

Electrical Features

- Low V_{CEsat}
- V_{CEsat} with positive Temperature Coefficient
- Extended Operation Temperature T_{vjop}



Typical Applications

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

Mechanical Features

- Isolated Base Plate
- Standard Housing
- High Creepage and Clearance Distances
- 4KV AC 1min Insulation

IGBT, Inverter

Maximum Rated Values							
Symbol	Item	Conditions	Rating			Unit	
IGBT							
V_{CES}	Collector-emitter voltage	$T_{vj}=25^{\circ}C$	1700			V	
V_{GES}	Gate-emitter voltage	-	± 20			V	
I_C	Collector current,DC	$T_C=100^{\circ}C, T_{vj}=175^{\circ}C$	300			A	
I_{CRM}	Repetitive peak collector current	$t_p=1ms$	600			A	
t_{SC}	Short circuit withstand time	$V_{GE}=15V, V_{CC}=900V, T_{vj}\leq 150^{\circ}C$	10			μs	
P_{tot}	Total power dissipation	$T_C=25^{\circ}C, T_{vj}=175^{\circ}C$	1704			W	
Characteristics Values							
Symbol	Item	Conditions	Values			Unit	
IGBT			Min.	Typ.	Max.		
I_{CES}	Collector-emitter cut-off current	$V_{CE}=1700V, V_{GE}=0V, T_{vj}=25^{\circ}C$	-	-	1	mA	
I_{GES}	Gate leakage current	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$	-	-	250	nA	
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=11.5mA, V_{CE}=V_{GE}, T_{vj}=25^{\circ}C$	5.2	5.6	6.5	V	
V_{CEsat}	Collector-emitter saturation voltage	$I_C=300A$ $V_{GE}=15V$	$T_{vj}=25^{\circ}C$	-	1.95		-
			$T_{vj}=125^{\circ}C$	-	2.50		-
			$T_{vj}=150^{\circ}C$	-	2.61	-	
C_{ies}	Input capacitance	$V_{CE}=25V, V_{GE}=0V$ $f=1MHz, T_{vj}=25^{\circ}C$	-	29.2	-	nF	
C_{oes}	Output capacitance		-	0.98	-		
C_{res}	Reverse transfer capacitance		-	0.88	-		
Q_G	Gate charge	$V_{CC}=900V, I_C=300A, V_{GE}=15V$	-	3.4	-	μC	
R_g	Internal gate resistance	$T_{vj}=25^{\circ}C$	-	2.0	-	Ω	

$t_{d(on)}$	Turn-on delay time	$V_{CC}=900V,$ $I_C=300A,$ $V_{GE}=\pm 15V,$ $R_{G(on)}=5.6\ \Omega,$ $R_{G(off)}=5.6\ \Omega,$ $L_{load}=100\mu H$ $di/dt=2233A/\mu s$ $(T_{vj}=150^\circ C)$ $du/dt=5325V/\mu s$ $(T_{vj}=150^\circ C)$	$T_{vj}=25^\circ C$	-	280	-	ns
			$T_{vj}=125^\circ C$	-	286	-	
			$T_{vj}=150^\circ C$	-	288	-	
t_r	Rise time		$T_{vj}=25^\circ C$	-	125	-	
			$T_{vj}=125^\circ C$	-	210	-	
			$T_{vj}=150^\circ C$	-	210	-	
$t_{d(off)}$	Turn-off delay time		$T_{vj}=25^\circ C$	-	489	-	
			$T_{vj}=125^\circ C$	-	779	-	
			$T_{vj}=150^\circ C$	-	833	-	
t_f	Fall time		$T_{vj}=25^\circ C$	-	384	-	
			$T_{vj}=125^\circ C$	-	432	-	
			$T_{vj}=150^\circ C$	-	515	-	
E_{on}	Turn-on energy (per pulse)	$T_{vj}=25^\circ C$	-	70.5	-	mJ	
		$T_{vj}=125^\circ C$	-	140.6	-		
		$T_{vj}=150^\circ C$	-	154.1	-		
E_{off}	Turn-off energy (per pulse)	$T_{vj}=25^\circ C$	-	62.4	-		
		$T_{vj}=125^\circ C$	-	76.9	-		
		$T_{vj}=150^\circ C$	-	89.4	-		
SC data	Short-circuit current	$V_{CC}=900V, V_{GE}\leq 15V,$ $t_p\leq 10\mu s$	$T_{vj}=25^\circ C$	-	1629	-	A
			$T_{vj}=150^\circ C$	-	1352	-	
R_{thJC}	Thermal resistance, junction to case	per IGBT	-	0.088	-	K/W	
R_{thCH}	Thermal resistance, case to heatsink	per IGBT/ $\lambda_{grease}=1W/(m\cdot K)$	-	0.104	-	K/W	
T_{vjop}	Temperature under switching conditions		-40	-	150	$^\circ C$	

Diode, Inverter

Maximum Rated Values

Symbol	Item	Conditions	Rating	Unit	
V_{RRM}	Repetitive peak reverse voltage	$T_{vj}=25^\circ C$	1700	V	
I_F	Forward current, DC		300	A	
I_{FRM}	Repetitive peak forward current	$t_p=1ms$	600	A	
$I^2 t$	$I^2 t$ -value	$V_R = 0 V, t_P = 10 ms,$	$T_{vj}=25^\circ C$	-	A^2s
		$V_R = 0 V, t_P = 10 ms,$	$T_{vj}=150^\circ C$	-	A^2s

Characteristic Values

V_F	Continuous forward voltage	$I_F=300A$ $V_{GE}=0V$	$T_{vj}=25^\circ C$	-	1.85	-	V
			$T_{vj}=125^\circ C$	-	1.73	-	
			$T_{vj}=150^\circ C$	-	1.65	-	
I_{RM}	Peak reverse recovery current	$V_R=900V$ $I_F=300A$	$T_{vj}=25^\circ C$	-	186	-	A
			$T_{vj}=125^\circ C$	-	198	-	
			$T_{vj}=150^\circ C$	-	226	-	
t_{rr}	Reverse recovery time	$di_F/dt=-1501A/\mu s$ $(T_{vj}=150^\circ C)$	$T_{vj}=25^\circ C$	-	522	-	ns
			$T_{vj}=125^\circ C$	-	1049	-	
			$T_{vj}=150^\circ C$	-	1146	-	
Q_r	Recovered charge		$T_{vj}=25^\circ C$	-	43.3	-	μC

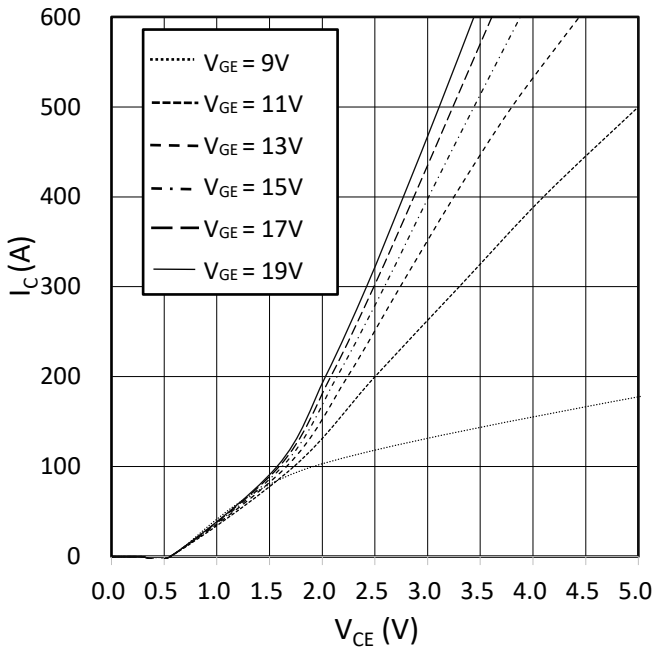
E _{rec}	Reverse recovery energy		T _{vj} =125°C	-	82.0	-	mJ
			T _{vj} =150°C	-	104.2	-	
			T _{vj} =25°C	-	26.8	-	
			T _{vj} =125°C	-	41.2	-	
			T _{vj} =150°C	-	54.3	-	
R _{thJC}	Thermal resistance, junction to case	per diode	-	0.145	-	K/W	
R _{thCH}	Thermal resistance, case to heatsink	per diode/ λgrease=1 W/(m·K)	-	0.097	-	K/W	
T _{vjop}	Temperature under switching conditions		-40	-	150	°C	

Module

Symbol	Item	Conditions	Rating			Unit
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			-
CTI	Comperative tracking index	-	>200			
T _{stg}	Storage temperature	-	-40~125			°C
Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
M	Mounting torque for module mounting	Screw M6	3.0	-	6.0	Nm
	Terminal connection torque	Screw M6	2.5	-	5.0	Nm
RCC'+EE'		TC = 25°C, per switch	-	0.62	-	mΩ
LsCE	Stray inductance module		-	19	-	nH
ds	Creepage distance	Terminal to terminal	-	23	-	mm
		Terminal to base plate	-	29	-	
da	Clearance	Terminal to terminal	-	11	-	mm
		Terminal to base plate	-	23	-	
m	Weight	-	-	315	-	g

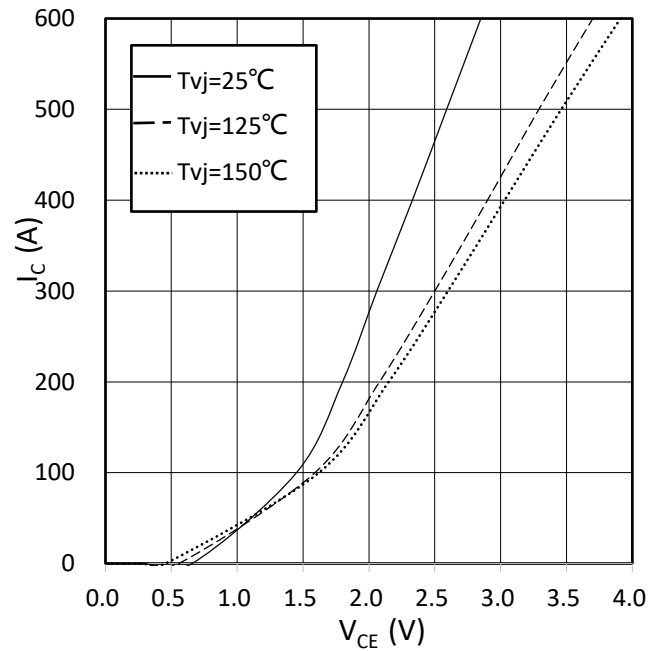
output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$
 $T_{vj} = 150^\circ\text{C}$



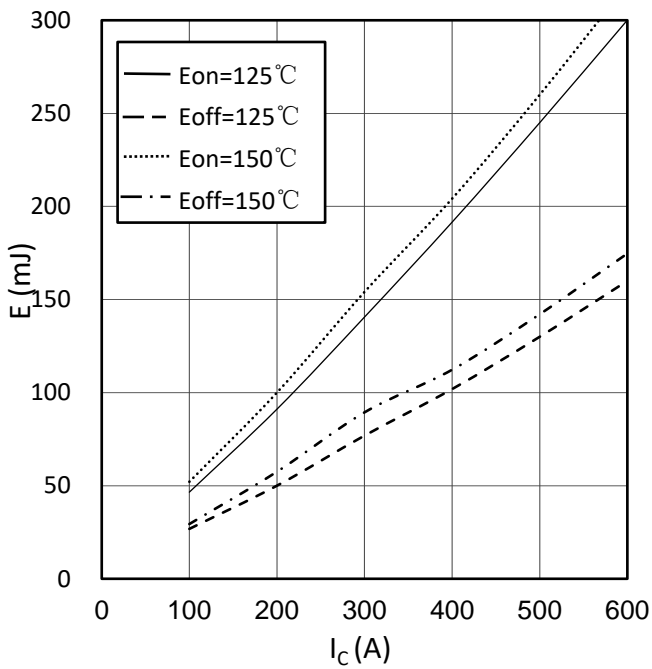
output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$
 $V_{GE} = 15\text{ V}$



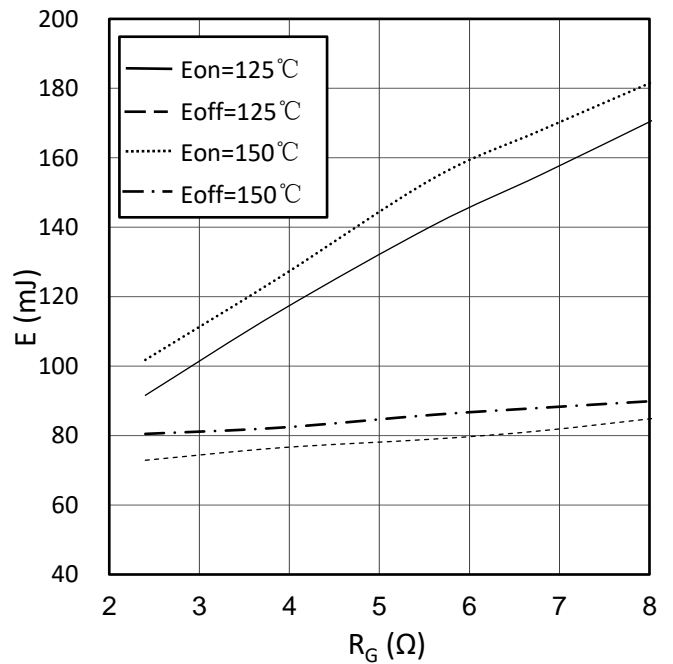
switching losses IGBT, Inverter (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{V}$, $R_{Gon} = 5.6\Omega$, $R_{Goff} = 5.6\Omega$, $V_{CE} = 900\text{V}$



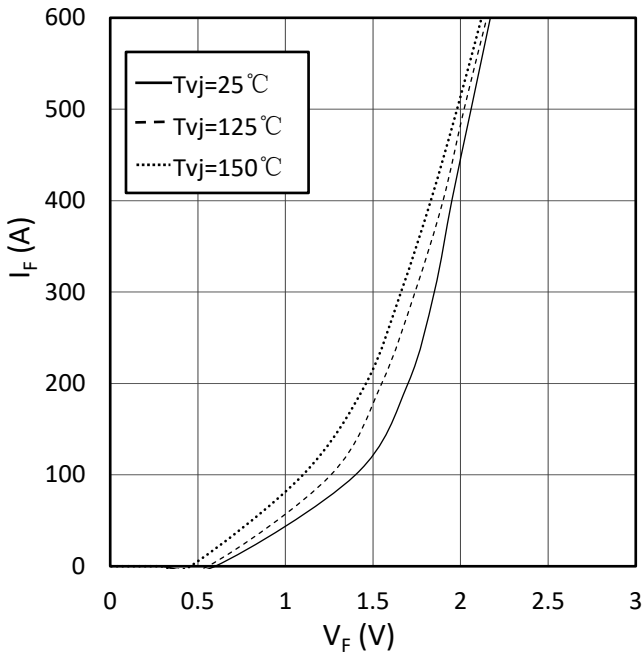
switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{V}$, $I_C = 300\text{A}$, $V_{CE} = 900\text{V}$



forward characteristic of Diode, Inverter (typical)

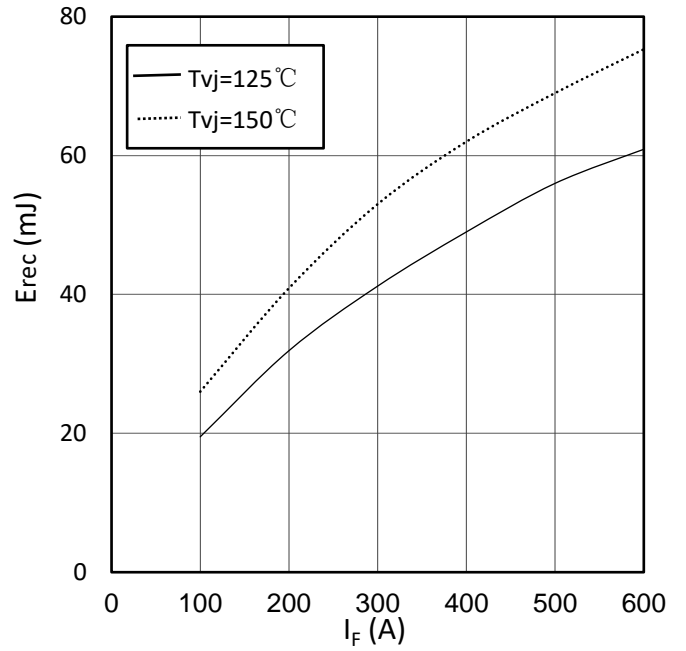
$I_F = f(V_F)$



switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

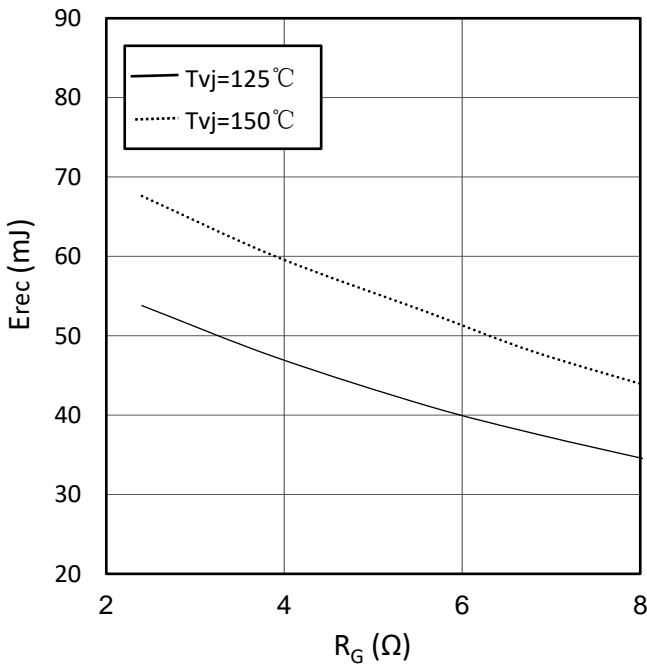
$R_{Gon}=5.6\Omega, V_{CE}=900V$



switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$

$I_F=300A, V_{CE}=900V$

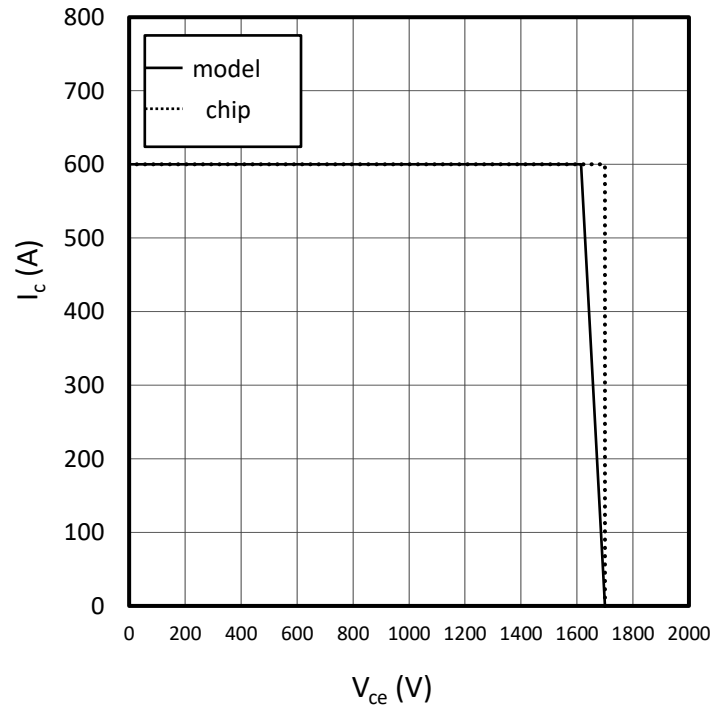


reverse bias safe operating area IGBT,

Inverter (RBSOA)

$I_C = f(V_{CE})$

$V_{GE} = \pm 15V, R_{Gon} = 5.6\Omega, R_{Goff} = 5.6\Omega, T_{vj} = 150^\circ\text{C}$



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序号 Item	日期 Date	变更记录及描述 Change History Description	版本序号 Rev. item	经办人 Responsibility
1	2021/11/1	初版规格书发布, 版本为V1.0	2021 11 Ver1.0	马慧明
2	2022/11/5	更新125℃、150℃数据, 版本为V1.1	2022 11 Ver1.1	梁华文
3	2023/2/11	更新热阻、功率, 版本为V1.2	2023 02 Ver1.2	梁华文
4	2023/10/30	增加RBSOA曲线、短路数据, 版本为V1.3	2023 10 Ver1.3	张成宇