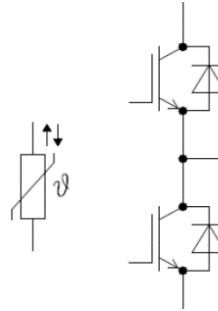


Features

- 1200V 600A, $V_{CE(sat)} = 1.5 \text{ V}@25^\circ\text{C}$
- MPT Gate Technology
- Low Losses
- High RBSOA capability
- Low reverse-recovery loss

Typical Applications

- Motor Drives
- Solar Applications
- UPS Systems
- Energy Storage



Equivalent Circuit Schematic

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage, $T_{vj}=25^\circ\text{C}$	1200	V
V_{GES}	Gate-emitter voltage	± 20	V
I_C	Collector current, DC, $T_C=100^\circ\text{C}, T_{vj}=175^\circ\text{C}$	620	A
I_{CRM}	Repetitive peak collector current	1200	A
T_{SC}	Short circuit withstand time, $V_{GE}=15\text{V}/-8\text{V}, V_{CC}=600\text{V}, T_{vj}=150^\circ\text{C}$	10	μs
T_{stg}	Storage Temperature Range	-40 to +125	$^\circ\text{C}$
T_{vjop}	Temperature under switching conditions	-40 to +150	$^\circ\text{C}$

1. IGBT Electrical Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{CEsat}	Collector-emitter saturation voltage	I _C = 600 A, V _{GE} = 15 V T _{vj} = 25°C		1.50		V
		I _C = 600A, V _{GE} = 15 V T _{vj} = 125°C		1.70		
		I _C = 600 A, V _{GE} = 15 V T _{vj} = 150°C		1.77		
I _{CES}	Collector-emitter cut-off current	V _{CE} = 1200 V, V _{GE} = 0 V, T _{vj} = 25°C			1	mA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} = 20V, V _{CE} = 0V, T _{vj} = 25°C			500	nA
V _{GE(th)}	Gate Threshold Voltage	V _{CE} = V _{GE} , I _D = 24mA, T _{vj} = 25°C	5.0	6.0	7.0	V
R _{Gint}	Internal Gate Resistor	T _{vj} = 25°C		0.43		Ω,
C _{ies}	Input Capacitance	V _{CE} = 25V, f = 100KHz, V _{GE} = 0 V,		TBD		nF
C _{oes}	Output Capacitance			TBD		
C _{res}	Reverse Transfer Capacitance			TBD		
E _{on}	Turn-on energy loss per pulse	V _{CC} = 600V, V _{GE} = -8V/15V I _C = 600A, R _{GON} = 0.5Ω,	T _{vj} = 25°C T _{vj} = 125°C T _{vj} = 150°C	46.37 60.32 64.81		mJ
E _{off}	Turn-off energy loss per pulse	R _{GOFF} = 3.6Ω Load = 35nH	T _{vj} = 25°C T _{vj} = 125°C T _{vj} = 150°C	54.24 69.01 72.84		mJ
Q _G	Gate Charge	V _{GS} = ± 15V		TBD		uC
td (on)	Turn-on delay time	V _{CE} = 600V, V _{GS} = -8V/+15V I _C = 600A, R _{GON} = 0.5Ω, R _{GOFF} = 3.6Ω	T _{vj} = 25°C T _{vj} = 125°C T _{vj} = 150°C	220 255 260		ns
tr	Rise Time		T _{vj} = 25°C T _{vj} = 125°C T _{vj} = 150°C	85 95 95		
td(off)	Turn-off delay time		T _{vj} = 25°C T _{vj} = 125°C T _{vj} = 150°C	877 943 960		
tf	Fall Time		T _{vj} = 25°C T _{vj} = 125°C T _{vj} = 150°C	72 119 151		
R _{thJC}	Thermal resistance, junction to case	per IGBT		0.060		K/W

Diode, Inverter
Maximum Rated Values

Symbol	Parameter	Conditions	Rating.	Unit
V _{RRM}	Repetitive peak reverse voltage	T _{vj} = 25°C	1200	V
I _F	Forward current, DC	T _C = 100°C, T _{vj} = 150°C	600	A
I _{FRM}	Repetitive peak forward current	t _p = 1ms	1200	A

Diode, Characteristic Values

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _F	Continuous forward voltage	I _F = 600A, V _{GE} = 0 T _{vj} = 25°C T _{vj} = 125°C T _{vj} = 150°C		2.44 2.60 2.53	2.60	V
Q _r	Recovery Charge	V _{GE} = -8 V, I _F = 600 A, T _{vj} = 25°C T _{vj} = 125°C T _{vj} = 150°C		19.4 33.8 45.3		uC
I _{rm}	Peak Reverse Recovery Current	V _R = 600V, -- dif/dt = 5000A/us, T _{vj} = 150°C		264 320 352		A
E _{rec}	Reverse recovery energy	T _{vj} = 150°C T _{vj} = 25°C T _{vj} = 125°C T _{vj} = 150°C		3.8 13.9 15.9		mJ

RthJC	Thermal resistance, junction to case	per diode		0.083		K/W
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Thermal Characteristics
NTC-Thermistor

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R ₂₅	Rated resistance	T _c =25°C		5.00		kΩ
ΔR/R	Deviation of R100	T _c = 100°C, R ₁₀₀ = 465Ω	-7.3		7.3	%
P ₂₅	Power Dissipatio	T _{NTC} = 25°C			10	mW
B _{25/50}	B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15 K))]$		3380		k
B _{25/80}	B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15 K))]$		3470		k
B _{25/100}	B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15 K))]$		3520		k

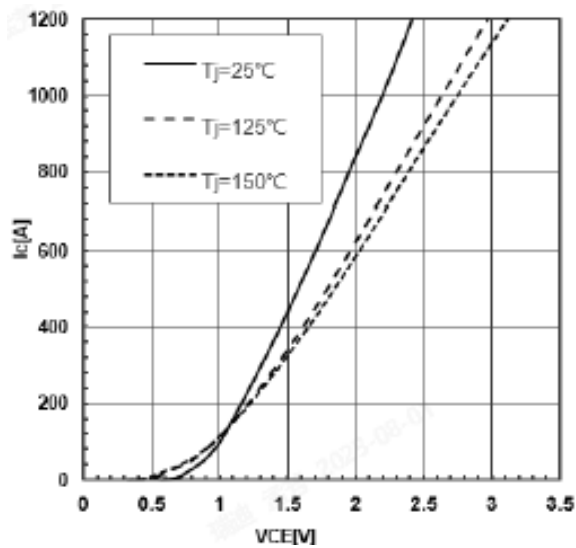
Module

Symbol	Parameter	Conditions	Rating.			Unit
			Min.	Typ.	Max.	
V _{ISOL}	Isolation voltage	Terminals to baseplate, RMS,f=50Hz,t=1min	3			KV
	Material of module baseplate		Cu			
	Internal isolation	Basic insulation	Al ₂ O ₃			A
T _{stg}	Storage temperature		-40~125			°C
Symbol	Parameter	Test Conditions	Values			Unit
			Min.	Typ.	Max.	
M	Mounting torque for module mounting	Screw M5	3.0		6.0	Nm
LsCE	Stray inductance module			20		nH
ds	Creepage distance	Terminal to terminal		13		mm
		Terminal to base plate		14.5		
da	Clearance	Terminal to terminal		10		mm
		Terminal to base plate		12.5		
CTI	Comperative tracking index			>200		
m	Weight			345		g

Typical Performance

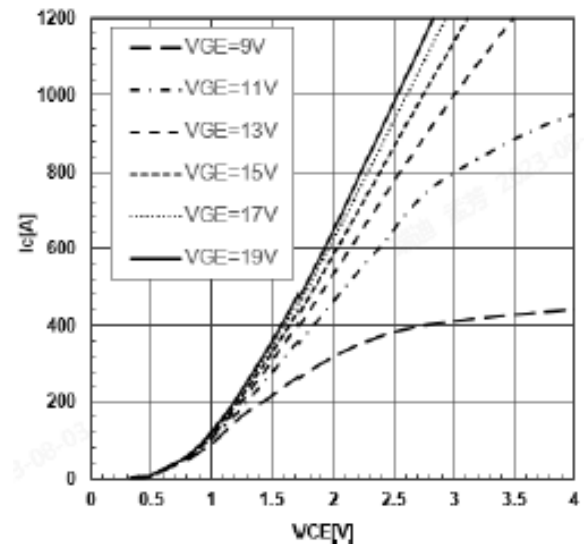
Output characteristic IGBT, Inverter(typical)

$I_c=f(V_{ce}), V_{GE}=15V$



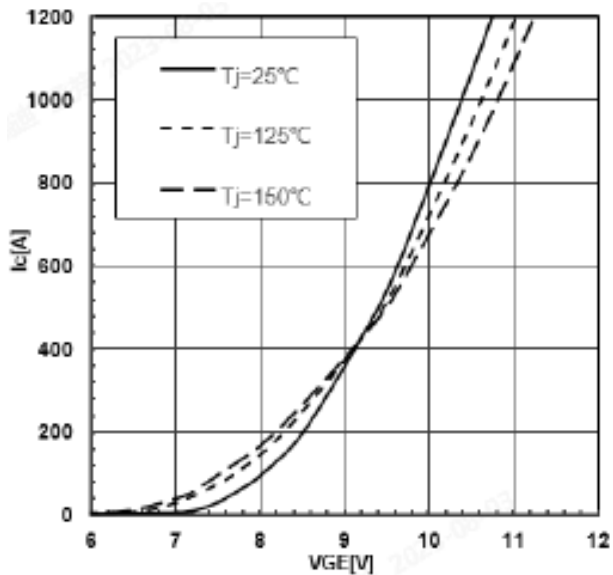
Output characteristic IGBT, Inverter(typical)

$I_c=f(V_{ce}), V_{GE}=15V$ Inclusive RCC´ +EE´



transfer characteristic IGBT, Inverter(typical)

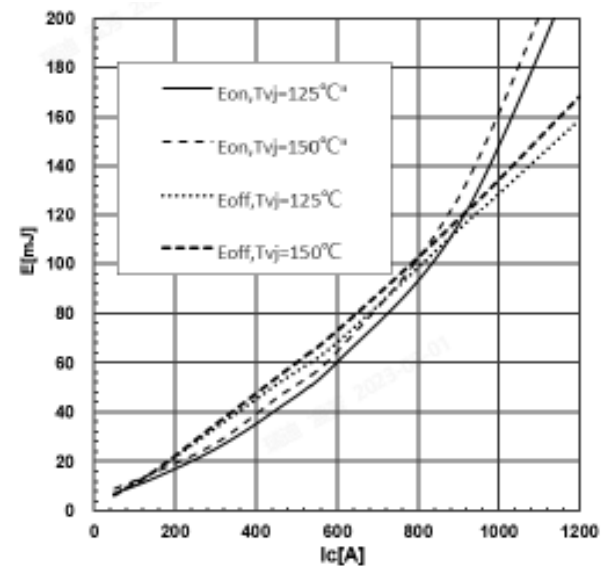
$I_c=f(V_{GE}), V_{CE}=20V$



Switching losses IGBT, Inverter(typical)

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

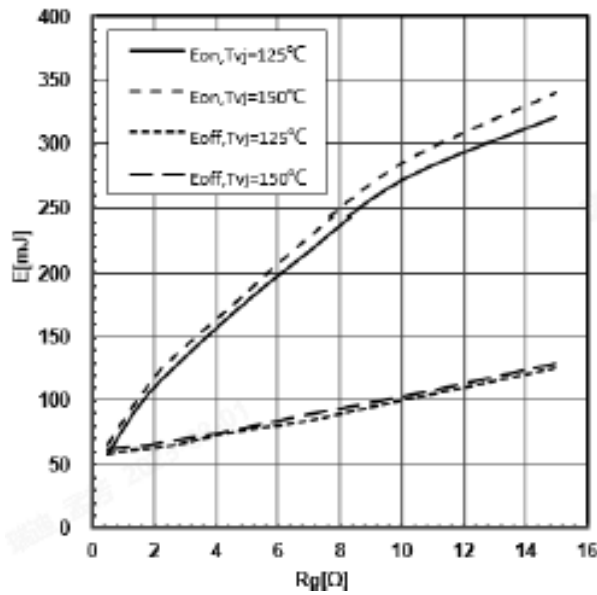
$V_{GE}=+15V/-8V, R_{Gon}=0.5\Omega, R_{Goff}=3.6\Omega, V_{CE}=600V$



Turn-on loss IGBT, Inverter(typical)

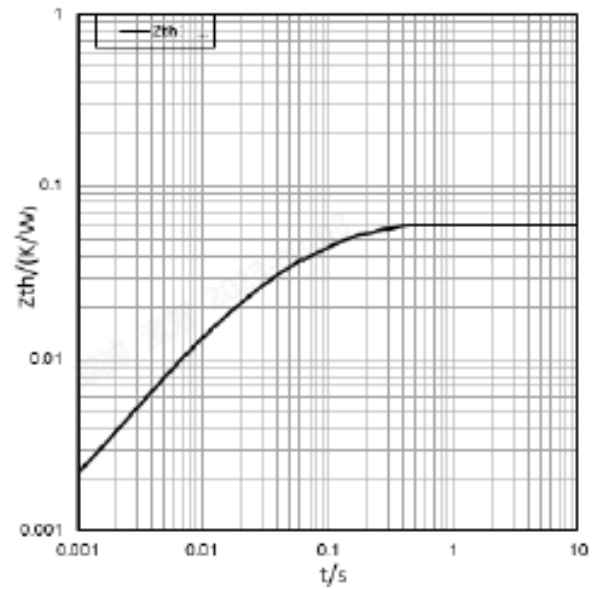
$E_{on}=f(R_g)$, $E_{off}=f(I_c)$

$V_{GE}=+15V/-8V$, $R_{Gon}=0.5\Omega$, $R_{Goff}=3.6\Omega$, $V_{CC}=600V$



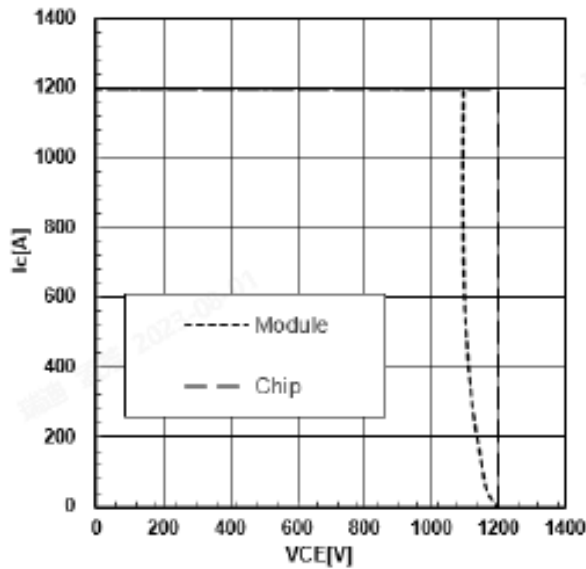
Transient thermal impedance IGBT, Inverter

$Z_{th}=f(t)$



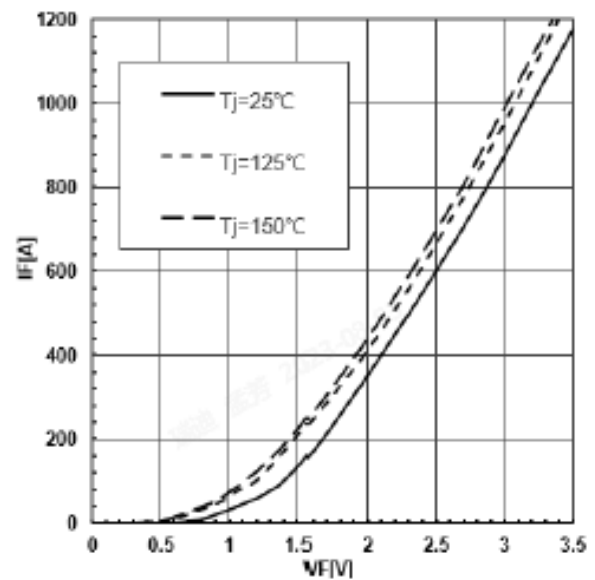
Reverse bias safe operating area IGBT, Inverter(RBSOA)

$I_C=f(V_{CE})$, $V_{GE}=+15V/-8V$, $R_{Goff}=3.6\Omega$, $T_{Vj}=150^\circ C$



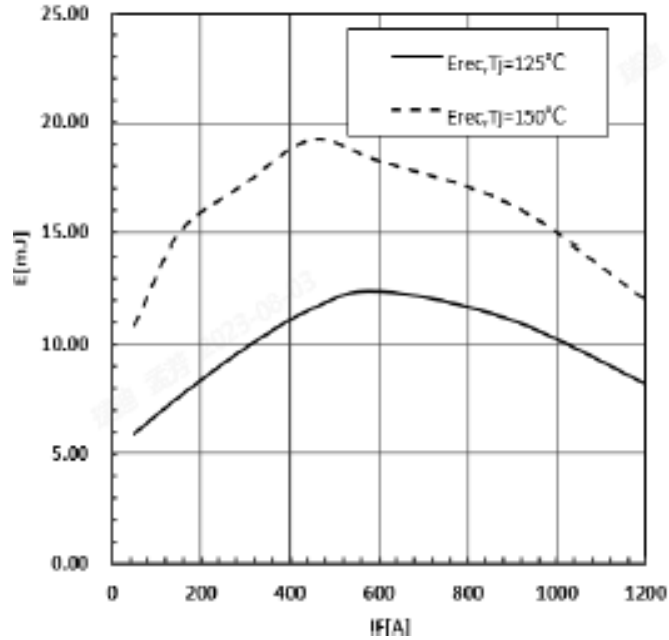
Output characteristic FRD, Inverter(typical) Inclusive

$R_{CC} + EE' \quad I_F=f(V_F)$



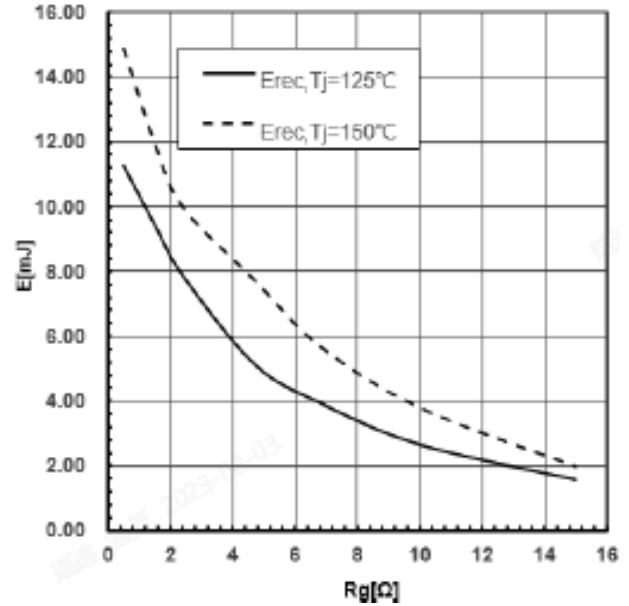
Switching losses FRD, Inverter(typical)

$E_{rec}=f(I_c)$, $R_{Gon}=0.5\Omega$, $V_{CE}=600V$



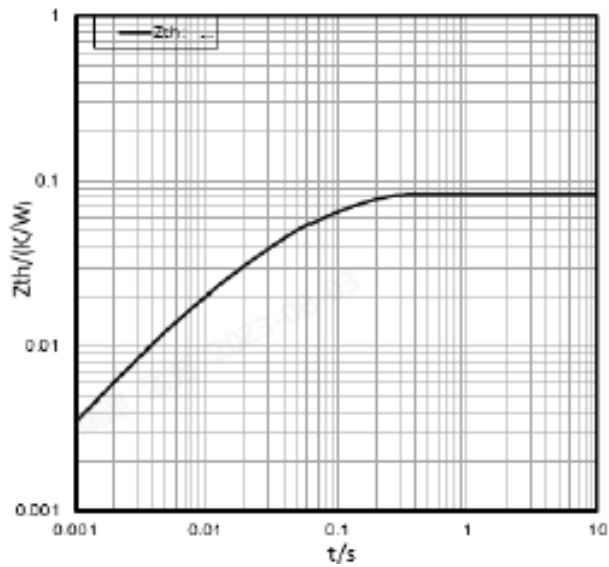
Switching losses FRD, Inverter(typical)

$E_{rec}=f(R_g)$, $I_F=600A$, $V_{CE}=600V$



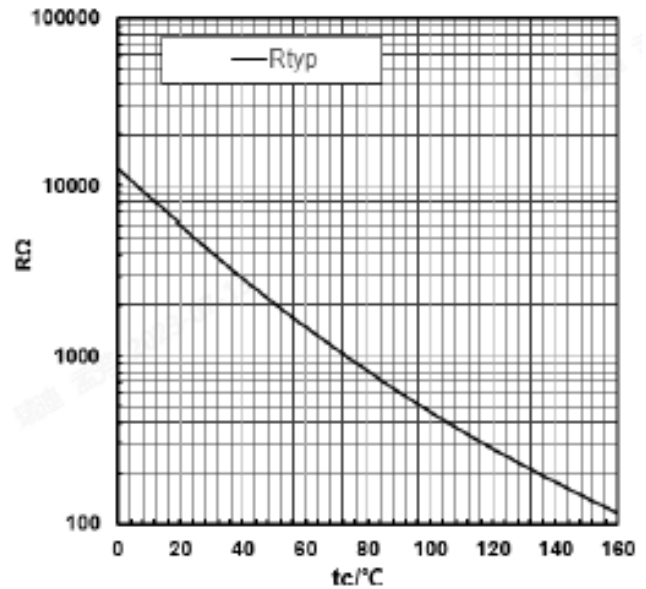
Transient thermal impedance FRD, Inverter

$Z_{th}=f(t)$

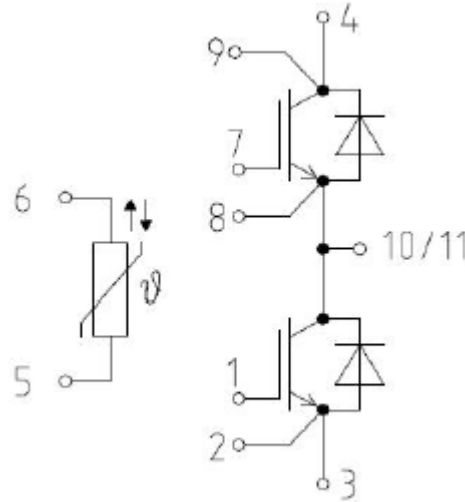


NTC- thermistor-temperature characteristic(typical)

$R=f(T)$



Circuit Diagram Headline



Package outlines (Unit: mm)

