

MITSUBISHI HVIGBT MODULES
CM800E6C-66H

3rd-Version HVIGBT (High Voltage Insulated Gate Bipolar Transistor) Modules

HIGH POWER SWITCHING USE
INSULATED TYPE

CM800E6C-66H



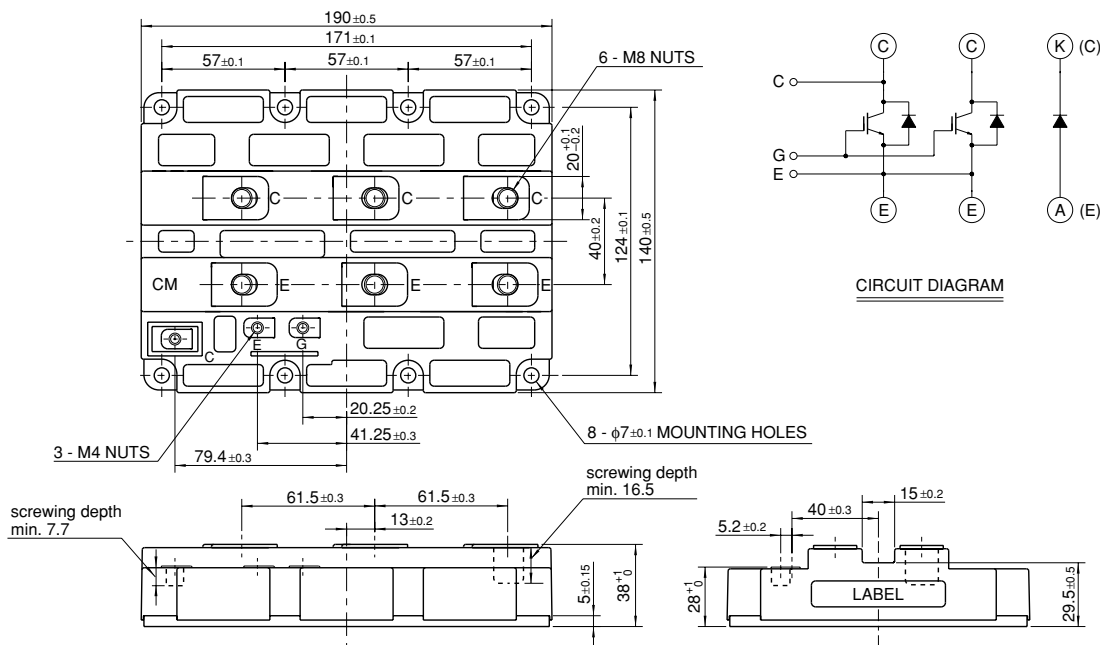
- Ic 800A
- VCES 3300V
- Insulated Type
- 1-element in a Pack (for brake)
- AISiC Baseplate

APPLICATION

Traction drives, DC choppers, Dynamic braking choppers

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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Jul. 2005



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MAXIMUM RATINGS

Symbol	Item	Conditions	Ratings	Unit
VCES	Collector-emitter voltage	VGE = 0V, Tj = 25°C	3300	V
VGES	Gate-emitter voltage	VCE = 0V, Tj = 25°C	±20	V
IC	Collector current	TC = 100°C	800	A
ICM		Pulse (Note 1)	1600	A
IE (Note 2)	Emitter current		800	A
IEM (Note 2)		Pulse (Note 1)	1600	A
PC (Note 3)	Maximum power dissipation	TC = 25°C, IGBT part	9600	W
Tj	Junction temperature		-40 ~ +150	°C
Top	Operating temperature		-40 ~ +125	°C
Tstg	Storage temperature		-40 ~ +125	°C
Viso	Isolation voltage	RMS, sinusoidal, f = 60Hz, t = 1min.	6000	V
tpsc	Maximum short circuit pulse width	VCC = 2200V, VCES ≤ 3300V, VGE = 15V Tj = 125°C	10	µs

ELECTRICAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
ICES	Collector cut-off current	VCE = VCES, VGE = 0V, Tj = 25°C	—	—	10	mA
VGE(th)	Gate-emitter threshold voltage	IC = 80mA, VCE = 10V, Tj = 25°C	5.0	6.0	7.0	V
IGES	Gate leakage current	VGE = VGES, VCE = 0V, Tj = 25°C	—	—	0.5	µA
VCE(sat)	Collector-emitter saturation voltage	IC = 800A, VGE = 15V, Tj = 25°C (Note 4)	—	3.30	4.20	V
		IC = 800A, VGE = 15V, Tj = 125°C (Note 4)	—	3.60	—	
Cies	Input capacitance	VCE = 10V, f = 100kHz VGE = 0V, Tj = 25°C	—	120	—	nF
Coes	Output capacitance		—	12.0	—	nF
Cres	Reverse transfer capacitance		—	3.6	—	nF
Qg	Total gate charge	VCC = 1650V, IC = 800A, VGE = 15V, Tj = 25°C	—	5.7	—	µC
VEC (Note 2)	Emitter-collector voltage	IE = 800A, VGE = 0V, Tj = 25°C (Note 4)	—	2.80	3.60	V
		IE = 800A, VGE = 0V, Tj = 125°C (Note 4)	—	2.70	—	
td(on)	Turn-on delay time	VCC = 1650V, IC = 800A, VGE = ±15V	—	—	1.60	µs
tr	Turn-on rise time	RG(on) = 2.5Ω, Tj = 125°C, Ls = 100nH	—	—	1.00	µs
Eon	Turn-on switching energy	Inductive load	—	1.10	—	J/pulse
td(off)	Turn-off delay time	VCC = 1650V, IC = 800A, VGE = ±15V	—	—	2.50	µs
tf	Turn-off fall time	RG(off) = 2.5Ω, Tj = 125°C, Ls = 100nH	—	—	1.00	µs
Eoff	Turn-off switching energy	Inductive load	—	1.05	—	J/pulse
trr (Note 2)	Reverse recovery time	VCC = 1650V, IC = 800A, VGE = ±15V	—	—	1.4	µs
Qrr (Note 2)	Reverse recovery charge	RG(on) = 2.5Ω, Tj = 125°C, Ls = 100nH	—	540	—	µC
Erec (Note 2)	Reverse recovery energy	Inductive load	—	0.60	—	J/pulse
VF (Note 5)	Forward voltage	IF = 800A, VGE = 0V, Tj = 25°C (Note 4)	—	2.80	3.60	V
		IF = 800A, VGE = 0V, Tj = 125°C (Note 4)	—	2.70	—	
trr (Note 5)	Reverse recovery time	VCC = 1650V, IC = 800A, VGE = ±15V	—	—	1.4	µs
Qrr (Note 5)	Reverse recovery charge	di/dt = 2600A/µs, Tj = 125°C, Ls = 100nH	—	540	—	µC
Erec (Note 5)	Reverse recovery energy	Inductive load	—	0.60	—	J/pulse

- Note 1. Pulse width and repetition rate should be such that junction temperature (Tj) does not exceed Topmax rating (125°C).
 2. The symbols represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWDI).
 3. Junction temperature (Tj) should not exceed Tjmax rating (150°C).
 4. Pulse width and repetition rate should be such as to cause negligible temperature rise.
 5. The symbols represent characteristics of the clamp diode (Clamp-Di).



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THERMAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
Rth(j-c)Q	Thermal resistance	Junction to Case, IGBT part	—	—	13.0	K/kW
Rth(j-c)R		Junction to Case, FWDi part	—	—	25.0	K/kW
		Junction to Case, Clamp-Di part	—	—	25.0	
Rth(c-f)	Contact thermal resistance	Case to Fin, $\lambda_{grease} = 1W/m^2K$	—	8.0	—	K/kW

MECHANICAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
M	Mounting torque	M8 : Main terminals screw	7.0	—	13.0	N·m
		M6 : Mounting screw	3.0	—	6.0	
		M4 : Auxiliary terminals screw	1.0	—	2.0	
—	Mass		—	1.5	—	kg
CTI	Comparative tracking index		600	—	—	—
da	Clearance distance in air		19.5	—	—	mm
ds	Creepage distance along surface		32.0	—	—	mm
LC-E(int)	Internal inductance	IGBT part	—	18	—	nH
		Clamp-Di part	—	24	—	
RC-E(int)	Internal lead resistance	Tc = 25°C, IGBT part	—	0.20	—	mΩ
		Tc = 25°C, Clamp-Di part	—	0.30	—	

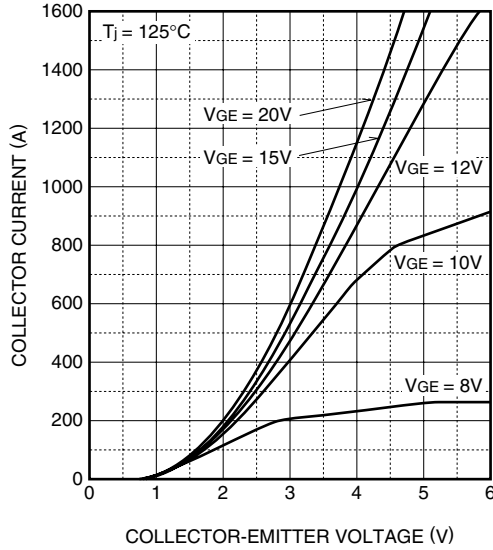
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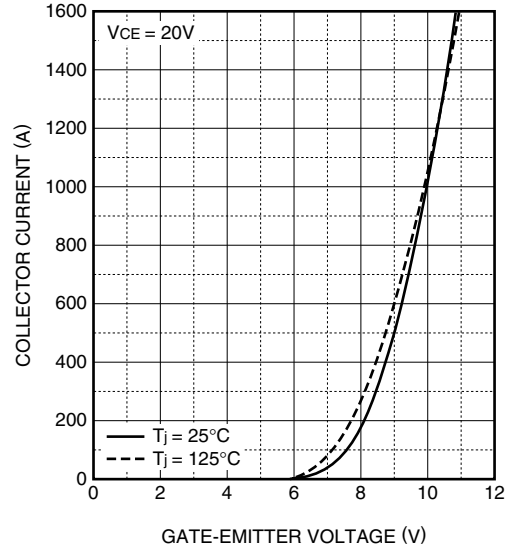
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PERFORMANCE CURVES

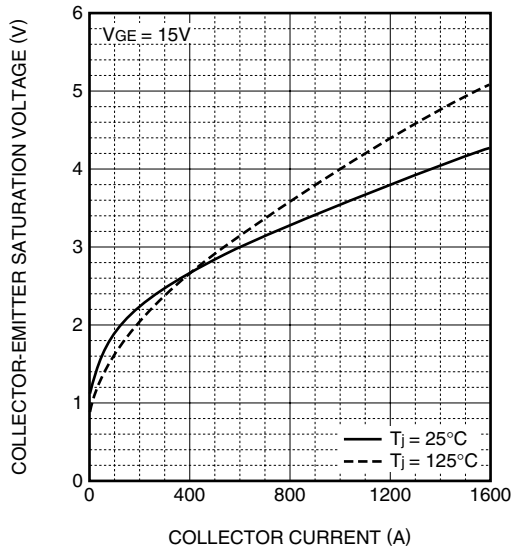
OUTPUT CHARACTERISTICS (TYPICAL)



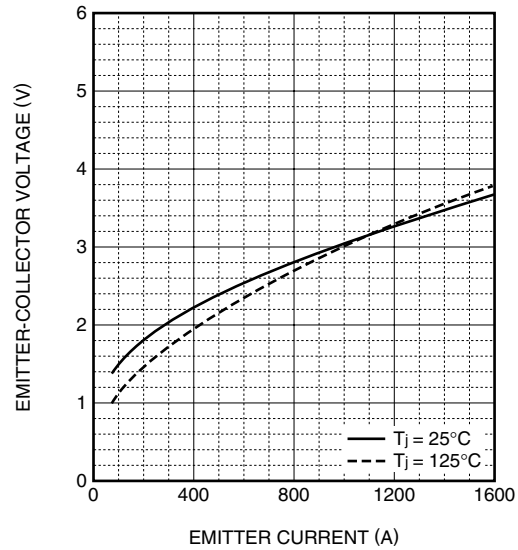
TRANSFER CHARACTERISTICS (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



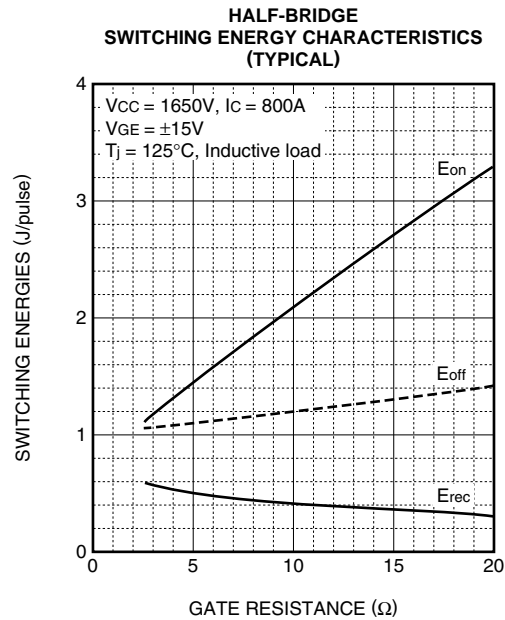
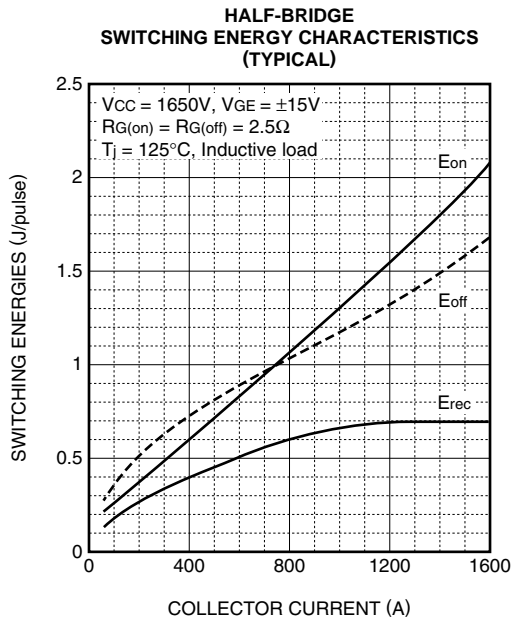
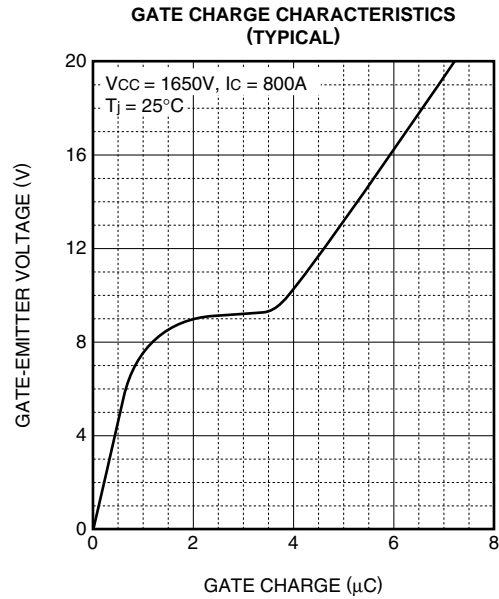
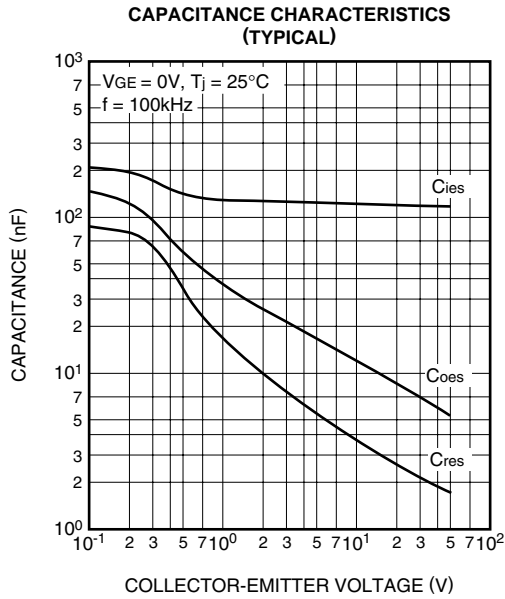
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



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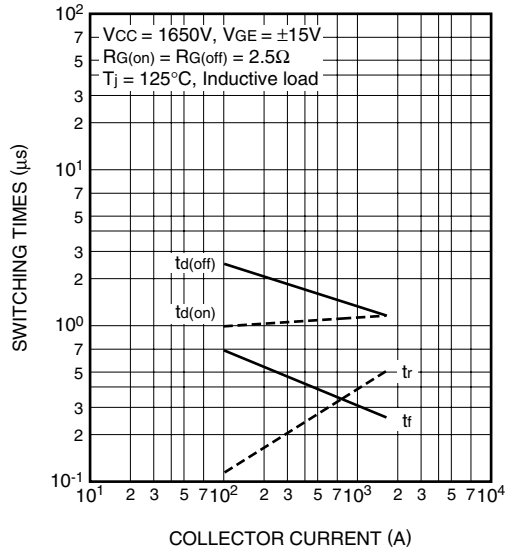


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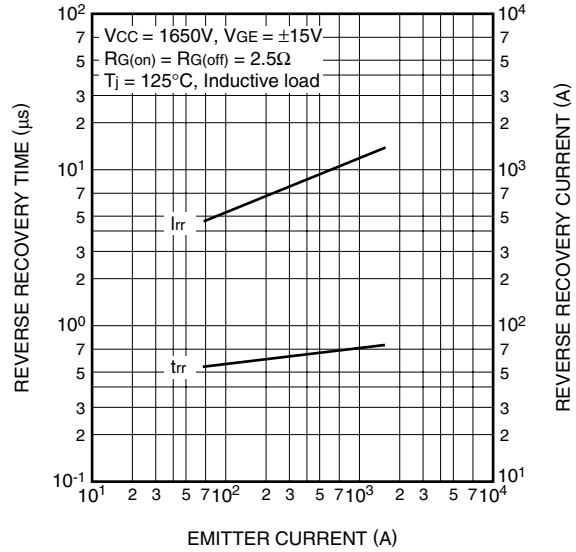
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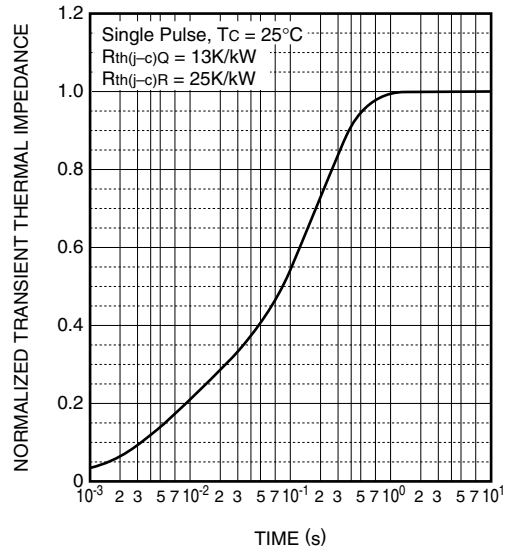
**HALF-BRIDGE
SWITCHING TIME CHARACTERISTICS
(TYPICAL)**



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



**TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS**



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