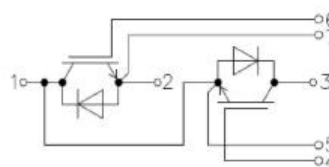


Features

- Trench/Fieldstop IGBT
- Low $V_{CE(sat)}$
- $V_{CE(sat)}$ with positive temperature coefficient
- 10 μ s short circuit capability
- Fast&soft reverse recovery anti-parallel FWD
- Low inductance case



Application

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



Halogen-Free

IGBT, Inverter

Absolute Maximum Ratings (TC=25°C unless otherwise noted)				
Symbol	Parameter		Rating	Unit
Common Ratings (TC=25°C Unless Otherwise Noted)				
V _{CES}	Collector Emitter Voltage	T _J =25°C	1200	V
V _{GES}	Gate Emitter Voltage		±20	V
I _C	DC Collector Current	Tc=100°C, T _{Jmax} =175°C	600	A
I _{CRM}	Repetitive peak collector current	tp=1ms	1200	A
t _{SC}	Short circuit withstand time	V _{GE} =15V, V _{CC} =600V, T _{vj} ≤150°C	10	us
P _{tot}	Power Dissipation Per IGBT	Tc=25°C, T _{Jmax} =175°C	3750	W

Diode, Inverter

Absolute Maximum Ratings (TC=25°C unless otherwise noted)				
Symbol	Parameter		Rating	Unit
Common Ratings (TC=25°C Unless Otherwise Noted)				
V _{RRM}	Repetitive Reverse Voltage	T _J =25°C	1200	V
I _F	Forward current,DC		600	A
I _{FRM}	Repetitive peak forward current	tp=1ms	1200	A

IGBT, Inverter

Electrical Characteristics (TC=25°C unless otherwise noted)								
Symbol	Parameter	Condition		Min	Typ	Max	Unit	
Static Electrical Characteristics @ TC= 25°C (unless otherwise stated)								
V _{GE(th)}	Gate Emitter Threshold Voltage	V _{CE} =V _{GE} , I _C =23mA		5.0	5.7	7.0	V	
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =600A, V _{GE} =15V, T _J =25°C		--	2.2	2.4	V	
		I _C =600A, V _{GE} =15V, T _J =125°C		--	2.7	--	V	
		I _C =600A, V _{GE} =15V, T _J =150°C		--	2.9	--	V	
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25°C		--	--	3.0	mA	
I _{GES}	Gate Leakage Current	V _{CE} =0V,V _{GE} =±20V, T _J =25°C		--	--	400	nA	
Q _g	Gate Charge	V _{GE} =±15V		--	7.5	--	nC	
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		--	49.77	--	nF	
C _{oes}	Output Capacitance			--	2.28	--	nF	
C _{res}	Reverse Transfer Capacitance			--	2.22	--	nF	
R _g	Internal gate resistance	T _J =25°C		--	0.28	--	Ω	
t _{d(on)}	Turn-on Delay Time	V _{CC} =600V,I _C =600A R _{G(on)} =5.1Ω,R _{G(off)} =5.1Ω V _{GE} =±15V, Lload=50uH, di/dt=4140A/μs (Tvj=125°C) du/dt=4328V/μs (Tvj=125°C)	T _J =25°C	--	259	--	ns	
			T _J =125°C	--	238	--	ns	
			T _J =150°C	--	227	--	ns	
t _r	Turn-on Rise Time		T _J =25°C	--	264	--	ns	
			T _J =125°C	--	262	--	ns	
			T _J =150°C	--	259	--	ns	
t _{d(off)}	Turn-Off Delay Time		T _J =25°C	--	988	--	ns	
			T _J =125°C	--	1073	--	ns	
			T _J =150°C	--	1102	--	ns	
t _f	Turn-Off Fall Time		T _J =25°C	--	145	--	ns	
			T _J =125°C	--	233	--	ns	
			T _J =150°C	--	281	--	ns	
E _{on}	Turn on Energy		T _J =25°C		149.5		mJ	
			T _J =150°C	--	171.5	--	mJ	
E _{off}	Turn off Energy	V _{CC} =600V,I _C =200A R _{G(on)} =2.5Ω,R _{G(off)} =2.5Ω V _{GE} =±15V, Inductive Load	T _J =25°C	--	86.2	--	mJ	
			T _J =150°C	--	110.6	--	mJ	
R _{thCH}	Thermalresistance,case to heatsink (Per IGBT/λgrease=1W/(m·K))			--	0.082	--	K/W	
T _{vjop}	Temperature under switching conditions			-40	--	150	°C	
R _{thJC}	Junction to Case Thermal Resistance (Per IGBT)			--	0.04	--	K/W	

Diode, Inverter

Absolute Maximum Ratings (TC=25°C unless otherwise noted)						
Symbol	Parameter		Min	Typ	Max	Unit
Common Ratings (TC=25°C Unless Otherwise Noted)						
V _F	Forward Voltage	I _F =600A , V _{GE} =0V, T _J =25°C	--	2.28	--	V
		I _F =600A , V _{GE} =0V, T _J =125°C	--	2.51	--	
		I _F =600A , V _{GE} =0V, T _J =150°C	--	2.53	--	
t _{rr}	Reverse Recovery Time	T _J =25°C	--	216.1	--	ns
		T _J =125°C	--	401.4	--	ns
		T _J =150°C	--	502.2	--	ns
I _{RM}	Peak reverse recovery current	T _J =25°C	--	208.8	--	A
		T _J =125°C	--	249.1	--	A
		T _J =150°C	--	267.8	--	A
Q _R	Recovered charge	T _J =25°C	--	24.2	--	μC
		T _J =125°C	--	61.3	--	μC
		T _J =150°C	--	76.7	--	μC
E _{rec}	Reverse Recovery Energy	T _J =25°C	--	8.8	--	mJ
		T _J =125°C	--	19.9	--	mJ
		T _J =150°C	--	26.1	--	mJ
R _{thCH}	Thermal resistance, case to heatsink		--	0.089	--	K/W
T _{vjop}	Temperature under switching conditions		-40	--	150	°C
R _{thJC}	Junction to Case Thermal Resistance (Per Diode)		--	0.07	--	K/W

Module

Absolute Maximum Ratings (TC=25℃unless otherwise noted)						
Symbol	Parameter		Rating			Unit
Common Ratings (TC=25℃ Unless Otherwise Noted)						
V _{ISOL}	Isolation voltage	Terminals to baseplate, RMS,f=50Hz,t=1min	4000			V
-	Material of module baseplate	-	Cu			
-	Internal isolation	Basic insulation(class 1, IEC 61140)	Al ₂ O ₃			
T _{stg}	Storage Temperature		-40~125			℃
Symbol	Parameter		Min	Typ	Max	Unit
M	Mounting torque for module mounting	Screw M6	3	-	5	Nm
	Terminal connection torque	Screw M6	2.5	-	5	Nm
L _{sCE}	Stray inductance module		-	45	-	nH
ds	Creepage distance	Terminal to terminal	-	13	-	mm
		Terminal to base plate	-	14.5	-	mm
da	Clearance	Terminal to terminal	-	10	-	mm
		Terminal to base plate	-	12.5	-	
m	Weight			340		g

NTC Thermistor Characteristics

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

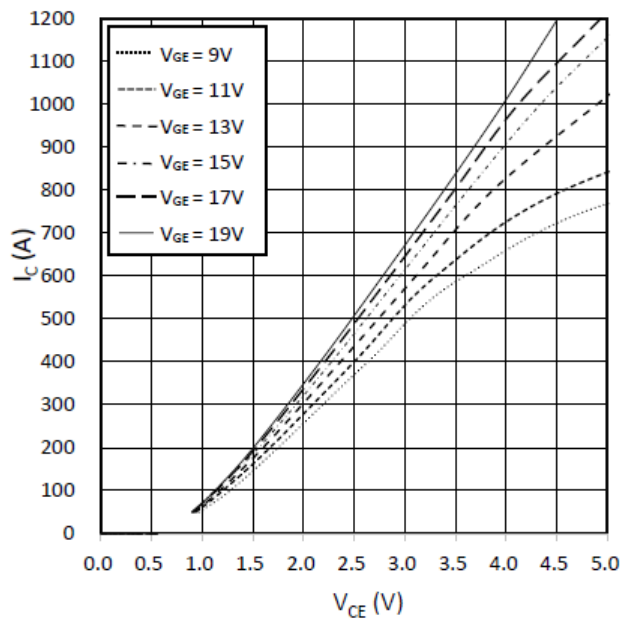
Symbol	Parameter		Min	Typ	Max	Unit
R ₂₅	Rated resistance	T _C =25°C	-	5	-	KΩ
ΔR/R	Deviation of resistance	T _C =100°C, R ₁₀₀ =493Ω	-5	-	5	%
P ₂₅	Power dissipation	T _C =25°C	-	-	20	mW
B _{25/50}	B-constant	$R_2 = R_{25} \exp[B_{25}/50(1/T_2 - 1/(298.15K))]$	-	3375	-	K
B _{25/80}	B-constant	$R_2 = R_{25} \exp[B_{25}/50(1/T_2 - 1/(298.15K))]$	-	3411	-	K
B _{25/100}	B-constant	$R_2 = R_{25} \exp[B_{25}/50(1/T_2 - 1/(298.15K))]$		3433		K

Typical Operating Characteristics

output characteristic IGBT, Inverter (typical)

$$I_C = f(V_{CE})$$

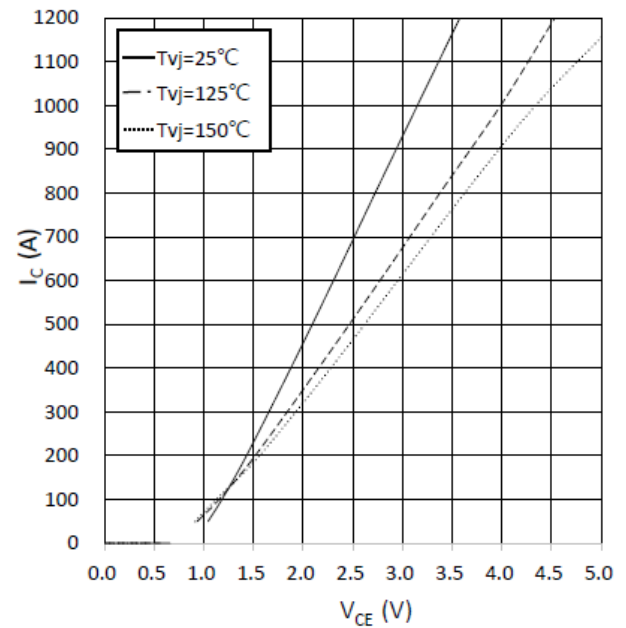
$$T_{vj} = 150^{\circ}\text{C}$$



output characteristic IGBT, Inverter (typical)

$$I_C = f(V_{CE})$$

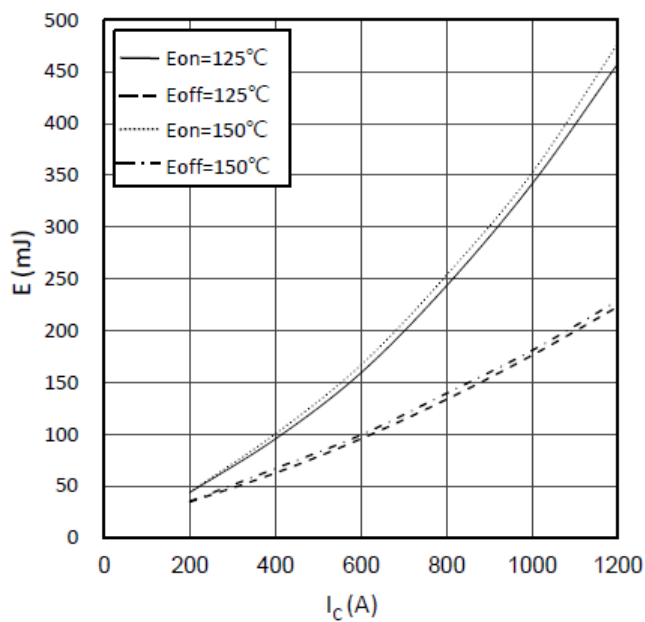
$$V_{GE} = 15\text{ V}$$



switching losses IGBT, Inverter (typical)

$$E_{on} = f(I_C), E_{off} = f(I_C)$$

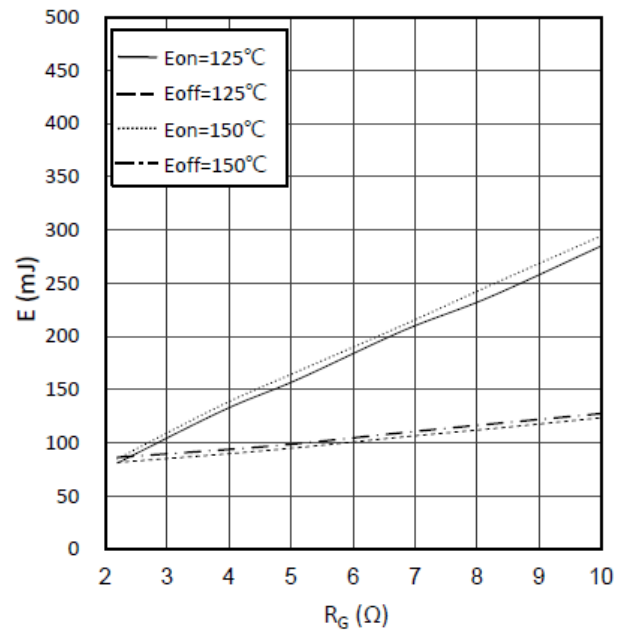
$$V_{GE} = \pm 15\text{ V}, R_{Gon} = 5.1\Omega, R_{Goff} = 5.1\Omega, V_{CE} = 600\text{ V}$$



switching losses IGBT, Inverter (typical)

$$E_{on} = f(R_G), E_{off} = f(R_G)$$

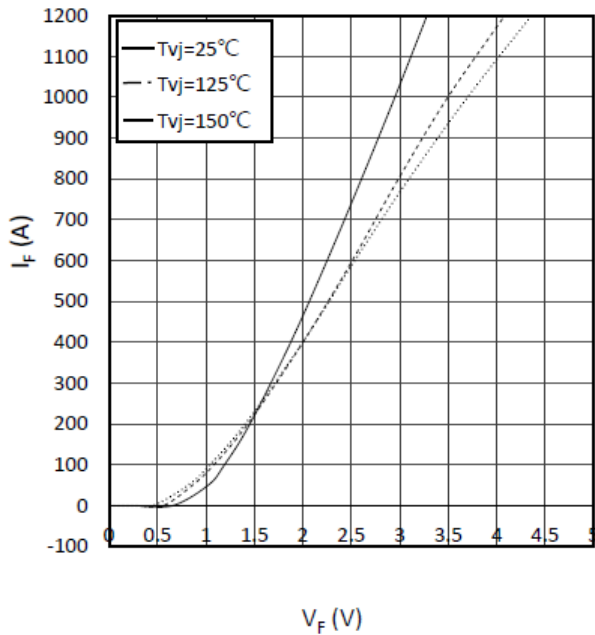
$$V_{GE} = \pm 15\text{ V}, I_C = 600\text{ A}, V_{CE} = 600\text{ V}$$



Typical Operating Characteristics

forward characteristic of Diode, Inverter (typical)

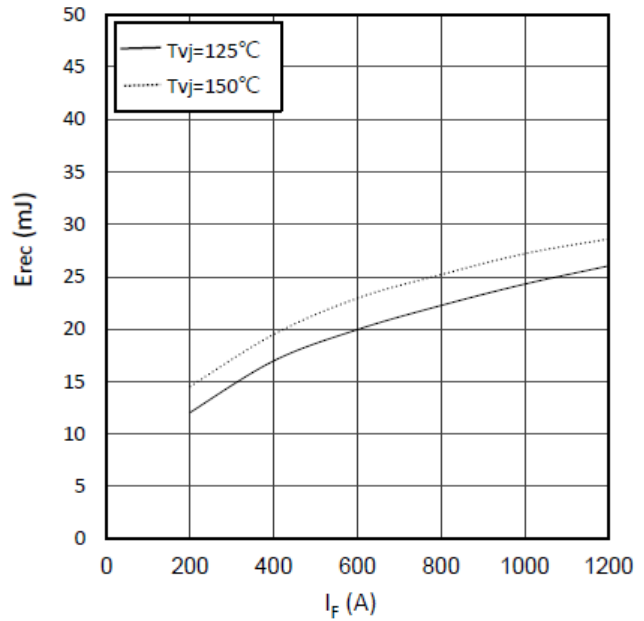
$$I_F = f(V_F)$$



switching losses Diode, Inverter (typical)

$$E_{rec} = f(I_F)$$

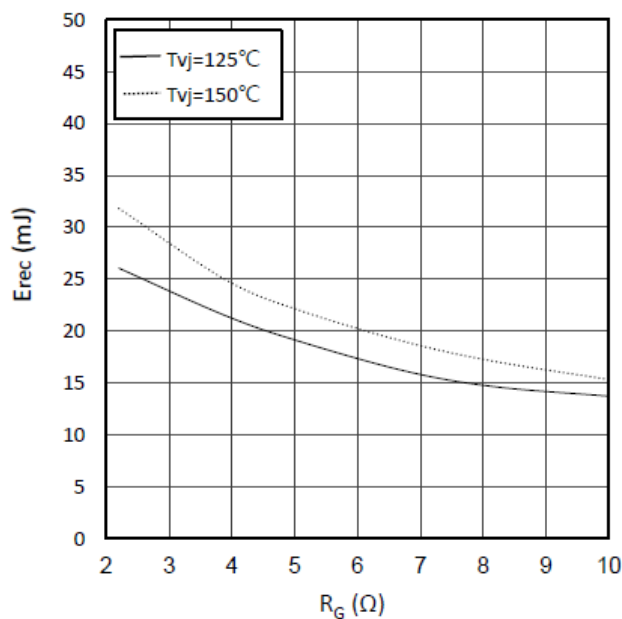
$$R_{Gon}=5.1\Omega, V_{CE}=600V$$



switching losses Diode, Inverter (typical)

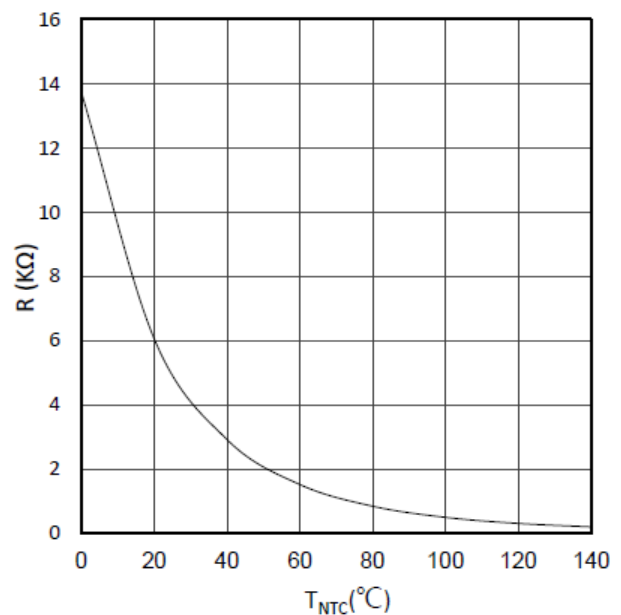
$$E_{rec} = f(R_G)$$

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



NTC-Thermistor-temperature characteristic(typical)

$$R=f(T)$$

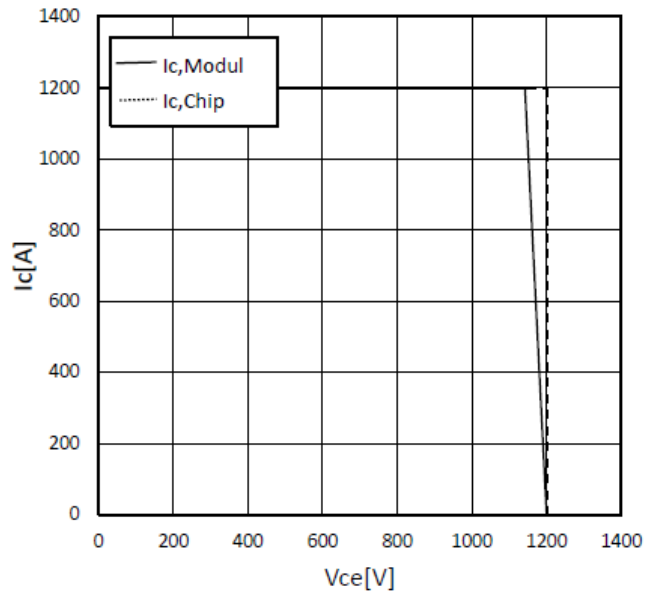


Typical Operating Characteristics

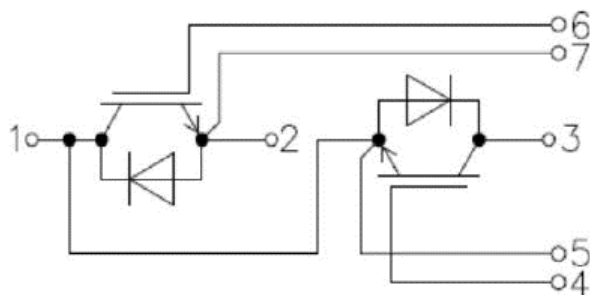
reverse bias safe operating area IGBT, Inverter (RBSOA)

$$I_C = f(V_{CE})$$

$$V_{GE} = \pm 15V, R_{Gon} = 5.1\Omega, R_{Goff} = 5.1\Omega, T_{vj} = 25^\circ C$$



Circuit diagram headline



Package outlines (Unit: mm)

