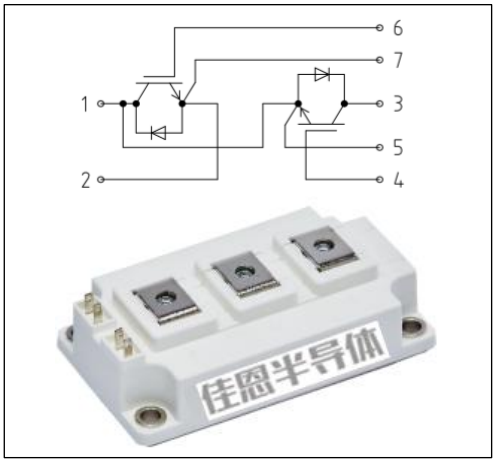
IGBT 62mm 半桥模块



Features

- 1200V 300A
- $V_{CE(sat)(typ.)}$= 1.6V @V_{GE}= 15V,I_C= 300A
- Soft turn off
- Positive VCE(on) Temperature Coefficient
- Easy paralleling

General Description

JIAEN Trench FS IGBTs offer lower losses and higher energy efficiency for general inverter and other soft switching applications. such as motor drive, AC and DC servo drive amplifier, power supply.

IGBT Maximum Rated Values

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Continuous Collector Current (T_C=70℃,$T_{vj\ max}$=150℃)	300	A
I_{CRM}	Repetitive Peak Collector Current (tp= 1 ms)	600	A
P_D	Maximum Power Dissipation (T_C=25℃,$T_{vj\ max}$=150℃)	1344	W

IGBT Characteristics

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=300A T_{vj}=25℃	-	1.6	1.9	V
	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=300A T_{vj}=150℃	-	1.9	-	V
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}=V_{CE}, I_C=11.4mA	5.0	5.8	6.6	V
Q_g	Total Gate Charge	V_{GE}=-15V…+15V	-	2.03		uC
C_{ies}	Input Capacitance	V_{CE}=25V V_{GE}=0V f=100KHz	-	59.2	-	nF
C_{oes}	Output Capacitance		-	1.55	-	nF
C_{res}	Reverse Transfer Capacitance		-	0.46	-	nF
I_{CES}	Collector-Emitter Leakage Current	V_{CE}=1200V, V_{GE}=0V	-	-	2.0	mA
I_{GES}	Gate Leakage Current, Forward	V_{GE}=20V, V_{CE}=0V	-	-	200	nA
	Gate Leakage Current, Reverse	V_{GE}=-20V, V_{CE}=0V	-	-	-200	nA

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=±15V I_C=300A R_G=3Ω Inductive Load T_{vj}=25 ℃	-	163	-	ns
t_r	Turn-on Rise Time		-	114	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	522	-	ns
t_f	Turn-off Fall Time		-	168	-	ns
Eon	Turn-on Switching Loss		-	14.2	-	mJ
Eoff	Turn-off Switching Loss		-	29.1	-	mJ
Ets	Total Switching Loss		-	43.3	-	mJ
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=±15V I_C=300A R_G=3Ω Inductive Load T_{vj}=125 ℃	-	175	-	ns
t_r	Turn-on Rise Time		-	122	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	574	-	ns
t_f	Turn-off Fall Time		-	259	-	ns
Eon	Turn-on Switching Loss		-	22.7	-	mJ
Eoff	Turn-off Switching Loss		-	36.8	-	mJ
Ets	Total Switching Loss		-	59.5	-	mJ
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=±15V I_C=300A R_G=3Ω Inductive Load T_{vj}=150 ℃	-	176	-	ns
t_r	Turn-on Rise Time		-	125	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	587	-	ns
t_f	Turn-off Fall Time		-	291	-	ns
Eon	Turn-on Switching Loss		-	23.5	-	mJ
Eoff	Turn-off Switching Loss		-	39.0	-	mJ
Ets	Total Switching Loss		-	62.5	-	mJ
Isc	Short circuit current	V_{GE}=15V, Tp≤10us T_{vj}=150℃, Vcc=600V $V_{CEM\ Chip}$≤1200V	-	1000	-	A
$R_{th\ j\text{-}c}$	Thermal resistance, junction to case		-	-	0.093	K/W
$T_{vj\ op}$	Temperature under switching condition		-40	-	150	℃

Diode Maximum Rated Values

Symbol	Parameter	Value	Units
V_{RRM}	Repetitive peak reverse voltage	1200	V
I_F	Continuous DC Forward Current	300	A
I_{FRM}	Repetitive Peak Collector Current (tp= 1ms)	600	A

Diode Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=300A V_{GE}=0V T_{vj}=25℃	-	2.7	3.2	V
		I_F=300A V_{GE}=0V T_{vj}=150℃	-	1.9	-	V
I_{RM}	Peak reverse recovery current	I_C=300A V_R=600V -di/dt=2500A/us V_{GE}=±15V T_{vj}=25℃	-	112	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	8.7	-	uC
E_{rec}	Reverse recovery energy		-	6.7	-	mJ
I_{RM}	Peak reverse recovery current	IC=300A VR=600V -di/dt=2500A/us V_{GE}=±15V T_{vj}=125℃	-	191	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	26.1	-	uC
E_{rec}	Reverse recovery energy		-	13.5	-	mJ
I_{RM}	Peak reverse recovery current	I_C=300A V_R=600V -di/dt=2500A/us V_{GE}=±15V T_{vj}=150℃	-	215	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	32.7	-	uC
E_{rec}	Reverse recovery energy		-	15.6	-	mJ
$R_{th\ j\text{-}c}$	Thermal resistance, junction to case		-	-	0.15	K/W
$T_{vj\ op}$	Temperature under switching condition		-40	-	150	℃

Module

Isolation test voltage	RMS, f=50 Hz, t=1 min	V_{ISOL}	4.0	kV
Material of module baseplate			Cu	
Internal isolation	basic insulation (class 1, IEC 61140)		Al_2O_3	
Clearance distance in air	Terminal to terminal		10	mm
Surface creepage distance	Terminal to terminal		13	mm
Comperative tracking index		CTI	>200	
Storage temperature		Tstg	-40~150	℃
Mounting torque for module mounting	M6 screws	M	3~6	Nm

Notes：

1. Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Performance Characteristics

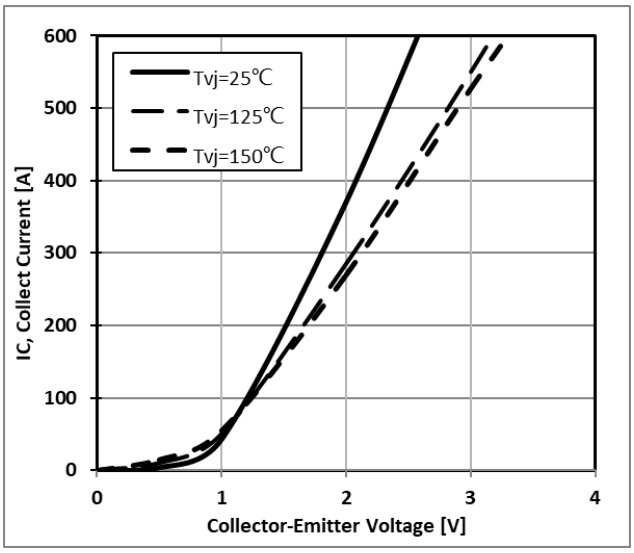


Figure 1: IGBT output characteristics (typical)
Ic=f(V_{CE}) V_{GE}=15V

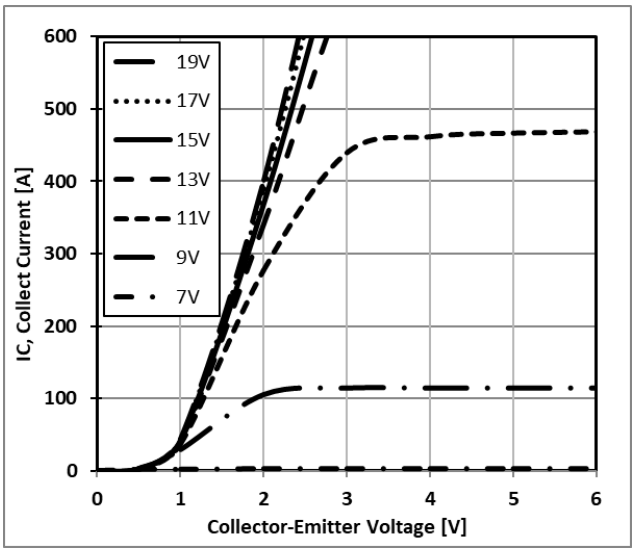


Figure 2: IGBT output characteristics (typical)
Ic=f(V_{CE}) T_{vj}=25℃

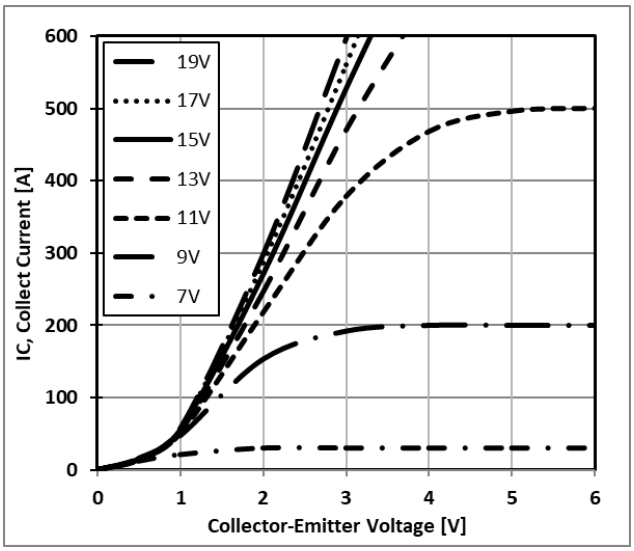


Figure 3: IGBT output characteristics (typical)
Ic=f(V_{CE}) T_{vj}=150℃

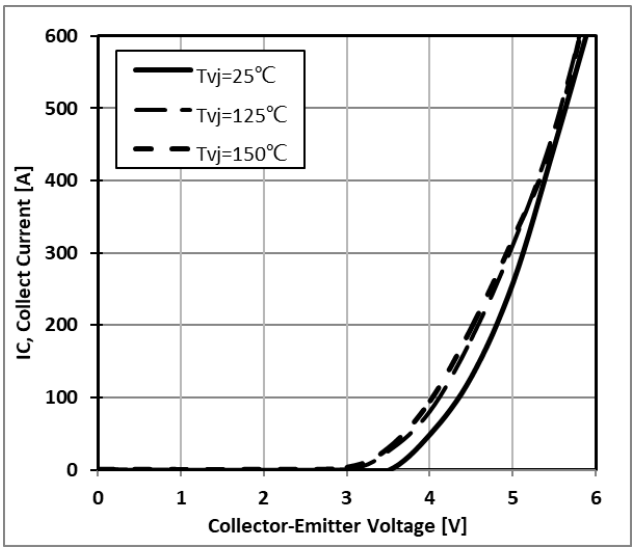


Figure 4: IGBT transfer characteristics (typical)
Ic=f(V_{GE}) V_{CE}=V_{GE}

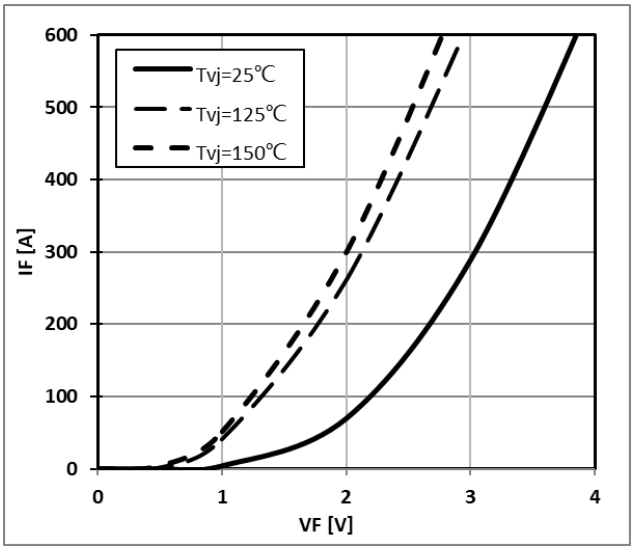


Figure 5: Diode forward characteristic (typical)

$I_F=f(V_F)$

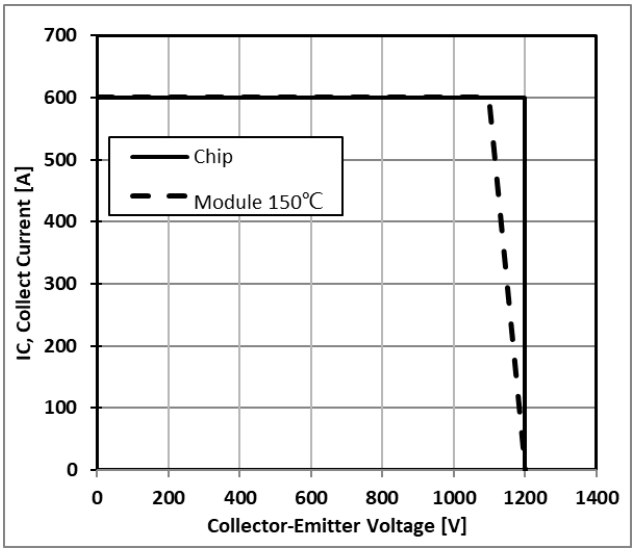


Figure 6: IGBT RBSOA

$Ic=f(V_{CEm})$ Rgoff=8Ω, $V_{GE}=\pm15V$

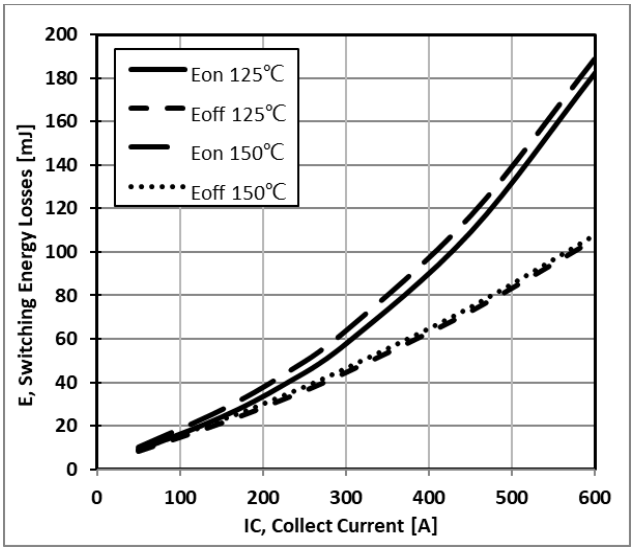


Figure 7: IGBT switching losses (typical)

$E=f(I_{CE})$

V_{CE}=600V, R_{Gon}=8Ω, R_{Goff}=8Ω, $V_{GE}=\pm15V$

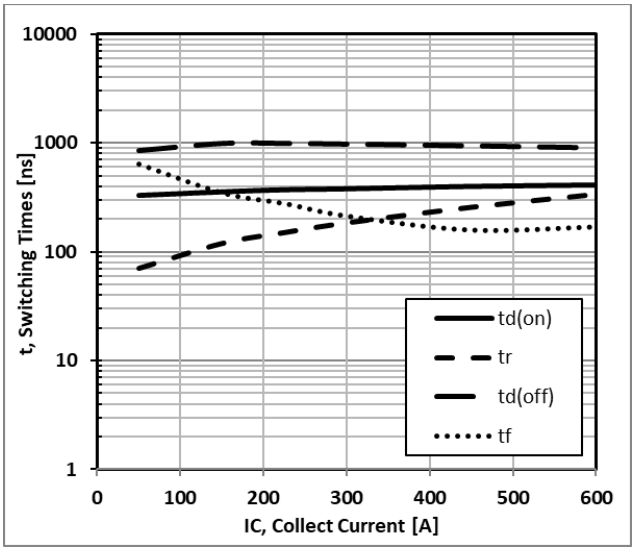


Figure 8: IGBT switching times (typical)

$t=f(I_{CE})$ T_{vj}=150℃

V_{CE}=600V, R_{Gon}=8Ω, R_{Goff}=8Ω, $V_{GE}=\pm15V$

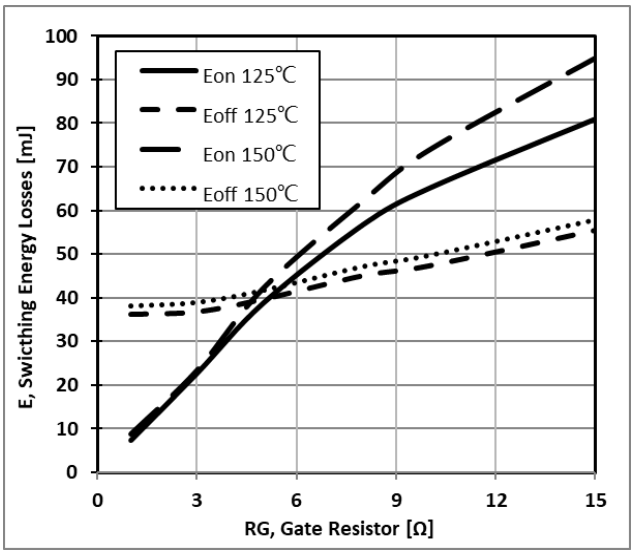


Figure 9: IGBT switching losses (typical)

E=f(R_G)

V_{CE}=600V, IC=300A, V_{GE}=±15V

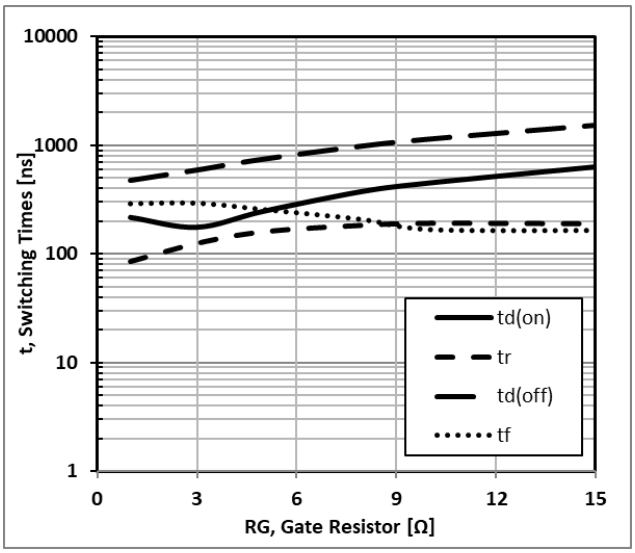


Figure 10: IGBT switching times (typical)

t=f(R_G) T_{vj}=150℃

V_{CE}=600V, IC=300A, V_{GE}=±15V

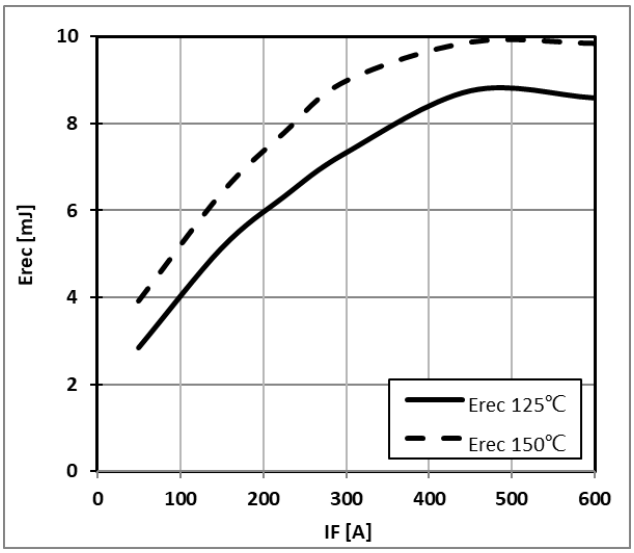


Figure 11: Diode switching characteristics (typical)

E_{REC}=f(I_F)

V_{DC}=600V, R_{Gon}=8Ω (IGBT), V_{GE}=±15V(IGBT)

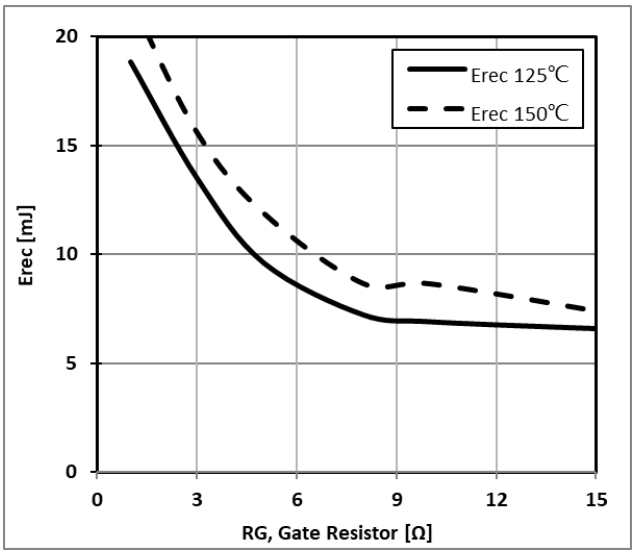


Figure 12: Diode switching characteristics (typical)

E_{REC}=f(R_G)

V_{DC}=600V, I_F=300A, V_{GE}=±15V(IGBT)

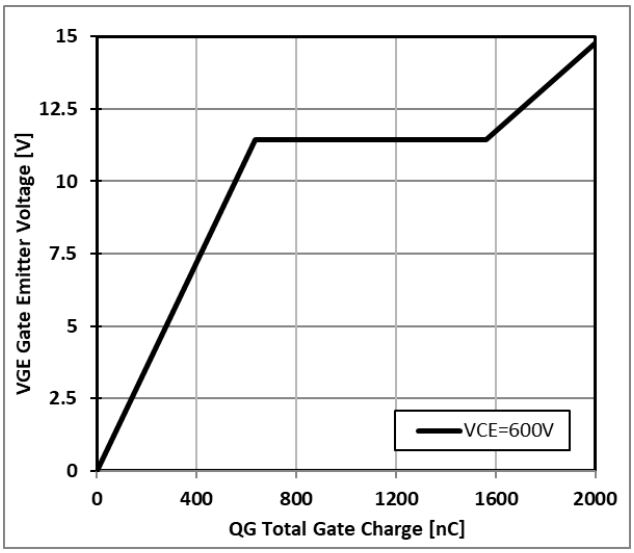


Figure 13: IGBT gate charge (typical)

$V_{GE}=f(Q_G)$ $T_{vj}=25℃$

$V_{CE}=600V$, IC=300A

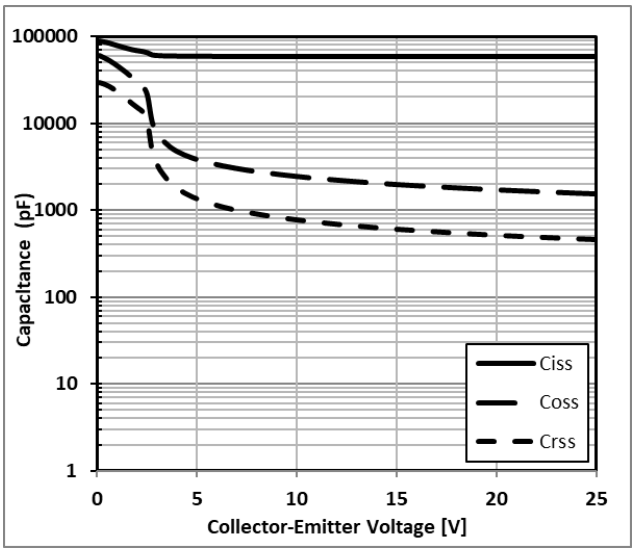
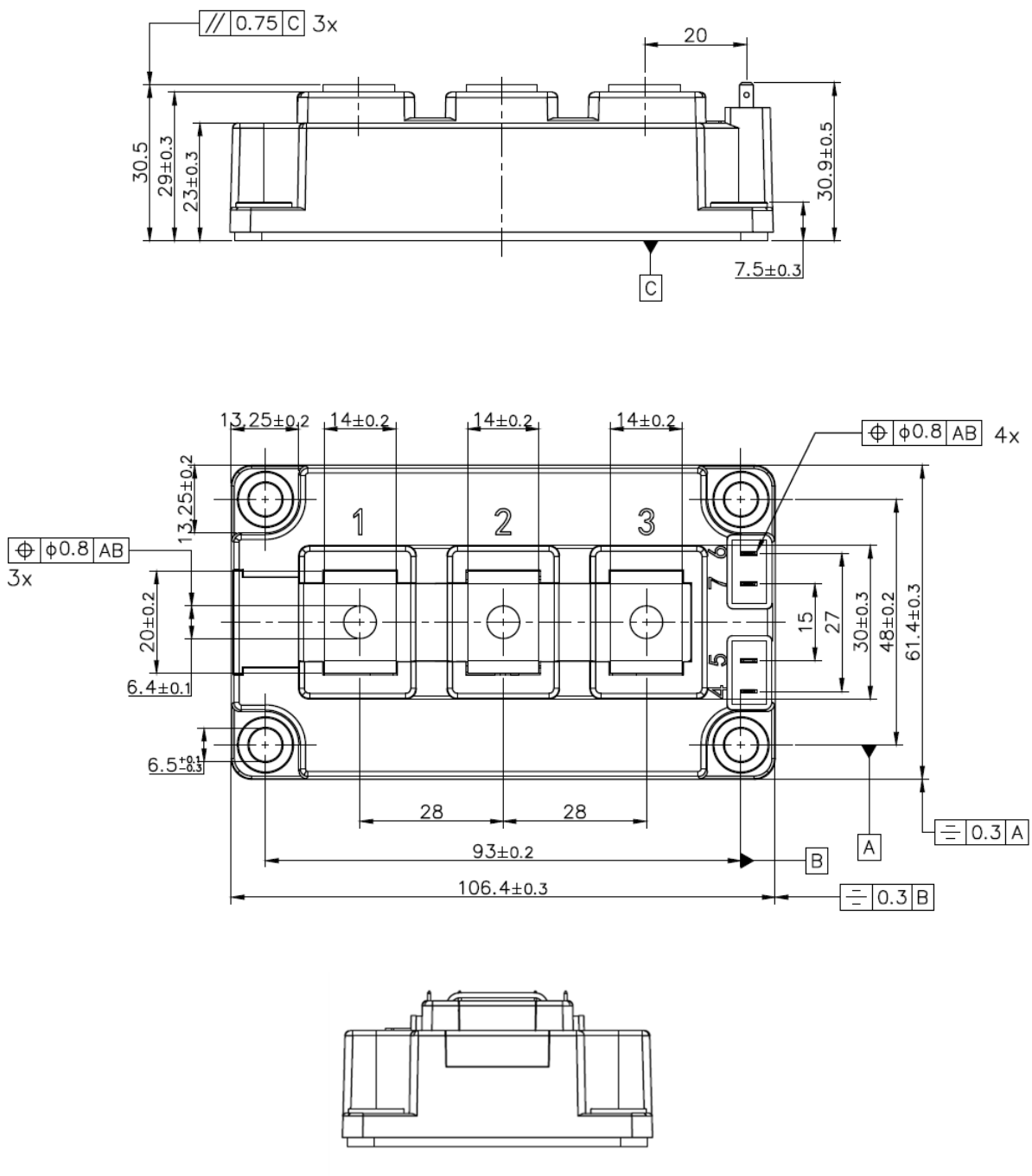


Figure 14: Capacitance characteristics (typical)

$C=f(V_{CE})$ $T_{vj}=25℃$

f=100KHz, $V_{GE}=0V$

Mechanical Dimensions



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