

MITSUBISHI HVIGBT MODULES
CM400DY-50H

HVIGBT (High Voltage Insulated Gate Bipolar Transistor) Modules

HIGH POWER SWITCHING USE
 INSULATED TYPE

CM400DY-50H



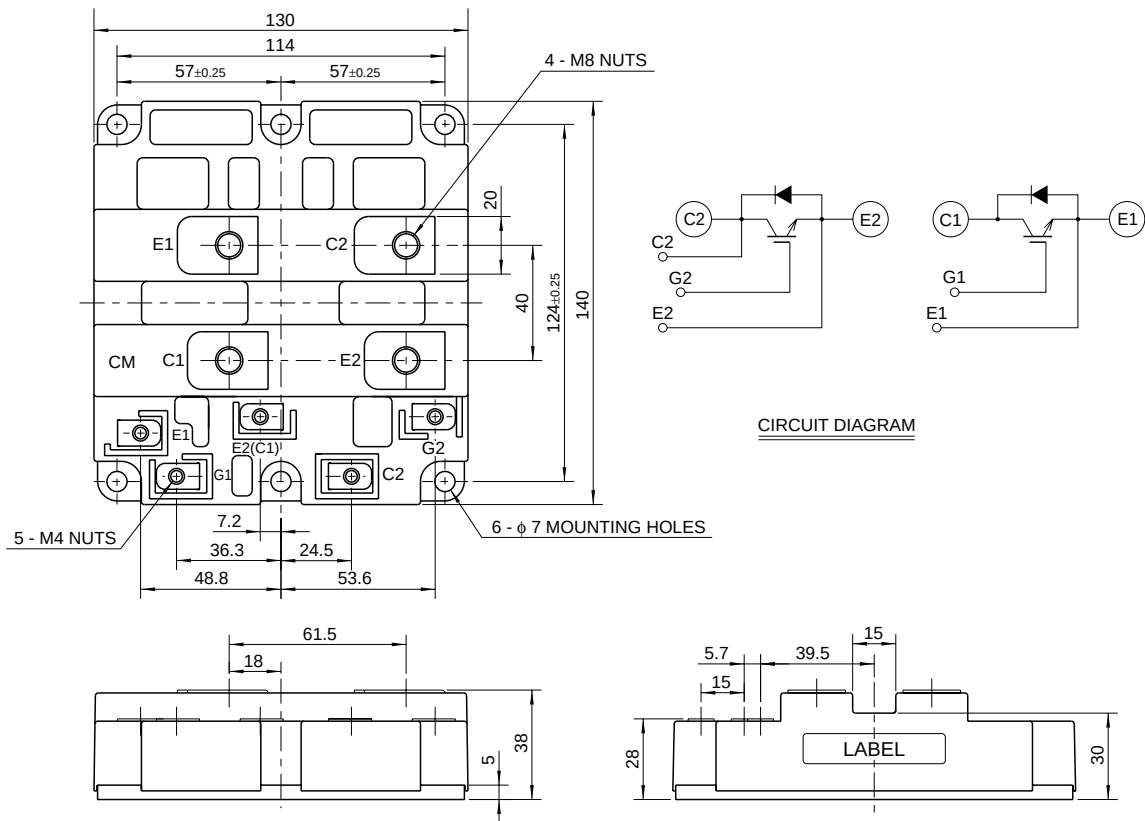
- IC400A
- VCES 2500V
- Insulated Type
- 2-elements in a pack

APPLICATION

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

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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Feb. 2000

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MAXIMUM RATINGS (T_j = 25°C)

Symbol	Item	Conditions	Ratings	Unit
V _{CES}	Collector-emitter voltage	V _{GE} = 0V	2500	V
V _{GES}	Gate-emitter voltage	V _{CE} = 0V	±20	V
I _C	Collector current	T _C = 25°C	400	A
I _{CM}		Pulse (Note 1)	800	A
I _E (Note 2)		T _C = 25°C	400	A
I _{EM} (Note 2)	Emitter current	Pulse (Note 1)	800	A
P _C (Note 3)	Maximum collector dissipation	T _C = 25°C, IGBT part	3400	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	1.5	kg

ELECTRICAL CHARACTERISTICS (T_j = 25°C)

Symbol	Parameter	Conditions		Limits			Unit	
				Min	Typ	Max		
ICES	Collector cutoff current	VCE = VCES, VGE = 0V		—	—	5	mA	
VGE(th)	Gate-emitter threshold voltage	IC = 40mA, 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	IC = 400A, VGE = 15V (Note 4)	—	3.20	4.16	V	
		Tj = 125°C		—	3.60	—		
Cies	Input capacitance	VCE = 10V		—	40	—	nF	
Coes	Output capacitance	VGE = 0V		—	4.4	—	nF	
Cres	Reverse transfer capacitance			—	1.3	—	nF	
QG	Total gate charge	VCC = 1250V, IC = 400A, VGE = 15V		—	1.8	—	μC	
td (on)	Turn-on delay time	VCC = 1250V, IC = 400A		—	—	1.00	μs	
tr	Turn-on rise time	VGE1 = VGE2 = 15V		—	—	2.00	μs	
td (off)	Turn-off delay time	RG = 7.5Ω		—	—	2.00	μs	
tf	Turn-off fall time	Resistive load switching operation		—	—	1.00	μs	
VEC (Note 2)	Emitter-collector voltage	IE = 400A, VGE = 0V		—	2.90	3.77	V	
ttr (Note 2)	Reverse recovery time	IE = 400A		—	—	1.20	μs	
Qrr (Note 2)	Reverse recovery charge	die / dt = −800A / μs		—	85	—	μC	
Rth(j-c)Q	Thermal resistance	Junction to case, IGBT part (Per 1/2 module)		—	—	0.036	K/W	
Rth(j-c)R		Junction to case, FWDi part (Per 1/2 module)		—	—	0.072	K/W	
Rth(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.

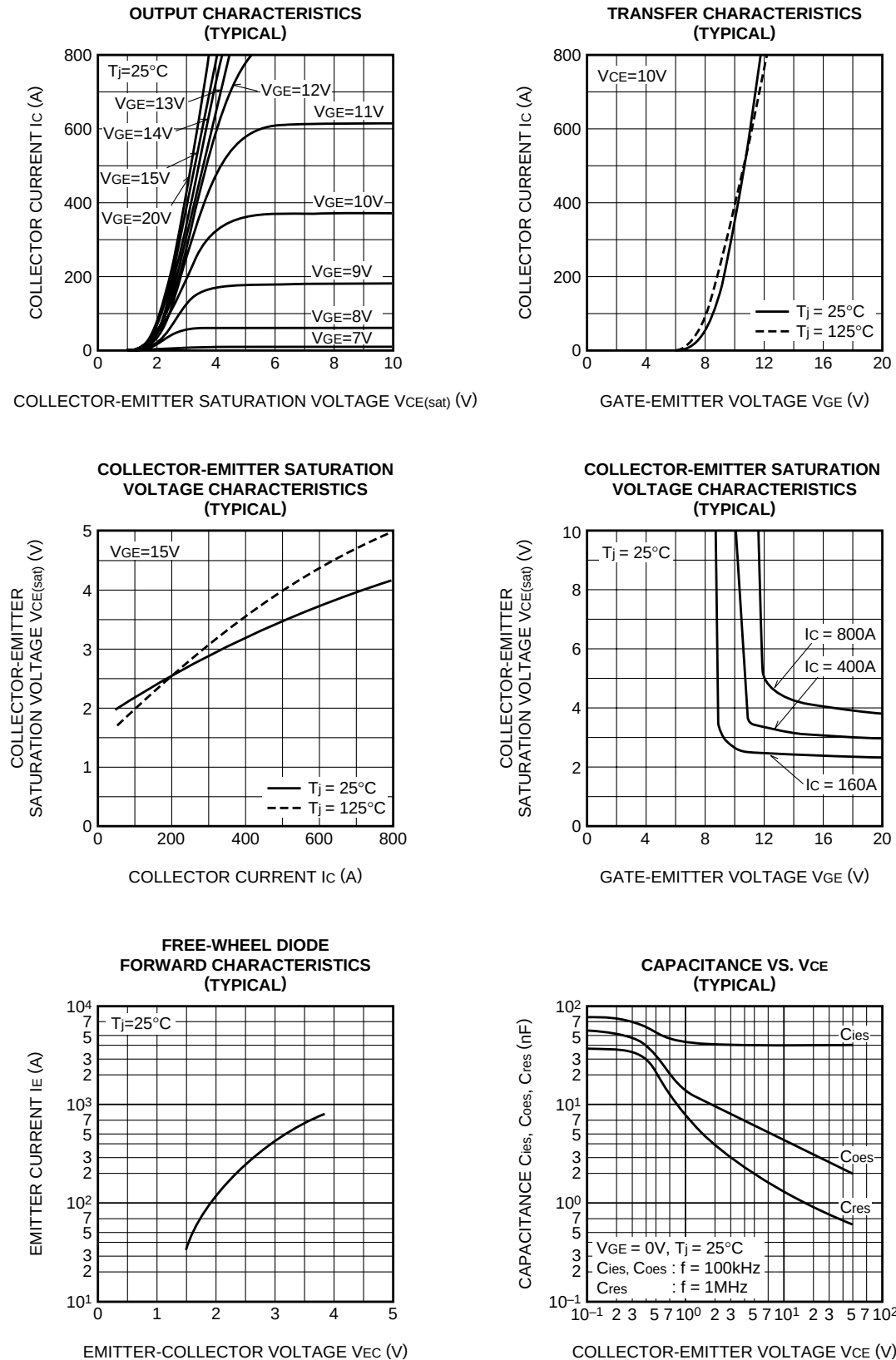
4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

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PERFORMANCE CURVES

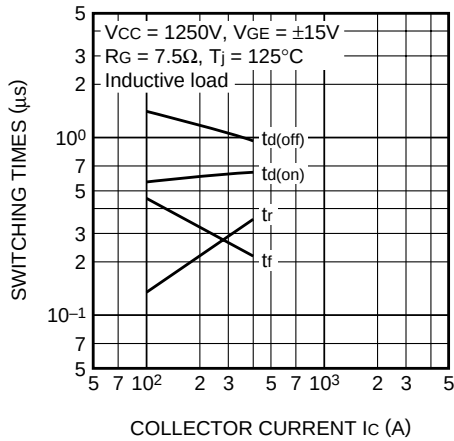


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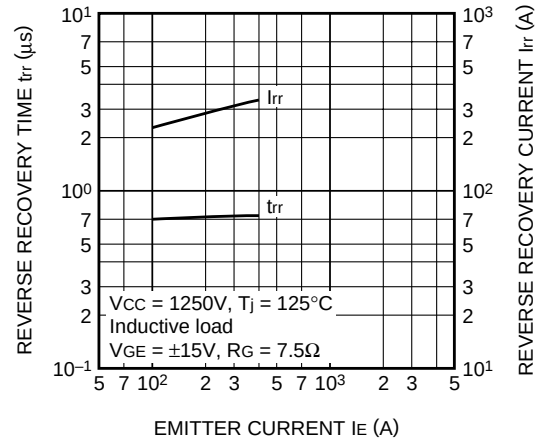
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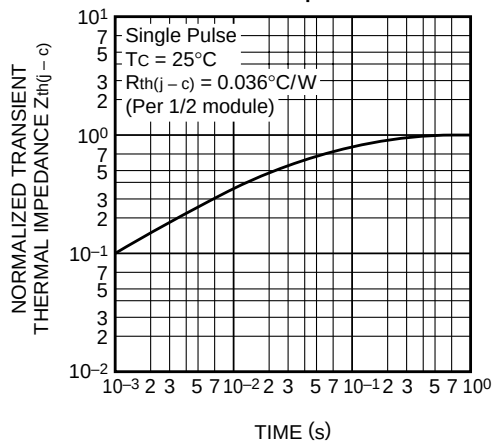
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)



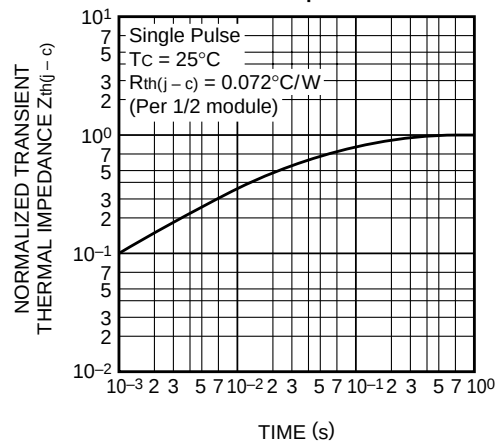
REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE
(TYPICAL)



TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(IGBT part)



TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(FWDi part)



V_{GE} - GATE CHARGE
(TYPICAL)

