

PRELIMINARY
 Notice: This is not a final specification.
 Some parametric limits are subject to change.

MITSUBISHI HVIGBT MODULES

CM600HB-90H

2nd-Version HVIGBT (High Voltage Insulated Gate Bipolar Transistor) Modules

HIGH POWER SWITCHING USE
 INSULATED TYPE

CM600HB-90H



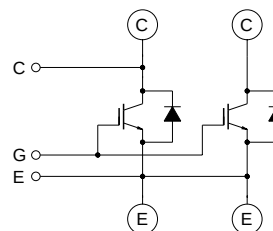
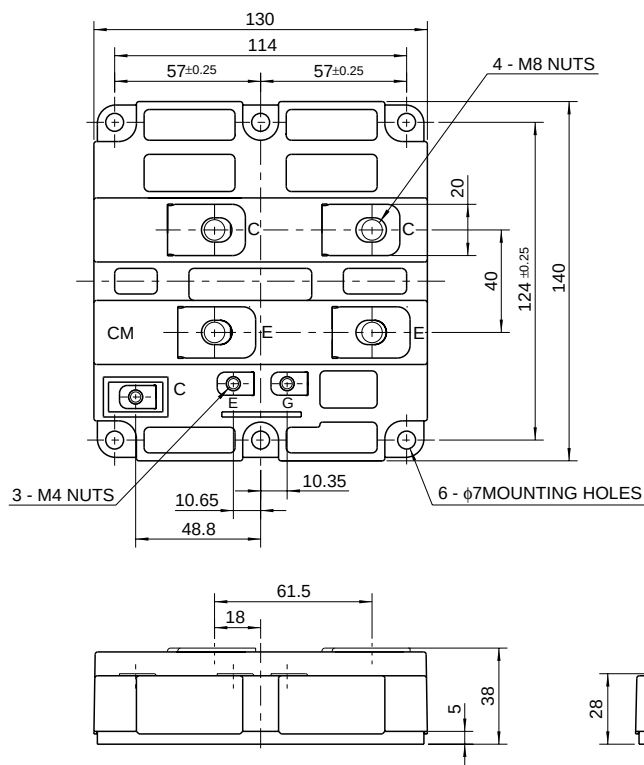
- IC.....600A
- VCES 4500V
- Insulated Type
- 1-element in a pack

APPLICATION

Inverters, Converters, DC choppers, Induction heating, DC to DC converters.

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



CIRCUIT DIAGRAM

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Mar. 2001

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MAXIMUM RATINGS (Tj = 25°C)

Symbol	Item	Conditions	Ratings	Unit
VCES	Collector-emitter voltage	VGE = 0V	4500	V
VGES	Gate-emitter voltage	VCE = 0V	±20	V
IC	Collector current	Tc = 25°C	600	A
ICM		Pulse (Note 1)	1200	A
IE (Note 2)	Emitter current	Tc = 25°C	600	A
IEM (Note 2)		Pulse (Note 1)	1200	A
PC (Note 3)	Maximum collector dissipation	Tc = 25°C, IGBT part	6700	W
Tj	Junction temperature	—	−40 ~ +125	°C
Tstg	Storage temperature	—	−40 ~ +125	°C
Viso	Isolation voltage	Charged part to base plate, rms, sinusoidal, AC 60Hz 1min.	6000	V
—	Mounting torque	Main terminals screw M8	6.67 ~ 13.00	N·m
		Mounting screw M6	2.84 ~ 6.00	N·m
		Auxiliary terminals screw M4	0.88 ~ 2.00	N·m
—	Mass	Typical value	1.5	kg

ELECTRICAL CHARACTERISTICS (Tj = 25°C)

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
ICES	Collector cutoff current	VCE = VCES, VGE = 0V	—	—	12	mA
VGE(th)	Gate-emitter threshold voltage	IC = 60mA, VCE = 10V	4.5	6.0	7.5	V
IGES	Gate-leakage current	VGE = VGES, VCE = 0V	—	—	0.5	μA
VCE(sat)	Collector-emitter saturation voltage	Tj = 25°C	—	3.00	3.90	V
		Tj = 125°C	—	3.30	—	
Cies	Input capacitance	VCE = 10V VGE = 0V	—	108	—	nF
Coes	Output capacitance		—	8.0	—	nF
Cres	Reverse transfer capacitance		—	2.4	—	nF
QG	Total gate charge	VCC = 2250V, IC = 600A, VGE = 15V	—	5.4	—	μC
td (on)	Turn-on delay time	VCC = 2250V, IC = 600A	—	—	2.40	μs
tr	Turn-on rise time	VGE1 = VGE2 = 15V	—	—	2.40	μs
td (off)	Turn-off delay time	RG = 15Ω	—	—	6.00	μs
tf	Turn-off fall time	Resistive load switching operation	—	—	1.20	μs
VEC(Note 2)	Emitter-collector voltage	IE = 600A, VGE = 0V	—	4.00	5.20	V
trr (Note 2)	Reverse recovery time	IE = 600A,	—	—	1.80	μs
Qrr (Note 2)	Reverse recovery charge	die / dt = −1200A / μs (Note 1)	—	240	—	μC
Rth(j-c)Q	Thermal resistance	Junction to case, IGBT part	—	—	0.015	K/W
Rth(j-c)R		Junction to case, FWDi part	—	—	0.030	K/W
Rth(c-f)	Contact thermal resistance	Case to fin, conductive grease applied	—	0.010	—	K/W

- Note 1. Pulse width and repetition rate should be such that the device junction temp. (Tj) does not exceed Tjmax rating.
 2. IE, VEC, trr, Qrr & die/dt represent characteristics of the anti-parallel, emitter to collector free-wheel diode.
 3. Junction temperature (Tj) should not increase beyond 125°C.
 4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

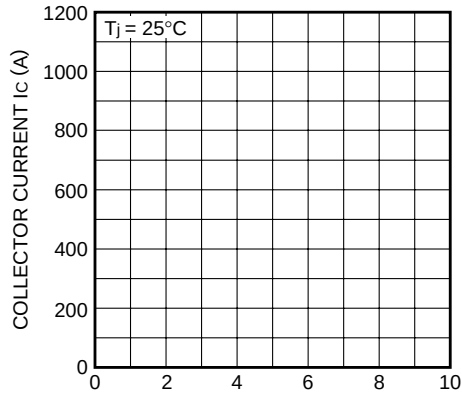
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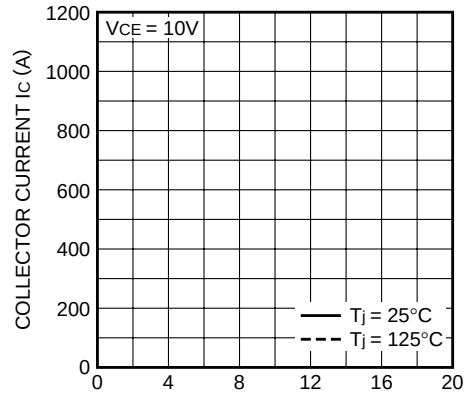
PERFORMANCE CURVES

**OUTPUT CHARACTERISTICS
 (TYPICAL)**



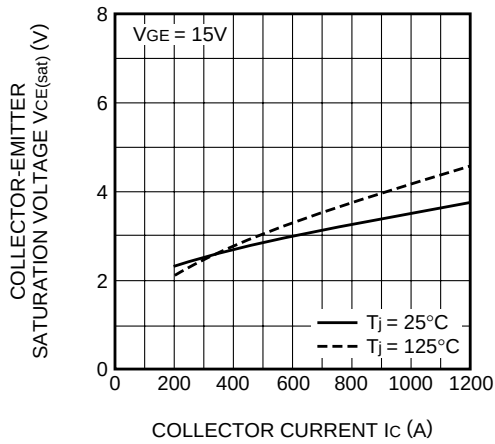
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE(sat)}$ (V)

**TRANSFER CHARACTERISTICS
 (TYPICAL)**



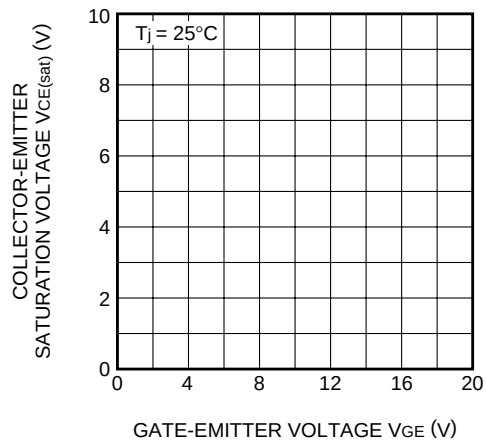
GATE-EMITTER VOLTAGE V_{GE} (V)

**COLLECTOR-EMITTER SATURATION
 VOLTAGE CHARACTERISTICS
 (TYPICAL)**



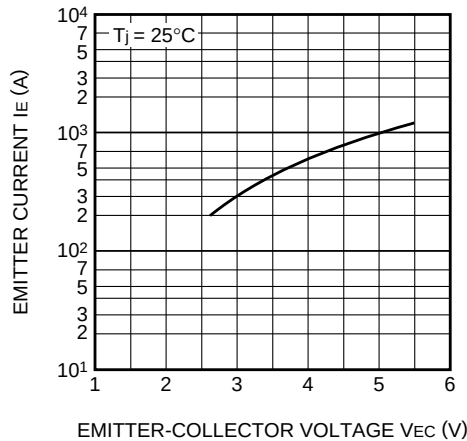
COLLECTOR CURRENT I_c (A)

**COLLECTOR-EMITTER SATURATION
 VOLTAGE CHARACTERISTICS
 (TYPICAL)**



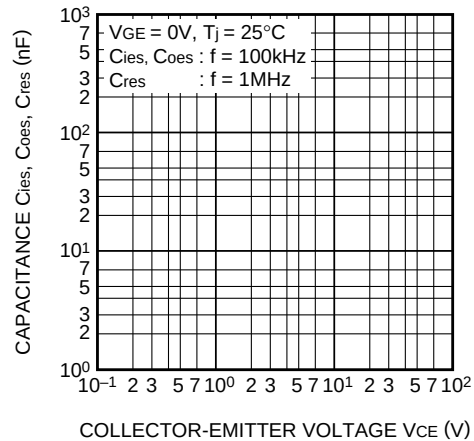
GATE-EMITTER VOLTAGE V_{GE} (V)

**FREE-WHEEL DIODE
 FORWARD CHARACTERISTICS
 (TYPICAL)**



EMITTER-COLLECTOR VOLTAGE V_{EC} (V)

**CAPACITANCE VS. V_{CE}
 (TYPICAL)**



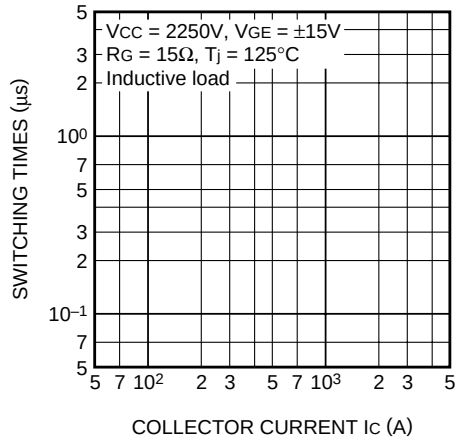
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

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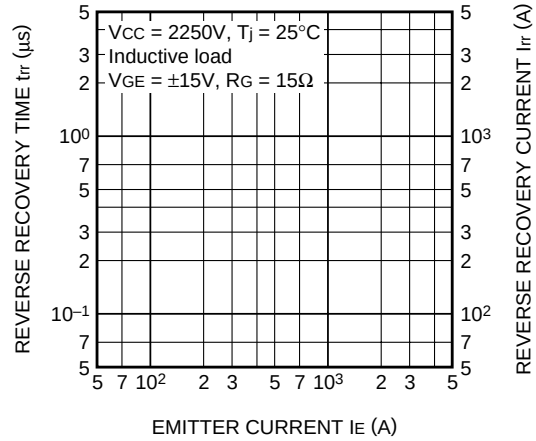
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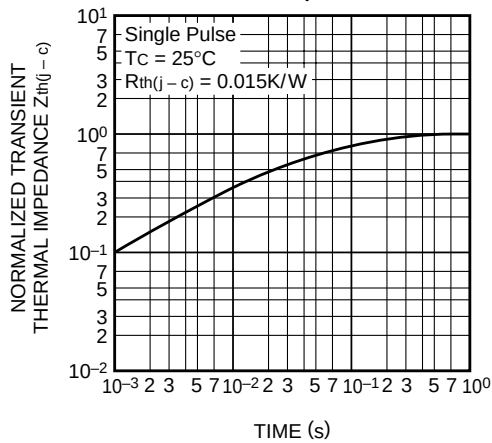
**HALF-BRIDGE
 SWITCHING CHARACTERISTICS
 (TYPICAL)**



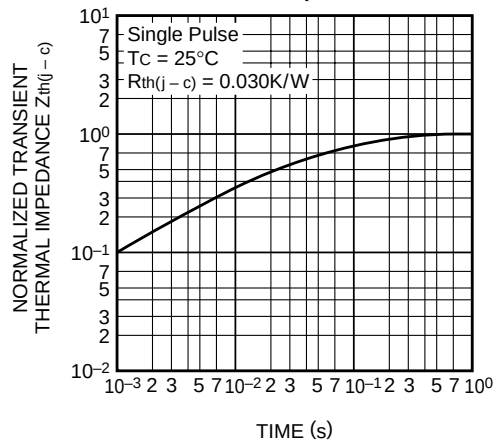
**REVERSE RECOVERY CHARACTERISTICS
 OF FREE-WHEEL DIODE
 (TYPICAL)**



**TRANSIENT THERMAL
 IMPEDANCE CHARACTERISTICS
 (IGBT part)**



**TRANSIENT THERMAL
 IMPEDANCE CHARACTERISTICS
 (FWDi part)**



**V_{GE} - GATE CHARGE
 (TYPICAL)**

