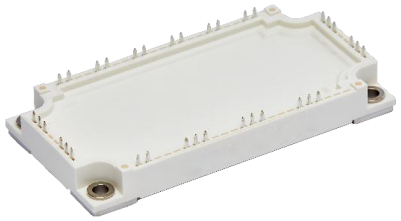
SixPack IGBT Module

V_{CES} =1200V， $I_{C\,nom}$ =150A / I_{CRM} =300A



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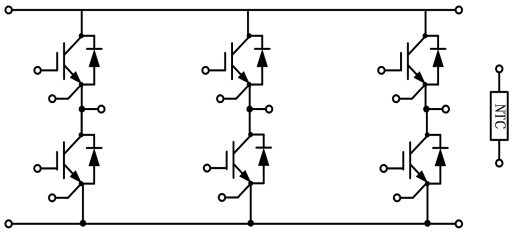


Equivalent Circuit

Features：

- 1200V Trench /Field Stop process
- Low switching losses
- Vcesat has a positive temperature coefficient

Applications:

- Power Converters
- Servo Drives
- Inverter

IGBT, Inverter

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Collector-Emitter voltage	T_{vj}=25°C	V_{CES}	1200	V
Continuous DC collector current	T_C=100°C, $T_{vj\,max}$=175°C	$I_{C\,nom}$	150	A
Repetitive peak collector current	t_P=1 ms	I_{CRM}	300	A
Gate emitter voltage		V_{GE}	+/-20	V

Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Collector-Emitter saturation voltage	V_{GE}=15V, I_C=150A T_{vj}=25°C V_{GE}=15V, I_C=150A T_{vj}=125°C V_{GE}=15V, I_C=150A T_{vj}=150°C	V_{CEsat}		1.53 1.75 1.81	2.10	V
Gate-Emitter threshold voltage	I_C=5.3mA, V_{GE}= V_{CE} T_{vj}=25°C	$V_{GE(th)}$	5.20	5.80	6.40	
Gate charge	V_{GE}=-15V…+15V	Q_G		1.56		µC
Internal gate resistor	Tvj=25°C	R_{Gint}		1.10		Ω
Input capacitance	f=100KHz V_{CE}=25V, V_{GE}=0 V T_{vj}=25°C	C_{ies}		23.82		nF
Reverse transfer capacitance		C_{res}		0.22		
Collector-emitter cut-off current	V_{CE}=1200V , V_{GE}= 0 V T_{vj}=25°C	I_{CES}			1	mA
Gate-emitter leakage current	V_{CE}=0 V, V_{GE}= 20 V T_{vj}=25°C	I_{GES}			100	nA
Turn-on delay time	I_C=150A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=5Ω T_{vj}=125°C (电感负载) /(inductive load) T_{vj}=150°C	$t_{d\ on}$		102 103 104		ns
Rise time	I_C=150A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=5Ω T_{vj}=125°C (电感负载) /(inductive load) T_{vj}=150°C	t_r		47 55 56		
Turn-off delay time	I_C=150A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=5Ω T_{vj}=125°C (电感负载) /(inductive load) T_{vj}=150°C	$t_{d\ off}$		337 381 397		
Fall time	I_C=150A, V_{CE}=600 V T_{vj}=25°C V_{GE}=±15 V, R_G=5Ω T_{vj}=125°C (电感负载) /(inductive load) T_{vj}=150°C	t_f		180 257 275		
Turn-on energy loss per pulse	I_C=150A, V_{CE}=600 V V_{GE}=±15 V, R_G=5Ω T_{vj}=25°C di/dt=2150A/µs(Tvj=150°C) T_{vj}=125°C (电感负载) /(inductive load) T_{vj}=150°C	E_{on}		11.09 19.92 22.71		mJ
Turn-off energy loss per pulse	I_C=150A, V_{CE}=600 V V_{GE}=±15V,R_G=5Ω T_{vj}=25°C du/dt=4250V/µs(Tvj=150°C) T_{vj}=125°C (inductive load) T_{vj}=150°C	E_{off}		10.18 13.54 14.45		
SC data	V_{GE}≤15V, Vcc=800V V_{CEmax}=V_{CES}-L_{sCE}·di/dt,t_P≤10us, T_{vj}=150°C	I_{SC}		730		A
Temperature under switching conditions		$T_{vj\ op}$	-40		150	°C

Diode, Inverter

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Repetitive peak reverse voltage	T_{vj}=25ºC	V_{RRM}	1200	V
Continuous DC forward current		I_F	150	A
Repetitive peak forward current	t_p=1ms	I_{FRM}	300	A
I^2t-value	t_p=10ms, sin180°, T_{vj}=125ºC	I^2t	8000	A^2s

Characteristic Values

Parameter	Conditions		Symbol	Value			Unit
				Min.	Typ.	Max.	
Forward voltage	I_F=150A, V_{GE}=0V I_F=150A, V_{GE}=0V I_F=150A, V_{GE}=0V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	V_F		2.05 1.75 1.67	2.40	V
Peak reverse recovery current	I_F=150A, -di$_F$/dt=2150A/µs(T_{vj}=150°C) V_R=600V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	I_{RM}		138 189 198		A
Recovered charge	I_F=150A, -di$_F$/dt=2150A/µs(T_{vj}=150°C) V_R=600V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	Q_r		11.67 29.77 35.09		µC
Reverse recovered energy	I_F=150A, -di$_F$/dt=2150A/µs(T_{vj}=150°C) V_R=600V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	E_{rec}		3.37 9.26 11.07		mJ
Temperature under switching conditions			$T_{vj\ op}$	-40		150	°C

NTC-Thermistor

Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Rated resistances	T_c=25°C， ±5%	R_{25}		5.0		kΩ
B-value	±1%	$B_{25/50}$		3380		K

Module

Parameter	Conditions	Symbol	Value			Unit
Isolation test voltag	RMS, f=50Hz, t=1min	V_{ISOL}	2500			V
Internal isolation			Al_2O_3			
Storage temperature		T_{stg}	-40		125	°C
Mounting torque for modul mounting		M	3.0		6.0	Nm
Weight		W		301		g

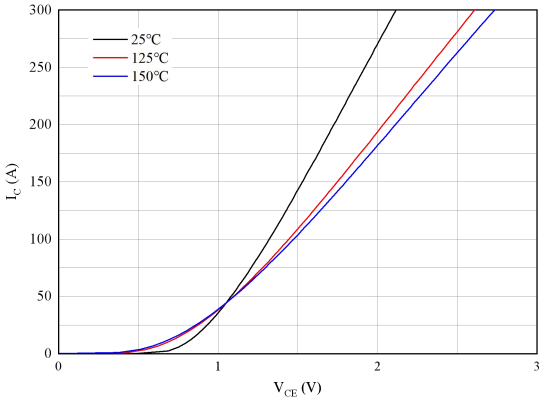


Fig 1. Output characteristics IGBT, Inverter

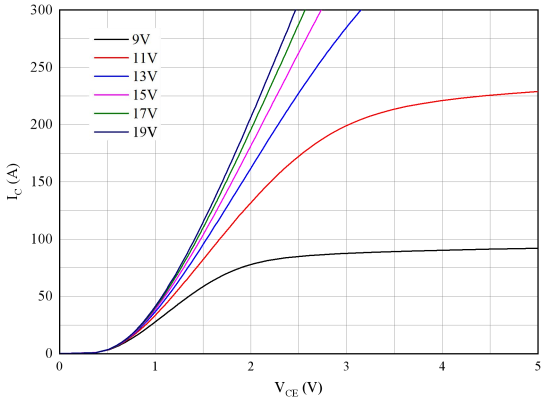


Fig 2. Output characteristics IGBT, Inverter

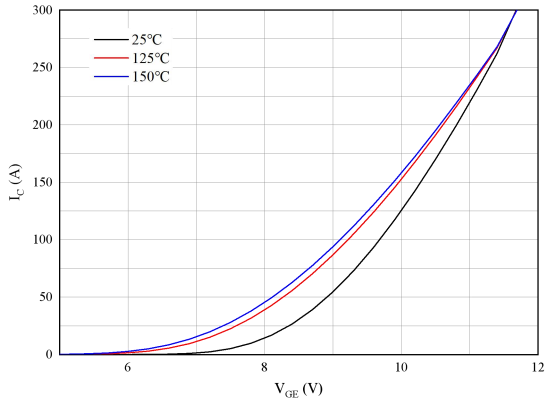


Fig 3. Transfer characteristics IGBT, Inverter

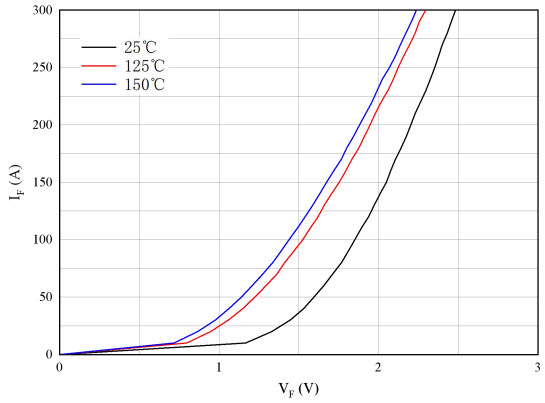


Fig 4. Forward characteristic of Diode

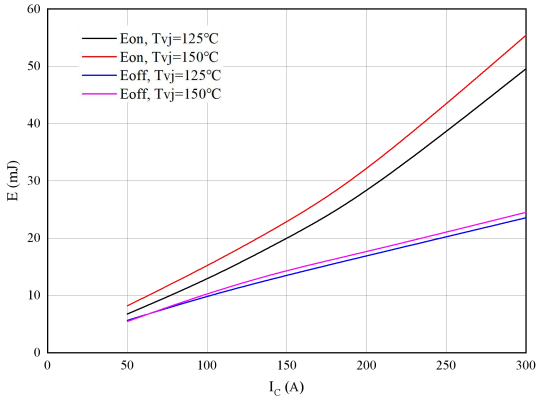


Fig 5. Switching losses of IGBT

V_{GE}=±15V, R_{Gon}=5Ω, R_{Goff}=5Ω, V_{CE}=600V

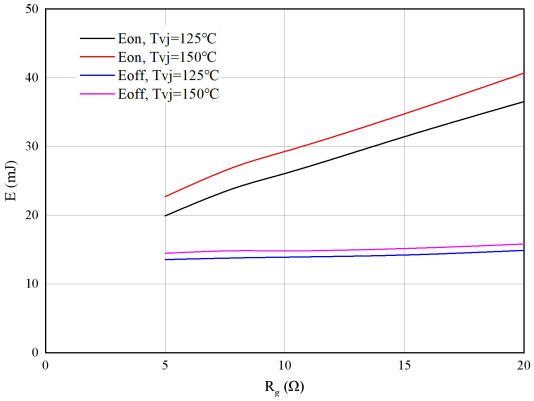


Fig 6. Switching losses of IGBT

V_{GE}=±15V, I_C=150A, V_{CE}=600V

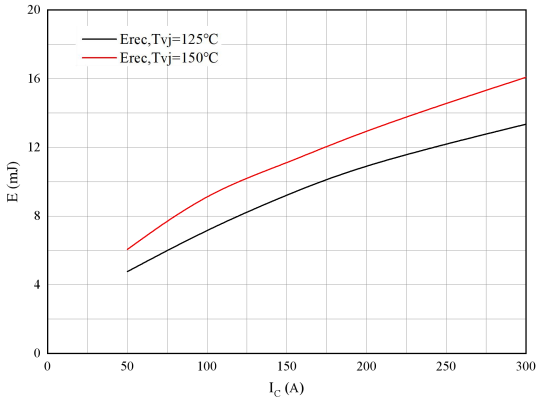


Fig 7. Switching losses of Diode

R_{Gon}=5 Ω , R_{Goff}=5Ω,V_{CE}=600V

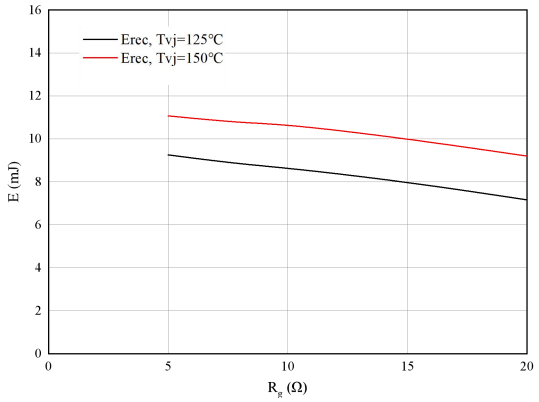


Fig 8. Switching losses of Diode

I_F=150A, V_{CE}=600V

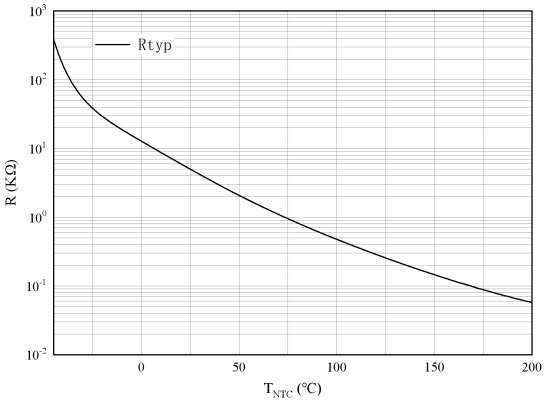


Fig 9. NTC-Themistor-temperature characteristic

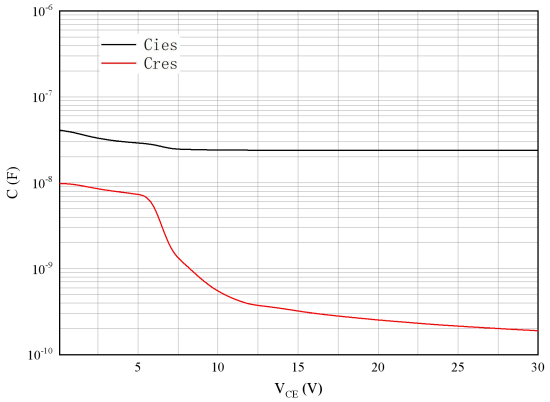
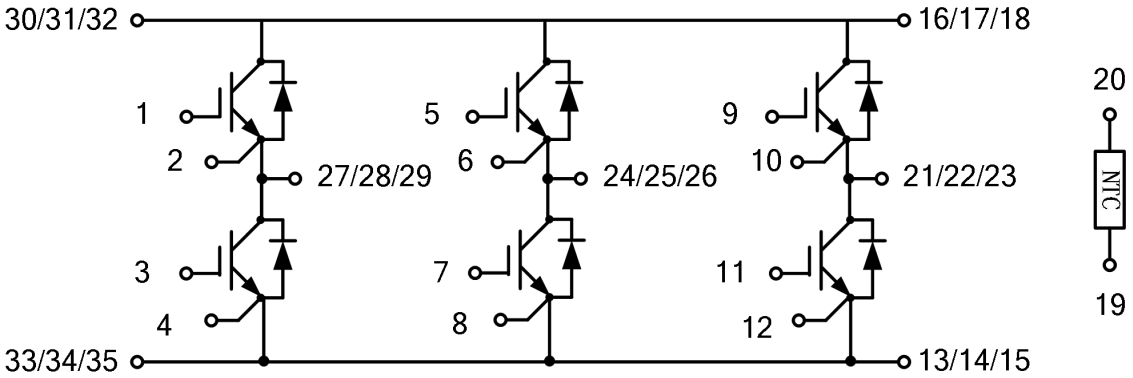


Fig 10. Capacitance characteristic

Circuit diagram



Package outlines