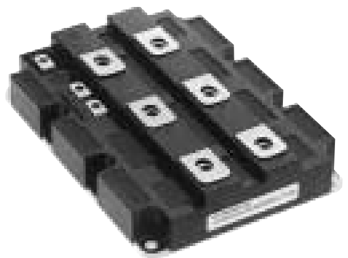
MITSUBISHI HVIGBT MODULES

CM800E2Z-66H

HIGH POWER SWITCHING USE
INSULATED TYPE

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

CM800E2Z-66H

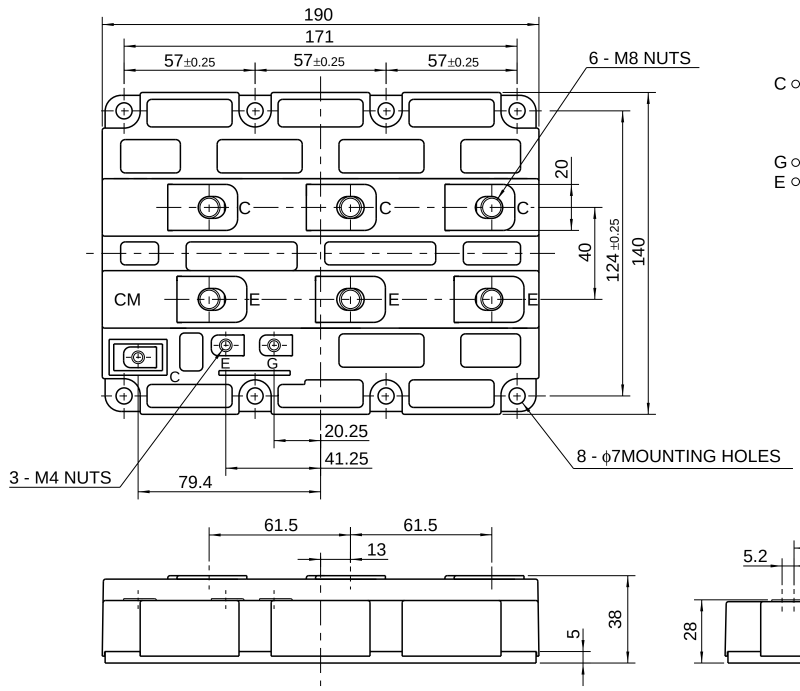


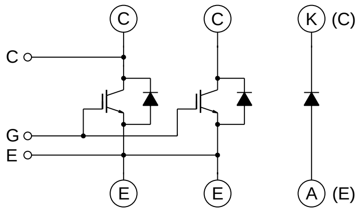
- I_C 800A
- V_{CES} 3300V
- Insulated Type
- 1-elements in a pack (for brake)

APPLICATION

DC choppers, Dynamic braking choppers.

OUTLINE DRAWING & CIRCUIT DIAGRAM **Dimensions in mm**





CIRCUIT DIAGRAM

Mar. 2001

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

MAXIMUM RATINGS (T_j = 25°C)

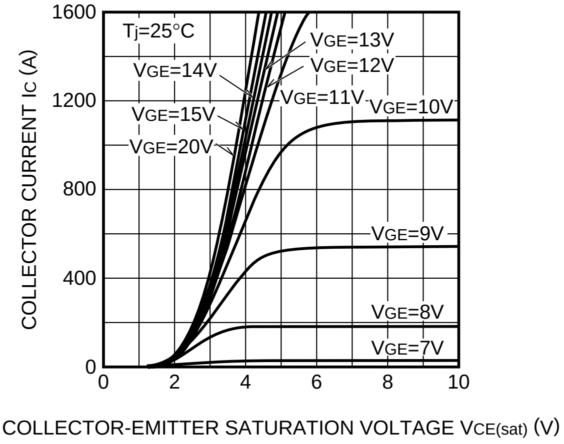
Symbol	Item	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	V_{GE} = 0V	3300	V
V_{GES}	Gate-emitter voltage	V_{CE} = 0V	±20	V
I_C	Collector current	T_C = 25°C	800	A
I_{CM}		Pulse (Note 1)	1600	A
I_E (Note 2)	Emitter current	T_C = 25°C	800	A
I_{EM} (Note 2)		Pulse (Note 1)	1600	A
P_C (Note 3)	Maximum collector dissipation	T_C = 25°C, IGBT part	10400	W
T_j	Junction temperature	—	–40 ~ +150	°C
T_{stg}	Storage temperature	—	–40 ~ +125	°C
V_{iso}	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	2.2	kg

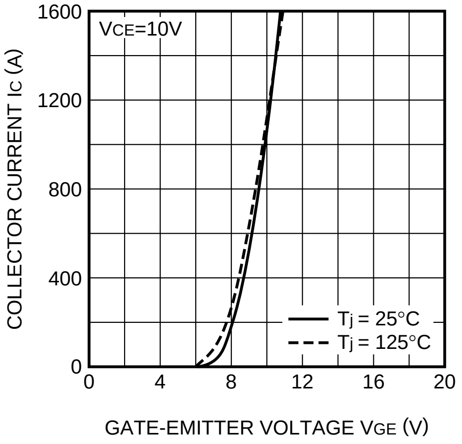
ELECTRICAL CHARACTERISTICS (T_j = 25°C)

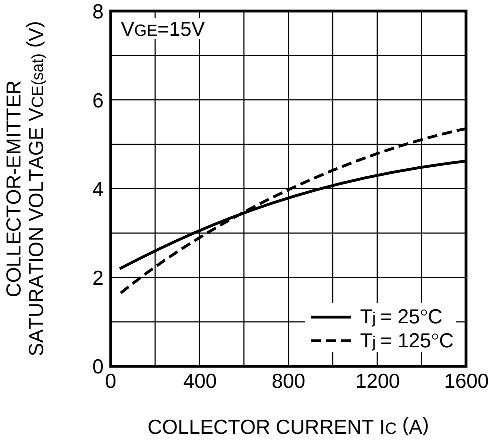
Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
I_{CES}	Collector cutoff current	V_{CE} = V_{CES}, V_{GE} = 0V	—	—	10	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C = 80mA, V_{CE} = 10V	4.5	6.0	7.5	V
I_{GES}	Gate-leakage current	V_{GE} = V_{GES}, V_{CE} = 0V	—	—	0.5	µA
$V_{CE(sat)}$	Collector-emitter saturation voltage	T_j = 25°C; I_C = 800A, V_{GE} = 15V (Note 4)	—	3.80	4.94	V
		T_j = 125°C	—	4.00	—	
C_{ies}	Input capacitance	V_{CE} = 10V V_{GE} = 0V	—	120	—	nF
C_{oes}	Output capacitance		—	12.0	—	nF
C_{res}	Reverse transfer capacitance		—	3.6	—	nF
Q_G	Total gate charge	V_{CC} = 1650V, I_C = 800A, V_{GE} = 15V	—	5.7	—	µC
$t_{d(on)}$	Turn-on delay time	V_{CC} = 1650V, I_C = 800A V_{GE1} = V_{GE2} = 15V R_G = 2.5Ω Resistive load switching operation	—	—	1.60	µs
t_r	Turn-on rise time		—	—	2.00	µs
$t_{d(off)}$	Turn-off delay time		—	—	2.50	µs
t_f	Turn-off fall time		—	—	1.00	µs
V_{EC} (Note 2)	Emitter-collector voltage	I_E = 800A, V_{GE} = 0V	—	2.80	3.64	V
t_{rr} (Note 2)	Reverse recovery time	I_E = 800A di_e / dt = –1600A / µs	—	—	1.40	µs
Q_{rr} (Note 2)	Reverse recovery charge		—	270	—	µC
$R_{th(j-c)Q}$	Thermal resistance	Junction to case, IGBT part	—	—	0.012	K/W
$R_{th(j-c)R}$		Junction to case, FWDi part	—	—	0.024	K/W
$R_{th(c-f)}$	Contact thermal resistance	Case to fin, conductive grease applied (Per 2/3 module)	—	0.008	—	K/W
V_{FM}	Forward voltage	I_F = 800A, Clamp diode part	—	3.00	3.90	V
t_{rr}	Reverse recovery time	I_F = 800A di_f / dt = –1600A / µs, Clamp diode part	—	—	1.40	µs
Q_{rr}	Reverse recovery charge		—	270	—	µC
$R_{th(j-c)}$	Thermal resistance	Junction to case, Clamp diode part	—	—	0.024	K/W
$R_{th(c-f)}$	Contact thermal resistance	Case to fin, conductive grease applied (Per 1/3 module)	—	0.008	—	K/W

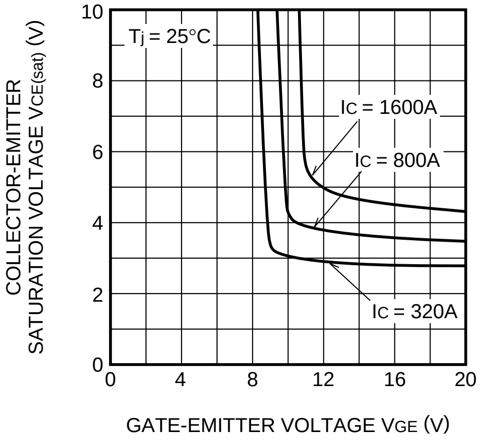
Note 1. Pulse width and repetition rate should be such that the device junction temp. (T_j) does not exceed T_{jmax} rating.
2. I_E, V_{EC}, t_{rr}, Q_{rr} & di_e/dt represent characteristics of the anti-parallel, emitter to collector free-wheel diode.
3. Junction temperature (T_j) should not increase beyond 150°C.
4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

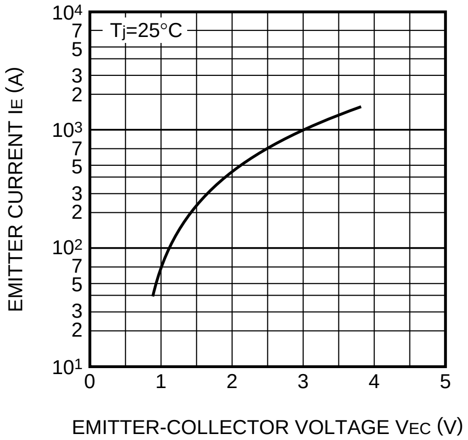
PERFORMANCE CURVES

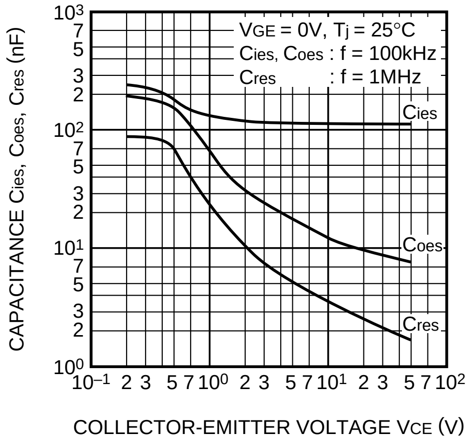

OUTPUT CHARACTERISTICS (TYPICAL)


TRANSFER CHARACTERISTICS (TYPICAL)

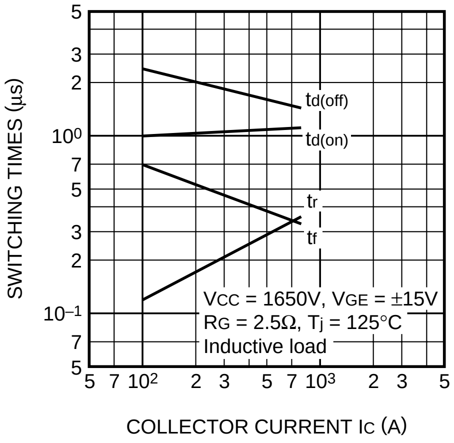

COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)


COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)

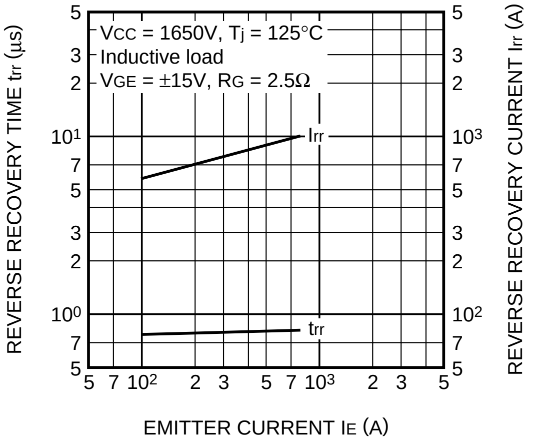

FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)


CAPACITANCE VS. VCE (TYPICAL)

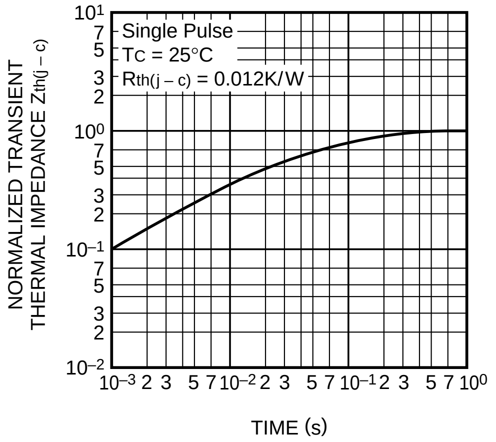
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



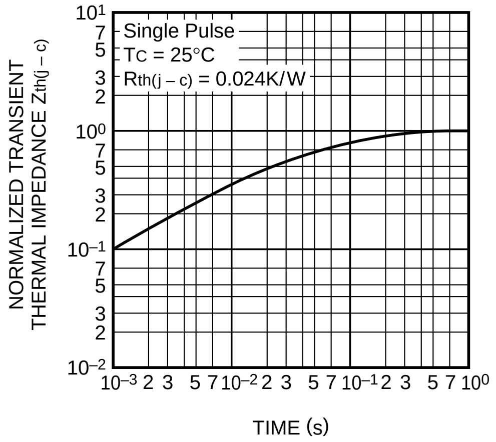
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi part)



VGE – GATE CHARGE (TYPICAL)