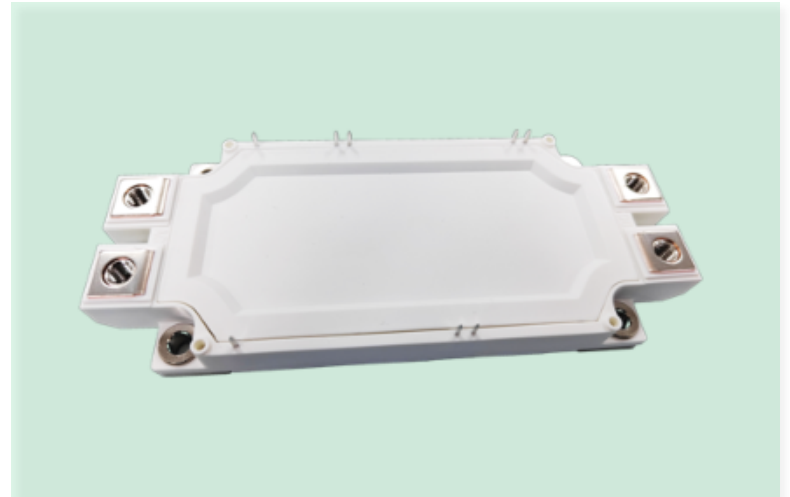


IGBT Module/IGBT 模块

Features/特性

- 1200V,600A
- H 桥模块
H-bridge module
- 更低的电感
Low inductance
- 更高的短路耐量
High short circuit capability
- 超低的通态及开关损耗
Ultra low conduction and switching loss
- 包含快速软恢复二极管
Including ultra fast&soft recovery anti-parallel



IGBT Power Module

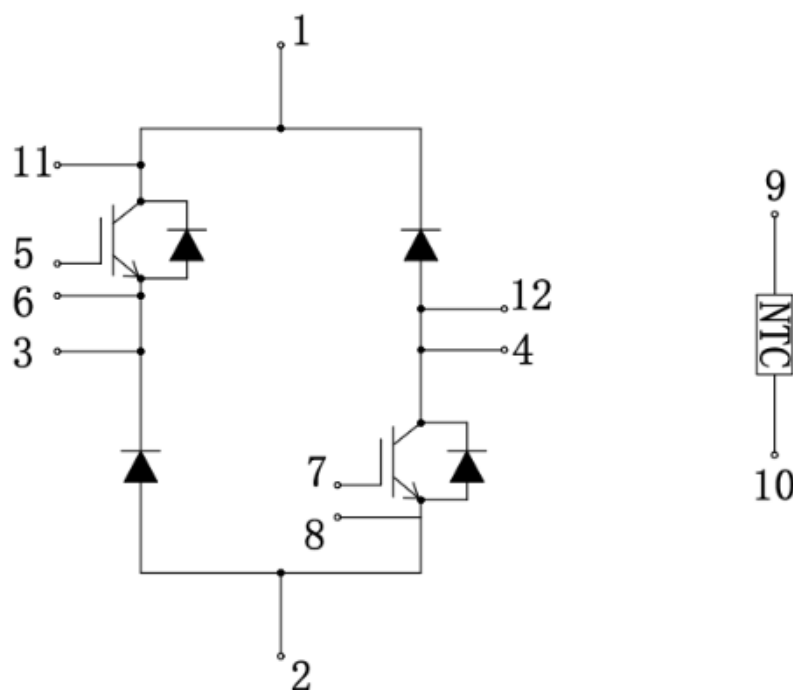
Mechanical Features/机械特性

绝缘的基板
Isolated Base Plate
标准封装
Standard Housing

Applications/应用

- 伺服应用
Servo Applications
- 电机驱动
Motor Drives
- UPS系统
UPS Systems

Equivalent Circuit Schematic/等效电路图



IGBT-Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage 集电极-发射极电压	1200	V
V_{GES}	Gate-Emitter Peak Voltage 栅极-发射极峰值电压	± 20	V
I_C	Continuous Collector Current 连续集电极直流电流	$T_C = 100^\circ\text{C}$ 600	A
I_{CM}	Pulsed Collector Current 集电极重复峰值电流	$t_p = 1\text{ms}$ 1200	A
P_{tot}	Total Power Dissipation 总功率功耗	$T_{vj} \text{ max} = 175^\circ\text{C}$ 4285	W

IGBT Characteristics (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE \text{ sat}}$	Collector to Emitter Saturation Voltage 集电极-发射极饱和电压	$I_C = 600\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^\circ\text{C}$		2.2	V
			$T_{vj} = 125^\circ\text{C}$		2.4	
$V_{GE \text{ th}}$	Gate-Emitter Threshold Voltage 栅极阈值电压	$I_C = 18\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^\circ\text{C}$		6.2		V
I_{CES}	Collector-Emitter Cut-off Current 集电极-发射极截止电流	$V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^\circ\text{C}$			1.0	mA
I_{GES}	Gate-emitter Leakage Current 栅极-发射极漏电流	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^\circ\text{C}$			600.0	nA
R_{Gint}	Internal Gate Resistor 内部栅极电阻			0.7		Ω
Q_G	Gate Charge 栅极电荷	$V_{GE} = -15 \dots +15\text{ V}$		2.6		μC
C_{ies}	Input Capacitance 输入电容	$V_{CE} = 25\text{ V}, f = 1\text{ MHz},$ $V_{GE} = 0\text{ V}$		23.8		nF
C_{res}	Reverse Transfer Capacitance 反向传输电容				2.2	
t_{don}	Turn-on Delay Time 开通延迟时间		$T_{vj} = 25^\circ\text{C}$		215	nS
			$T_{vj} = 125^\circ\text{C}$		240	
t_r	Rise Time 上升时间		$T_{vj} = 25^\circ\text{C}$		75	nS
			$T_{vj} = 125^\circ\text{C}$		80	
t_{doff}	Turn-off Delay Time 关断延迟时间	$V_{CE} = 600\text{ V}, I_C = 600\text{ A},$ $R_G = 1\Omega, V_{GE} = -8\text{ V} \dots +15\text{ V}$	$T_{vj} = 25^\circ\text{C}$		750	nS
			$T_{vj} = 125^\circ\text{C}$		840	
t_f	Fall Time 下降时间		$T_{vj} = 25^\circ\text{C}$		75	nS
			$T_{vj} = 125^\circ\text{C}$		200	
E_{on}	Turn-On Switching Loss Per Pulse 开通损耗能量		$T_{vj} = 25^\circ\text{C}$		30	mJ
			$T_{vj} = 125^\circ\text{C}$		44	
E_{off}	Turn-off Energy Loss Per Pulse 关断损耗能量		$T_{vj} = 25^\circ\text{C}$		42	mJ
			$T_{vj} = 125^\circ\text{C}$		56	
I_{sc}	SC Data 短路数据	$V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}, t_p \leq 10\mu\text{s},$ $T_{vj} = 150^\circ\text{C}$		2400		A
R_{thJC}	Thermal Resistance, Junction to Case 结-外壳热阻	per IGBT		0.035		K/W

Diode-Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter	Value	Units
V _{RRM}	Repetitive Peak Reverse Voltage 反向重复峰值电压	1200	V
I _F	Diode Continuous Forward Current 连续正向直流电流	600	A
I _{FM}	Diode Maximum Forward Current 正向重复峰值电流	tp=1ms 1200	A

Diode Characteristics (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _F	Diode Forward Voltage 正向电压	I _F = 600 A	Tvj=25°C	2.0		V
			Tvj=125°C		2.1	
Q _r	Recovered Charge 恢复电荷	I _F = 600A, V _R = 600 V, V _{GE} = -8 V...+15 V, di/dt=4600A/us	Tvj=25°C	40.0		μC
			Tvj=125°C		70	
I _{rm}	Peak Reverse Recovery Current 反向恢复峰值电流	I _F = 600A, V _R = 600 V, V _{GE} = -8 V...+15 V, di/dt=4600A/us	Tvj=25°C	330		A
			Tvj=125°C		385	
E _{rec}	Reverse Recovery Energy 反向恢复损耗	I _F = 600A, V _R = 600 V, V _{GE} = -8 V...+15 V, di/dt=4600A/us	Tvj=25°C	13.0		mJ
			Tvj=125°C		26.0	
R _{thJC}	Thermal Resistance, Junction to Case 结-外壳热阻	per Diode		0.075		K/W

Diode-Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter	Value	Units
V _{RRM}	Repetitive Peak Reverse Voltage 反向重复峰值电压	1200	V
I _F	Diode Continuous Forward Current 连续正向直流电流	40	A
I _{FM}	Diode Maximum Forward Current 正向重复峰值电流	tp=1ms 80	A

Diode Characteristics (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _F	Diode Forward Voltage 正向电压	I _F = 600 A	Tvj=25°C	1.9		V
			Tvj=125°C		1.9	
Q _r	Recovered Charge 恢复电荷	I _F = 600A, V _R = 600 V, V _{GE} = -8 V...+15 V, di/dt=4600A/us	Tvj=25°C	1.4		μC
			Tvj=125°C		4	
I _{rm}	Peak Reverse Recovery Current 反向恢复峰值电流	I _F = 600A, V _R = 600 V, V _{GE} = -8 V...+15 V, di/dt=4600A/us	Tvj=25°C	48		A
			Tvj=125°C		49	
E _{rec}	Reverse Recovery Energy 反向恢复损耗	I _F = 600A, V _R = 600 V, V _{GE} = -8 V...+15 V, di/dt=4600A/us	Tvj=25°C	0.7		mJ
			Tvj=125°C		1.4	
R _{thJC}	Thermal Resistance, Junction to Case 结-外壳热阻	per Diode		1.0		K/W

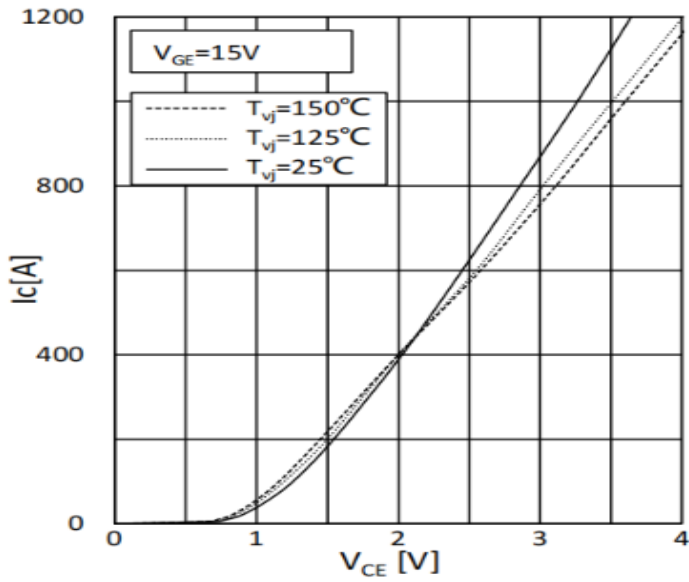
Module

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{ISOL}	Isolation Test Voltage 绝缘测试电压	RMS, f = 50 Hz, t = 1 min	3000			V
T _{vj max}	Maximum Junction Temperature 最大结温				175	°C
T _{vj op}	Operating Junction Temperature 工作结温		-40		150	°C
T _{STG}	Storage Temperature Range 储存温度		-40		150	°C
M _s	Mounting Torque For Modul Mounting 模块安装的安装扭矩	Recommended(M6)	3		6	Nm
M _t	Terminal Connection Torque 端子连接扭矩	Recommended(M5)	3		6	Nm
G	Weight 重量			358		g

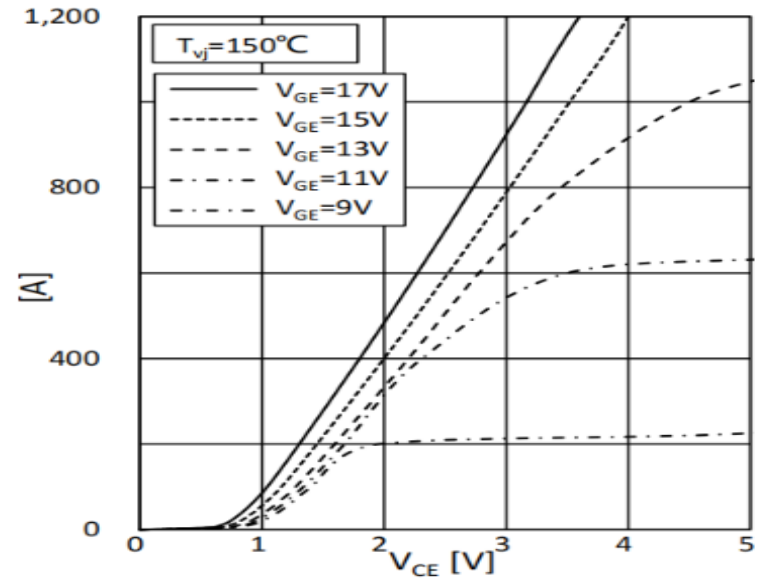
负温度系数热敏电阻/NTC Thermistor, 特征值(@ TC = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R ₂₅	额定电阻值 Rated resistance			5		kΩ
ΔR/R	R100_x005f偏差 Deviation of R100	T _C = 100°C, R ₁₀₀ = 493Ω	-5		5	%
P ₂₅	耗散功率 Power dissipation				20	m/W
B _{25/50}	B-值 B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15 K))]$		3375		K
B _{25/80}	B-值 B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15 K))]$		3411		K
B _{25/100}	B-值 B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15 K))]$		3433		K

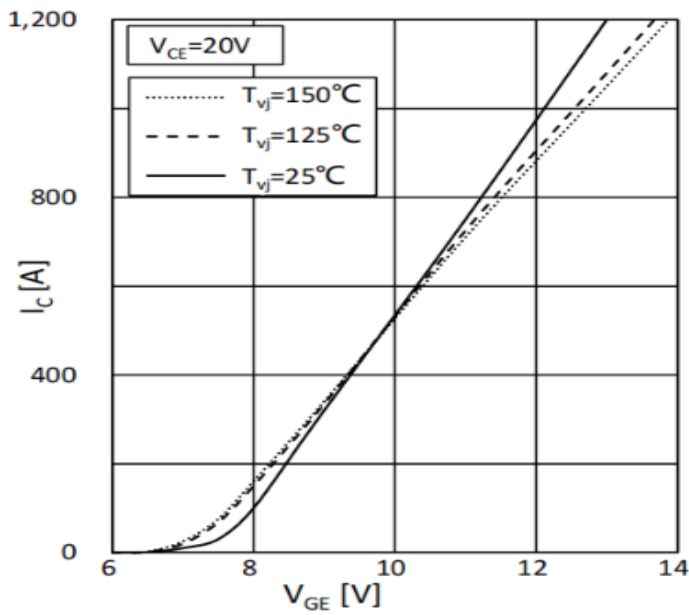
输出特性IGBT
output characteristic IGBT
 $I_C=f(V_{CE})$
 $V_{GE}=15V$



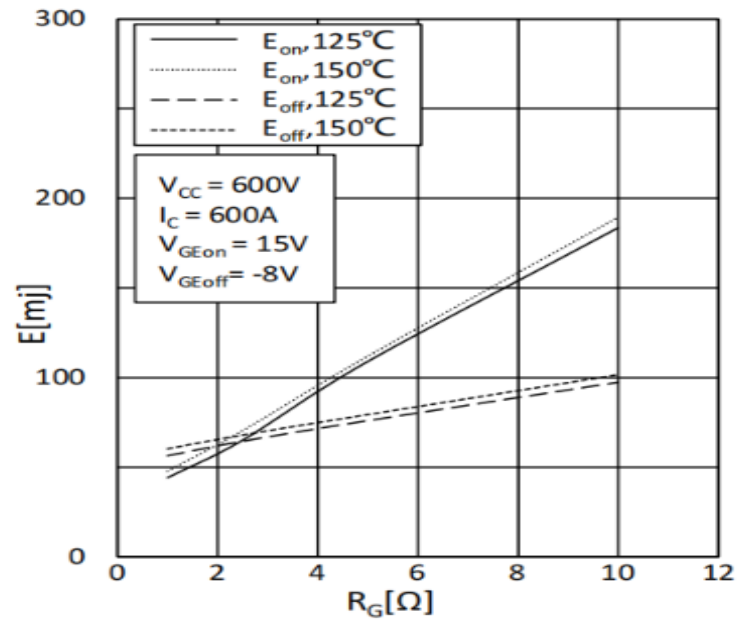
输出特性IGBT
output characteristic IGBT
 $I_C=f(V_{CE})$
 $T_{vj}=150^\circ C$



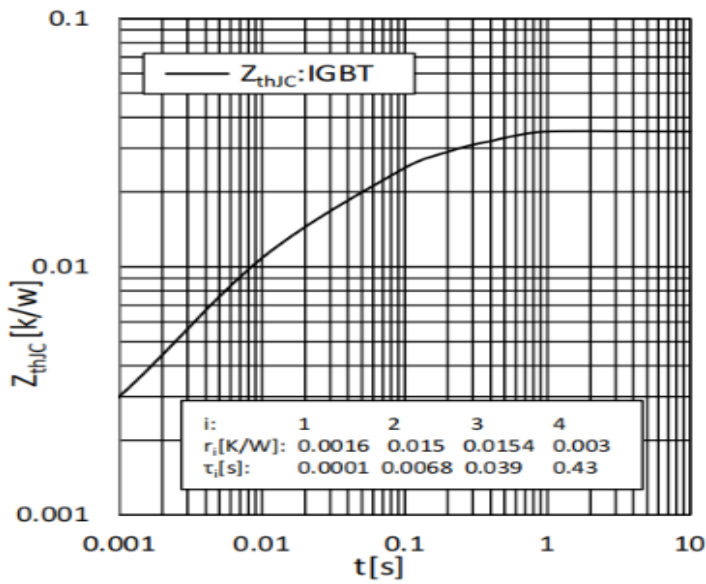
传输特性IGBT
transfer characteristic IGBT
 $I_C=f(V_{GE})$
 $V_{CE}=20V$



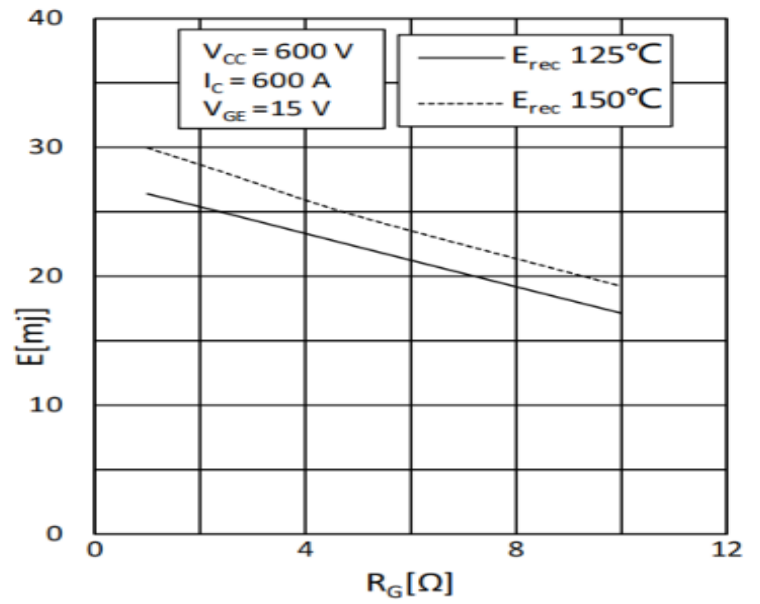
开关损耗IGBT
switching losses IGBT
 $E_{on}=f(R_G), E_{off}=f(R_G)$
 $V_{GE}=\pm 15V, I_C=600A, V_{CE}=600V$



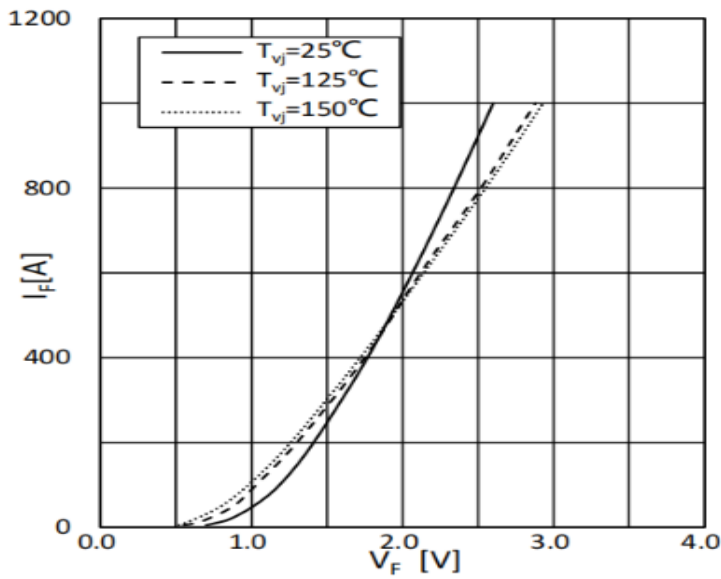
瞬态热阻抗IGBT,斩波
transient thermal impedance IGBT,Chopper
 $Z_{thJC}=f(t)$



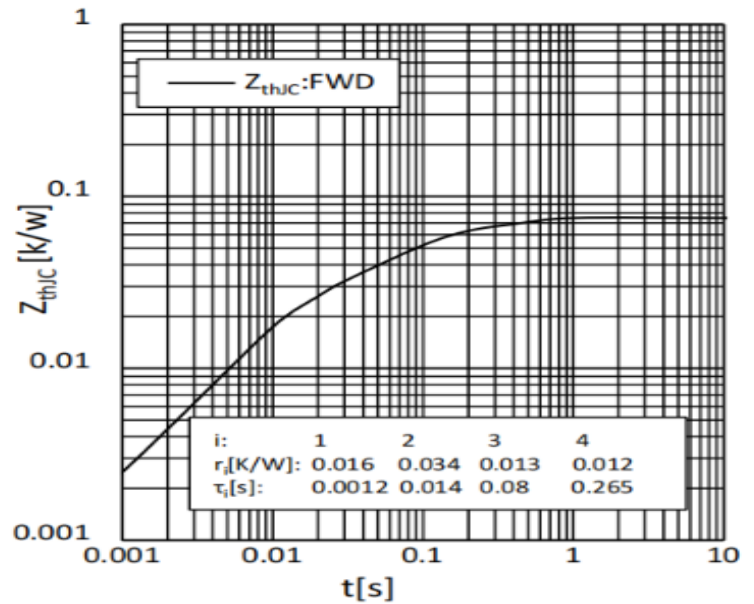
开关损耗二极管,斩波
switching losses Diode,Chopper
 $E_{rec}=f(R_G)$
IF=600A,VCE=600V



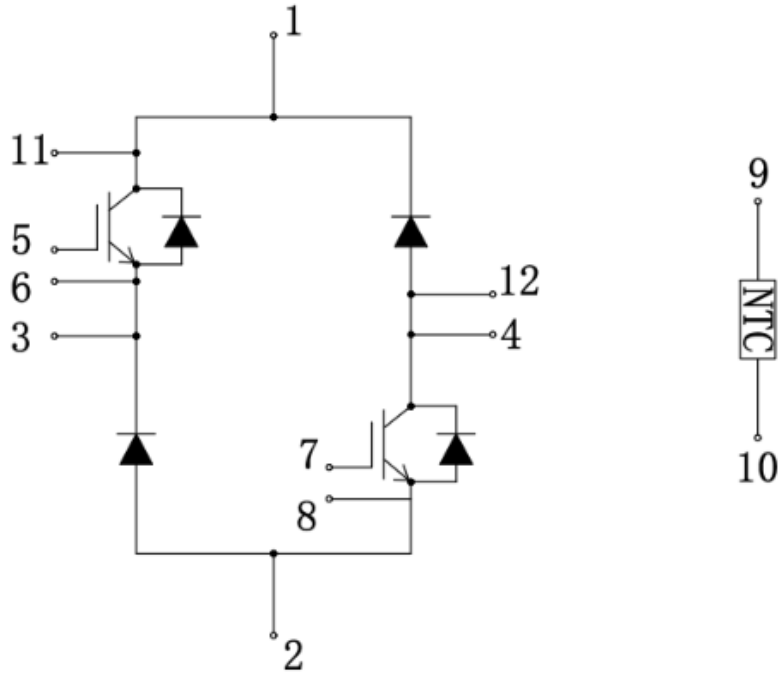
正向偏压特性二极管,斩波
forward characteristic of Diode, Inverter(typical)
IF=f(VF)



瞬态热阻抗,FWD
transient thermal impedance,FWD
 $Z_{thJC}=f(t)$



接线图/circuit_diagram_headline



封装尺寸/package outlines

