V_{GS}; I_D=90mA
$R_{DS(on)}$	Static Drain-source on Resistance	-	1.8	2.5	mΩ	V_{GS}=18V; I_D=450A
$V_{GS(on)}$	Recommended Turn-on Voltage	-	18	-	V	Static
$V_{GS(off)}$	Recommended Turn-off Voltage	-	-5	-	V	
R_G	Gate Resistance	-	0.35	-	Ω	V_{AC}=25mV; f=1MHz
Dynamic characteristics (at T_C=25°C unless otherwise specified)						
C_{iss}	Input Capacitance	-	61.9	-	nF	V_{DS}=1000V; f=100kHz; V_{AC}=25mV
C_{oss}	Output Capacitance	-	2.6	-		
C_{rss}	Reverse Transfer Capacitance	-	117	-	pF	
E_{on}	Turn-on Energy	-	65.1	-	mJ	V_{DD}=900V; V_{GS}=-5/+18V; I_D=500A; Load=100μH
E_{off}	Turn-off Energy	-	50.4	-		
Q_{GS}	Gate-source Charge	-	690.3	-	nC	V_{DD}=800V; V_{GS}=-5/+18V; I_D=450A
Q_{GD}	Gate-drain Charge	-	705	-		
Q_G	Total Gate Charge	-	2142	-		
$t_{d(on)}$	Turn-on Delay Time	-	158	-	ns	V_{DD}=900V; V_{GS}=-5/+18V; I_D=500A; $R_{G(ext)}$=5Ω; Load=100μH
t_r	Rise Time	-	143	-		
$t_{d(off)}$	Turn-off Delay Time	-	549	-		
t_f	Fall Time	-	141	-		

Body Diode Characteristics (at T_J=25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{FSD}	Forward Voltage	-	-	6	V	V_{GS}=0V; I_F=450A
I_S	Continuous Diode Forward Current	-	450	-	A	V_{GS}=0V; T_C=25°C
t_{RR}	Reverse Recovery Time	-	96	-	ns	V_{GS}=-5/+18V; I_F=500A; V_R=900V; Load=100μH
Q_{RR}	Reverse Recovery Charge	-	5517	-	nC	
I_{RRM}	Peak Reverse Recovery Current	-	175	-	A	

NTC Thermistor Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
R_{25}	Rated Resistance	-	5.00	-	kΩ	T_{NTC}=25°C
ΔR/R	Deviation of R_{100}	-5	-	5	%	T_{NTC}=100°C; R_{100}=493.3Ω
$B_{25/50}$	Beta Value for 25°C to 50°C	-	3375	-	K	$R_2=R_{25}\exp[B_{25/50}(1/T_2 - 1/(298.15K))]$
$B_{25/80}$	Beta Value for 25°C to 80°C	-	3414	-	K	$R_2=R_{25}\exp[B_{25/80}(1/T_2 - 1/(298.15K))]$
$B_{25/100}$	Beta Value for 25°C to 100°C	-	3436	-	K	$R_2=R_{25}\exp[B_{25/100}(1/T_2 - 1/(298.15K))]$

Typical Performance

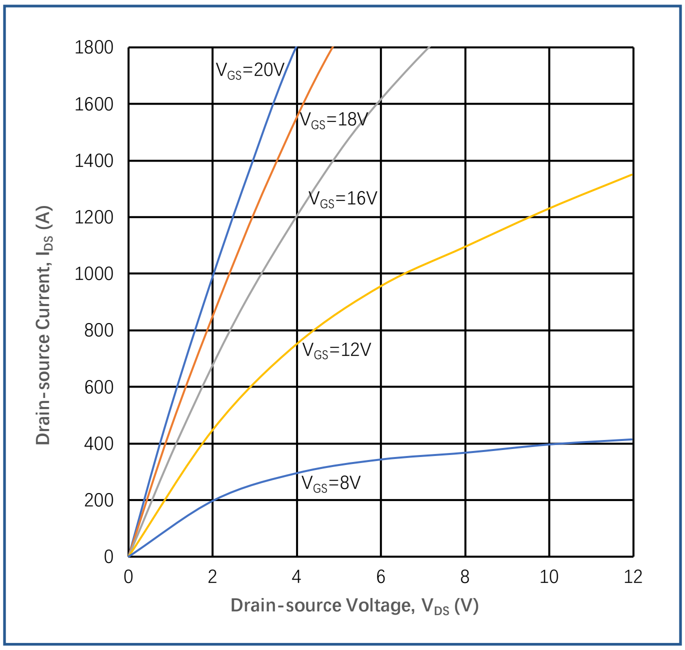


Figure 1

Output Characteristics (T_J=25 °C)

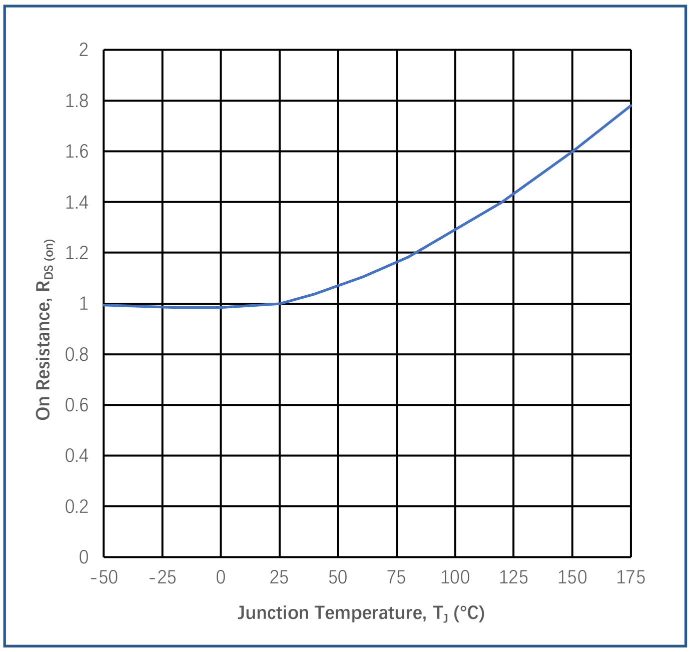


Figure 2

Normalized on-resistance vs. Temperature

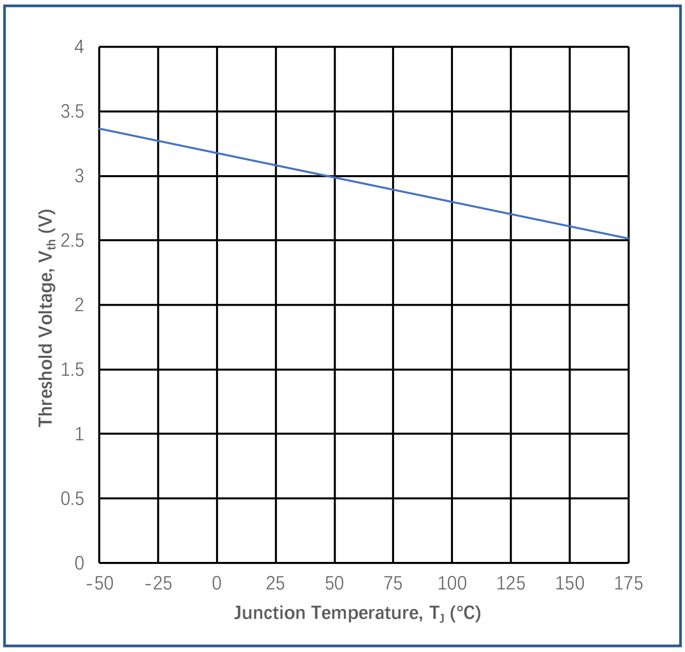


Figure 3

Threshold Voltage vs. Temperature

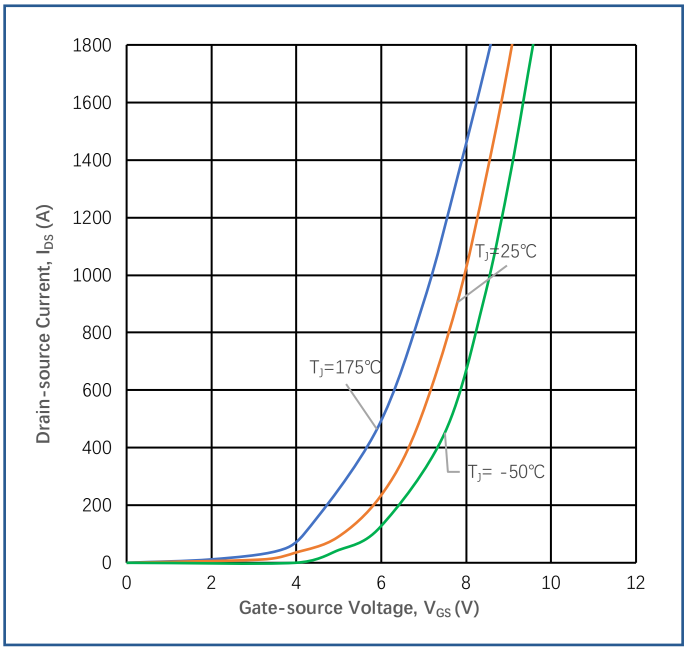


Figure 4

Transfer Characteristic for Various T_J

Typical Performance

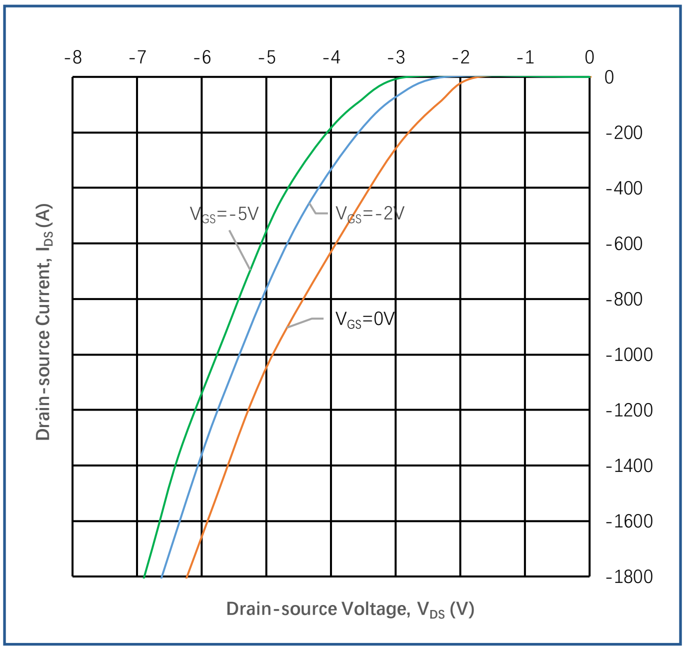


Figure 5

Diagnode Characteristic at 25 ˚C

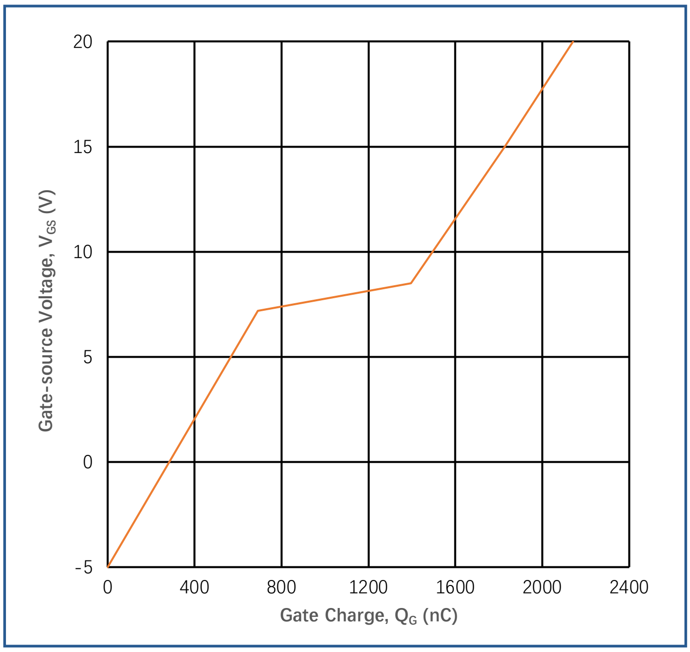


Figure 6

Typical Gate Charge Characteristics

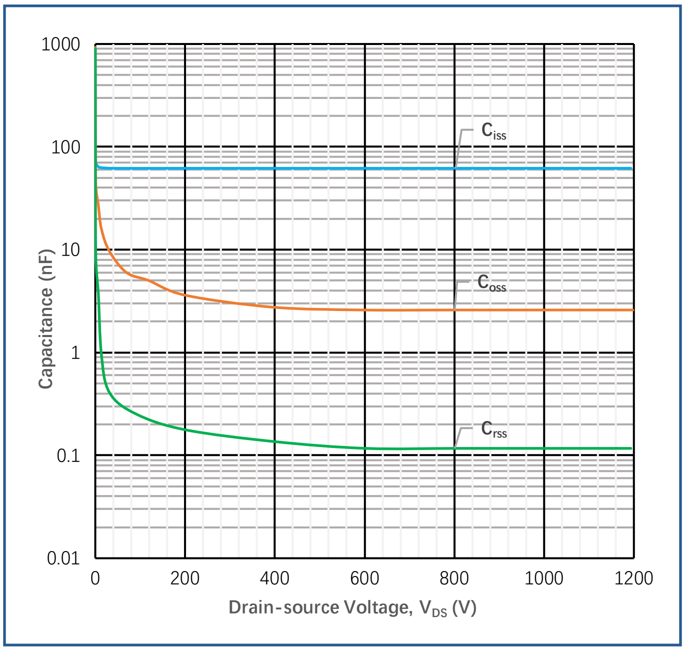


Figure 7

Typical Capacitances vs. Drain-source Voltage

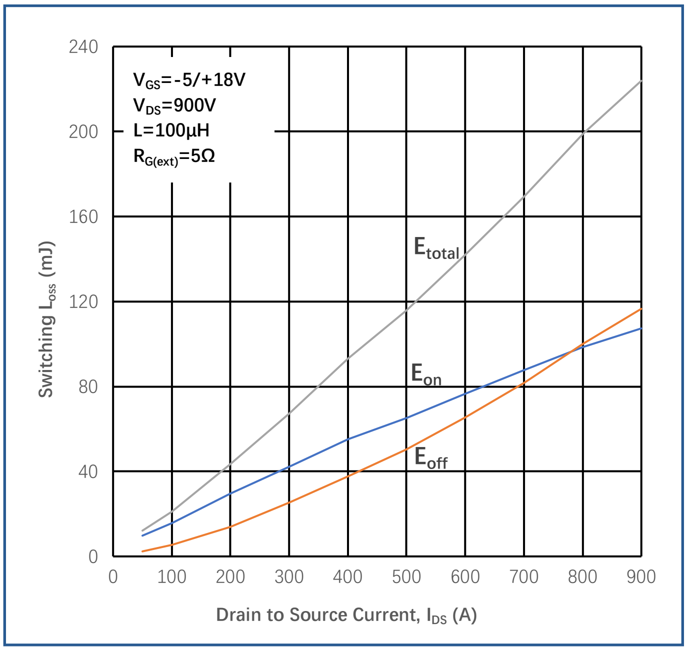


Figure 8

Inductive Switching Energy vs. Drain Current

Typical Performance

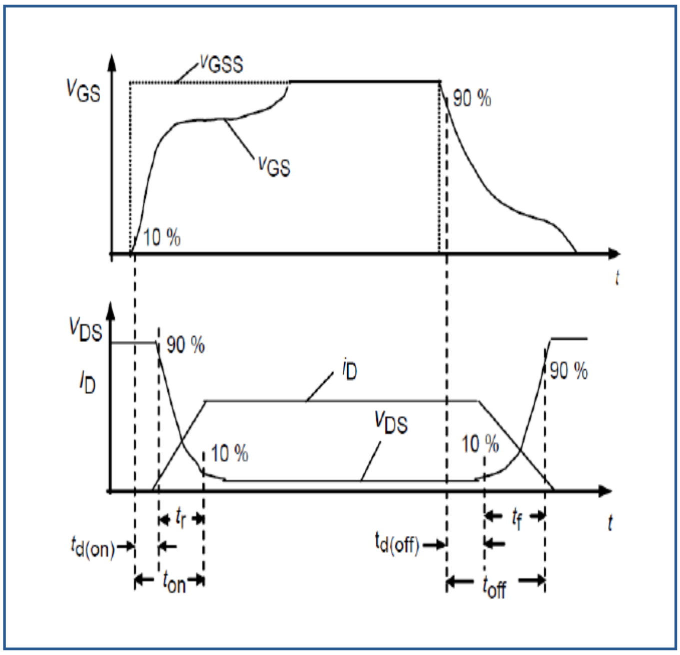


Figure 9

Switching Time Description

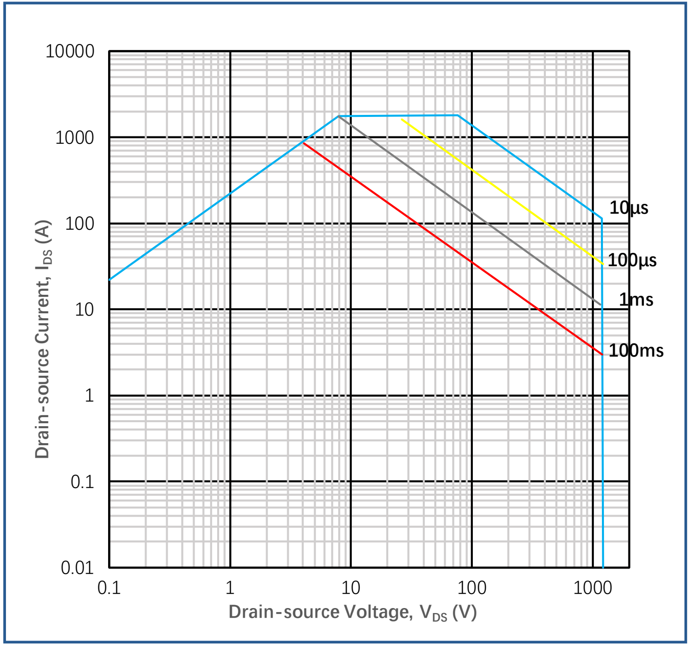
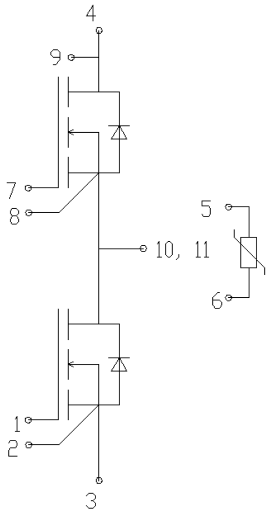


Figure 10

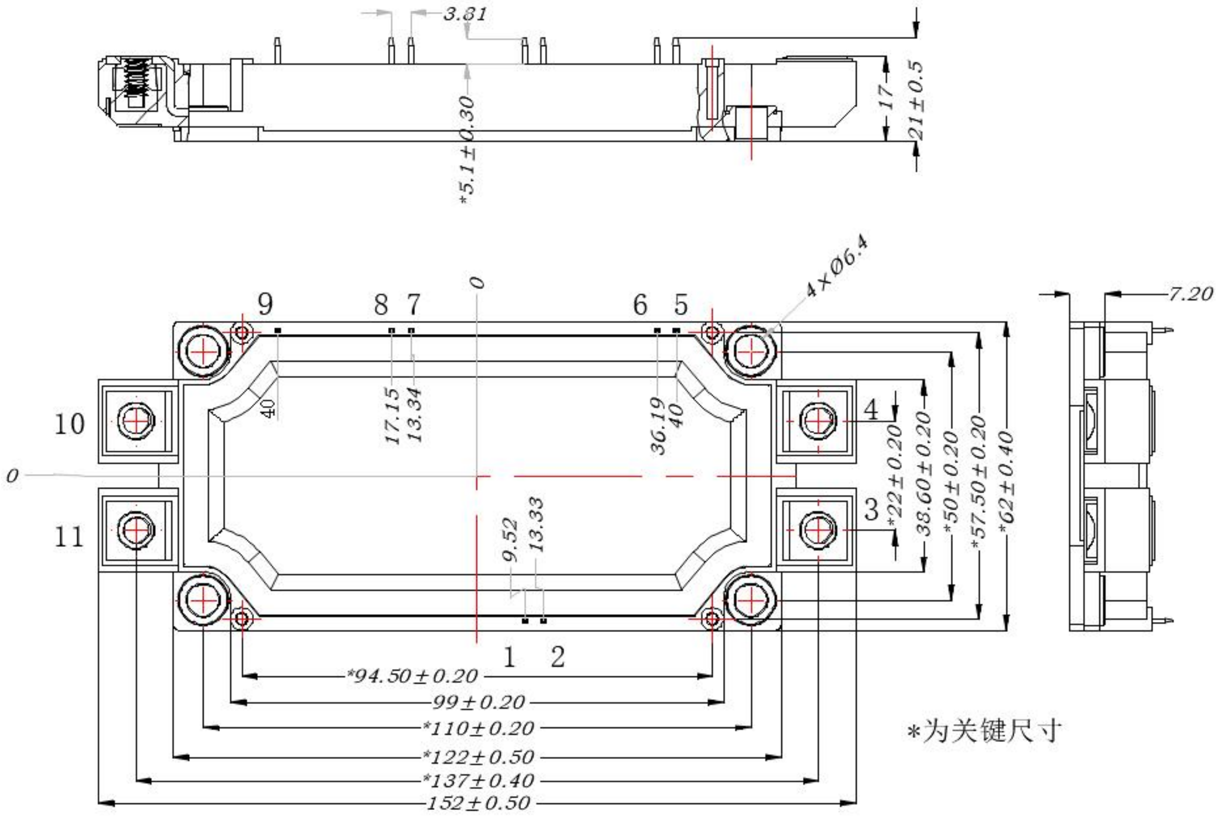
Safe Operating Area

Circuit Diagram Headline



Package Dimensions (mm)

Package Type：ED



*为关键尺寸

未标注线性公差按 GB/1804-2000c 级执行	公差分段	0.5-3	3-6	6-30	30-120	120-400
	c 级	±0.2	±0.3	±0.5	±0.8	±1.2

Notes & Disclaimer

This document and the information contained herein are subject to change without notice. Any such change shall be evidenced by the publication of an updated version of this document by SCE Technology. No communication from any employee or agent of SCE Technology or any third party shall effect an amendment or modification of this document.

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, SCE Technology hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

Any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of SCE Technology in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

Except as otherwise explicitly approved by SCE Technology in a written document signed by authorized representatives, the products of SCE Technology may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.