

MITSUBISHI HVIGBT MODULES
CM400DY-50H

HVIGBT (High Voltage Insulated Gate Bipolar Transistor) Modules

HIGH POWER SWITCHING USE
 INSULATED TYPE

CM400DY-50H



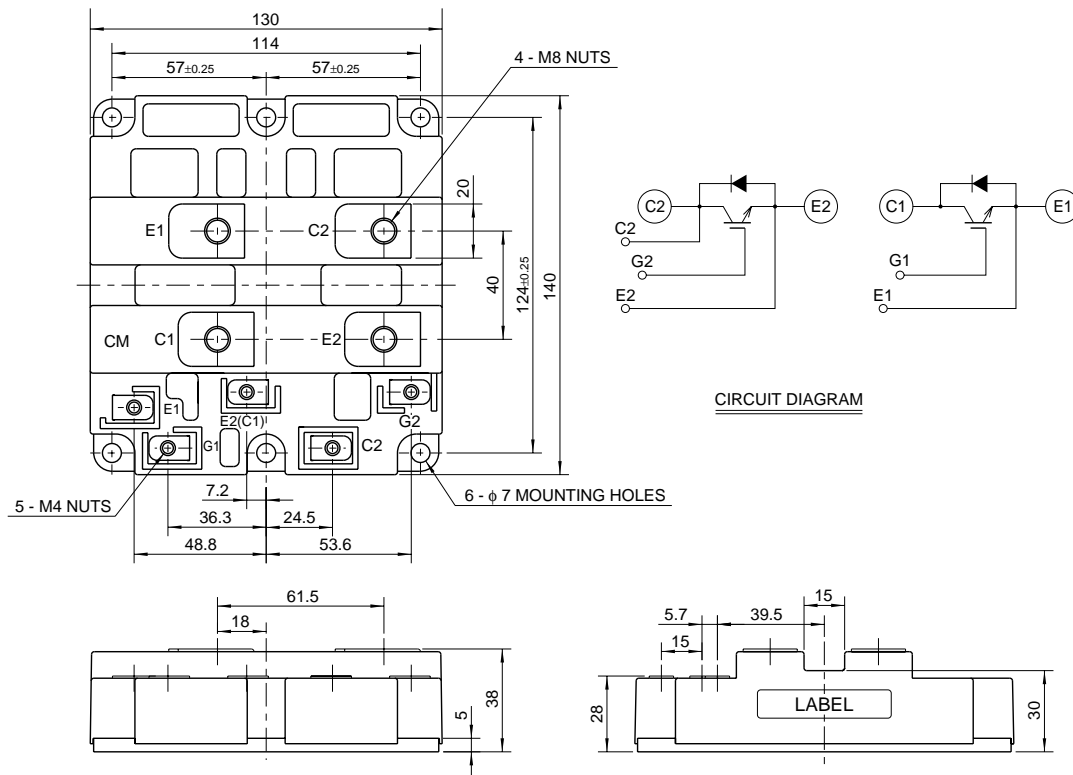
- Ic400A
- VCES2500V
- Insulated Type
- 2-elements in a pack

APPLICATION

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

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



HVIGBT MODULES (High Voltage Insulated Gate Bipolar Transistor Modules)

Mar. 2003



CM400DY-50H

HIGH POWER SWITCHING USE
INSULATED TYPE

HVIGBT (High Voltage Insulated Gate Bipolar Transistor) Modules

MAXIMUM RATINGS ($T_j = 25^\circ\text{C}$)

Symbol	Item	Conditions	Ratings	Unit
VCES	Collector-emitter voltage	$V_{GE} = 0V$	2500	V
VGES	Gate-emitter voltage	$V_{CE} = 0V$	± 20	V
IC	Collector current	DC, $T_c = 80^\circ\text{C}$	400	A
ICM		Pulse (Note 1)	800	A
IE (Note 2)	Emitter current		400	A
IEM (Note 2)		Pulse (Note 1)	800	A
PC (Note 3)	Maximum collector dissipation	$T_c = 25^\circ\text{C}$, IGBT part	3400	W
Tj	Junction temperature	—	$-40 \sim +150$	$^\circ\text{C}$
Tstg	Storage temperature	—	$-40 \sim +125$	$^\circ\text{C}$
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 ($T_j = 25^\circ\text{C}$)

Symbol	Parameter	Conditions	Limits			Unit
			Min	Typ	Max	
ICES	Collector cutoff current	$V_{CE} = V_{CES}$, $V_{GE} = 0V$	—	—	5	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C = 40\text{mA}$, $V_{CE} = 10V$	4.5	6.0	7.5	V
IGES	Gate-leakage current	$V_{GE} = V_{GES}$, $V_{CE} = 0V$	—	—	0.5	μA
$V_{CE(sat)}$	Collector-emitter saturation voltage	$T_j = 25^\circ\text{C}$	—	3.20	4.16	V
		$T_j = 125^\circ\text{C}$	—	3.60	—	
Cies	Input capacitance	$V_{CE} = 10V$ $V_{GE} = 0V$	—	40	—	nF
Coes	Output capacitance		—	4.4	—	nF
Cres	Reverse transfer capacitance		—	1.3	—	nF
QG	Total gate charge	$V_{CC} = 1250V$, $I_C = 400A$, $V_{GE} = 15V$	—	1.8	—	μC
td (on)	Turn-on delay time	$V_{CC} = 1250V$, $I_C = 400A$	—	—	1.00	μs
tr	Turn-on rise time	$V_{GE1} = V_{GE2} = 15V$	—	—	2.00	μs
td (off)	Turn-off delay time	$R_G = 7.5\Omega$	—	—	2.00	μs
tf	Turn-off fall time	Resistive load switching operation	—	—	1.00	μs
V_{EC} (Note 2)	Emitter-collector voltage	$I_E = 400A$, $V_{GE} = 0V$	—	2.90	3.77	V
t _{rr} (Note 2)	Reverse recovery time	$I_E = 400A$	—	—	1.20	μs
Q _{rr} (Note 2)	Reverse recovery charge	die / dt = $-800A / \mu\text{s}$	—	85	—	μC
R _{th(j-c)Q}	Thermal resistance	Junction to case, IGBT part (Per 1/2 module)	—	—	0.036	K/W
R _{th(j-c)R}		Junction to case, FWDi part (Per 1/2 module)	—	—	0.072	K/W
R _{th(c-f)}	Contact thermal resistance	Case to fin, conductive grease applied (Per 1/2 module)	—	0.016	—	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} & die/dt represent characteristics of the anti-parallel, emitter to collector free-wheel diode.3. Junction temperature (T_j) should not increase beyond 150°C .

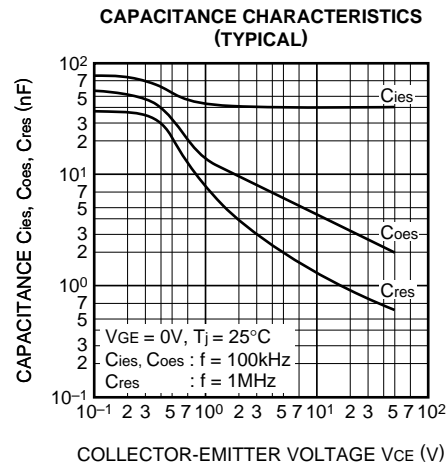
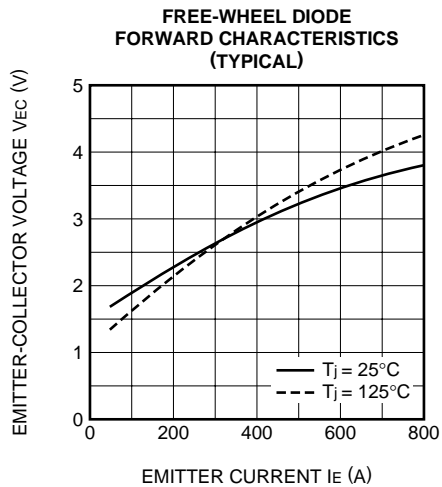
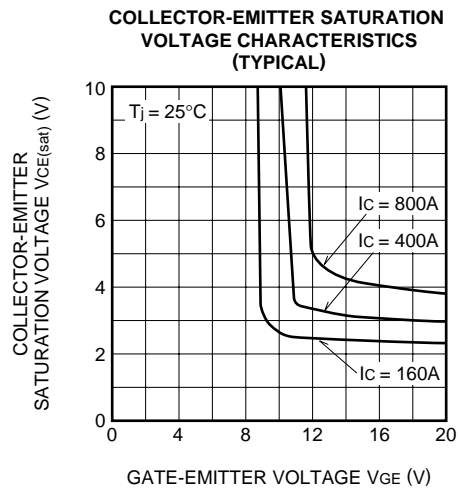
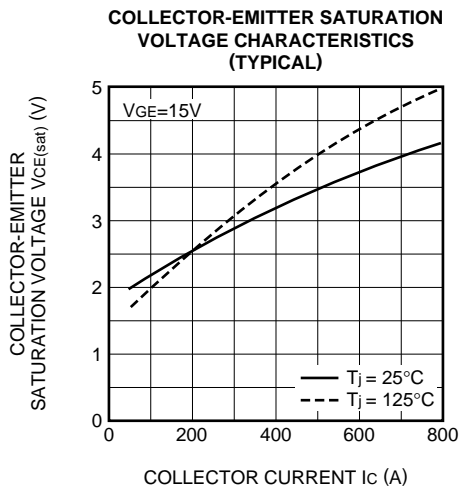
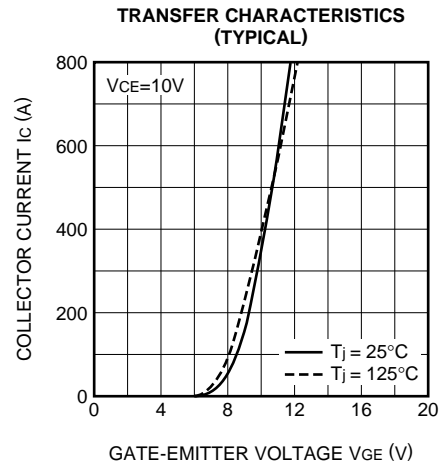
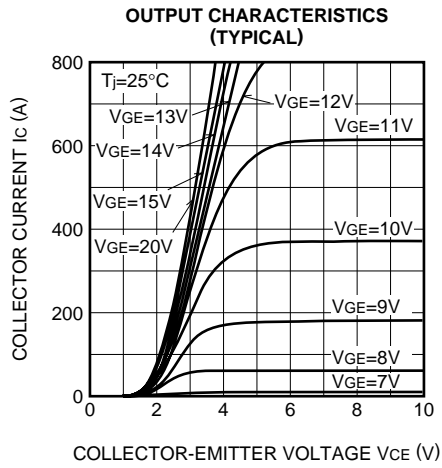
4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

CM400DY-50H

HIGH POWER SWITCHING USE
INSULATED TYPE

HVIGBT (High Voltage Insulated Gate Bipolar Transistor) Modules

PERFORMANCE CURVES

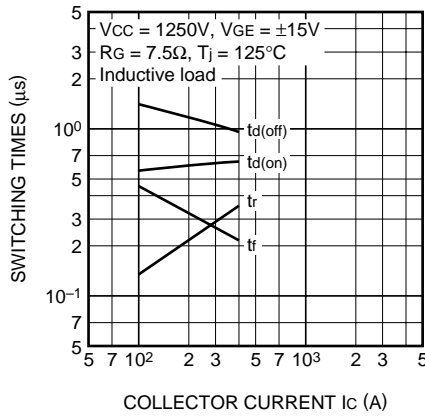


CM400DY-50H

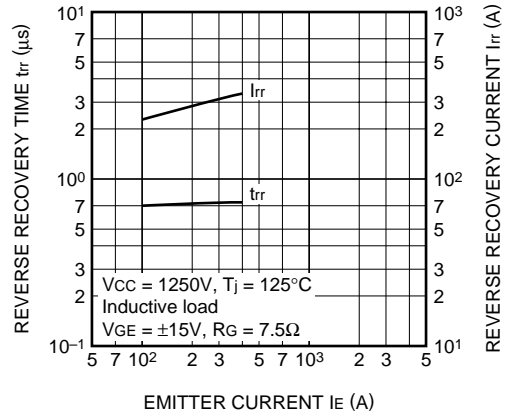
HIGH POWER SWITCHING USE
INSULATED TYPE

HVIGBT (High Voltage Insulated Gate Bipolar Transistor) Modules

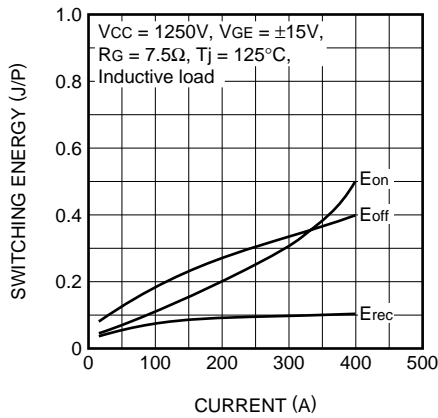
**HALF-BRIDGE
SWITCHING TIME CHARACTERISTICS
(TYPICAL)**



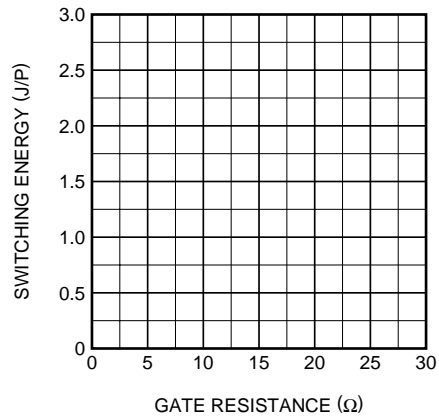
**REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE
(TYPICAL)**



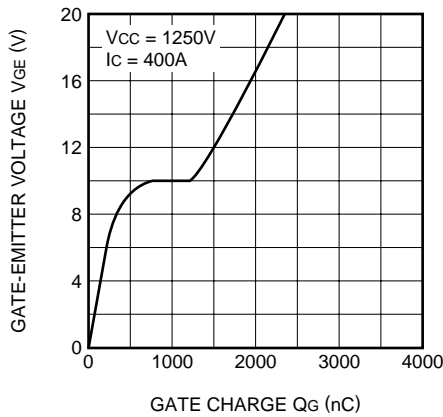
**HALF-BRIDGE
SWITCHING ENERGY CHARACTERISTICS
(TYPICAL)**



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



**GATE CHARGE CHARACTERISTICS
(TYPICAL)**



**TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS**

