CM400DY-66H

HIGH POWER SWITCHING USE
INSULATED TYPE

HVIGBT (High Voltage Insulated Gate Bipolar Transistor) Modules

CM400DY-66H

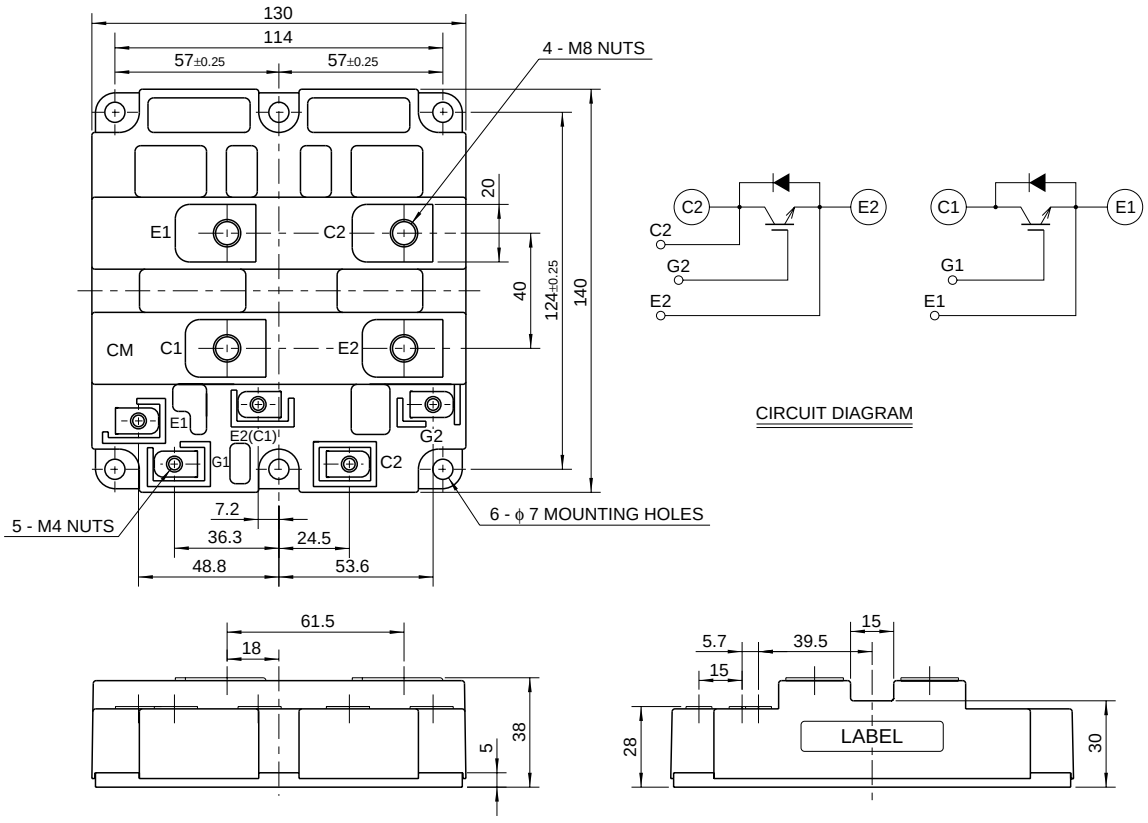
- I_C 400A
- V_{CES} 3300V
- Insulated Type
- 2-elements in a pack

APPLICATION

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

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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MAXIMUM RATINGS (Tj = 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	400	A
I_{CM}		Pulse (Note 1)	800	A
I_E (Note 2)	Emitter current	T_C = 25°C	400	A
I_{EM} (Note 2)		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

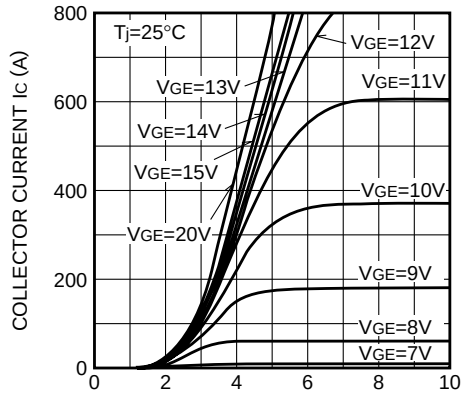
ELECTRICAL CHARACTERISTICS (Tj = 25°C)

Symbol	Item	Conditions		Limits			Unit
				Min	Typ	Max	
I_{CES}	Collector cutoff current	V_{CE} = V_{CES}, V_{GE} = 0V		—	—	5	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C = 40mA, 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 = 400A, V_{GE} = 15V (Note 4)	—	4.40	5.72	V
		T_j = 125°C		—	4.80	—	
C_{ies}	Input capacitance	V_{CE} = 10V, V_{GE} = 0V		—	40	—	nF
C_{oes}	Output capacitance			—	4.0	—	nF
C_{res}	Reverse transfer capacitance			—	1.2	—	nF
Q_G	Total gate charge	V_{CC} = 1650V, I_C = 400A, V_{GE} = 15V		—	1.9	—	µC
$t_{d(on)}$	Turn-on delay time	V_{CC} = 1650V, I_C = 400A, V_{GE1} = V_{GE2} = 15V, R_G = 7.5Ω, Resistive load switching operation		—	—	1.00	µs
t_r	Turn-on rise time			—	—	2.00	µs
$t_{d(off)}$	Turn-off delay time			—	—	2.00	µs
t_f	Turn-off fall time			—	—	1.00	µs
V_{EC} (Note 2)	Emitter-collector voltage	I_E = 400A, V_{GE} = 0V		—	3.30	4.29	V
t_{rr} (Note 2)	Reverse recovery time	I_E = 400A, die / dt = –800A / µs		—	—	1.20	µs
Q_{rr} (Note 2)	Reverse recovery charge			—	100	—	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.

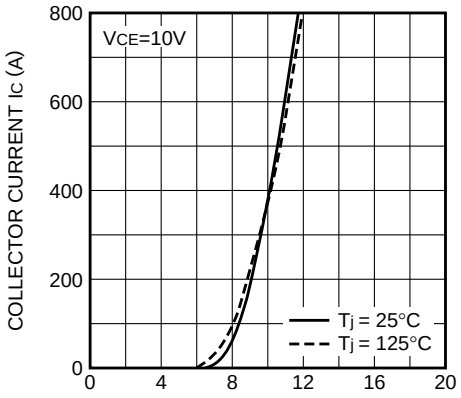
PERFORMANCE CURVES

OUTPUT CHARACTERISTICS (TYPICAL)



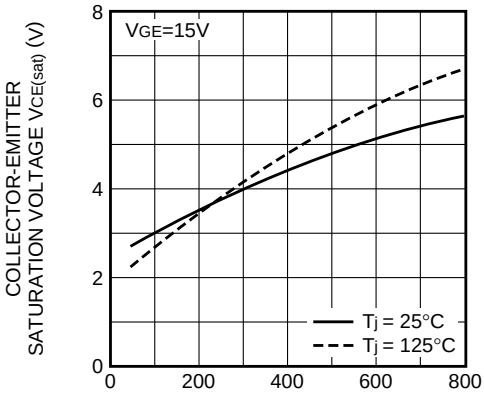
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE(sat)}$ (V)

TRANSFER CHARACTERISTICS (TYPICAL)



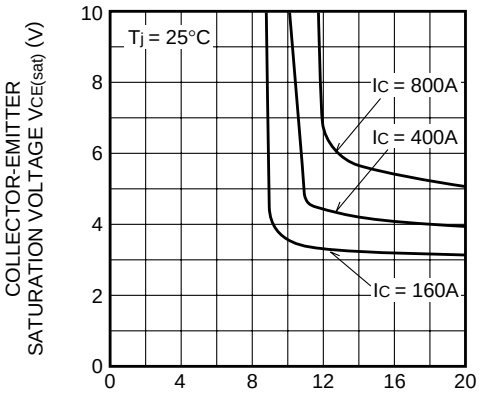
GATE-EMITTER VOLTAGE V_{GE} (V)

COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



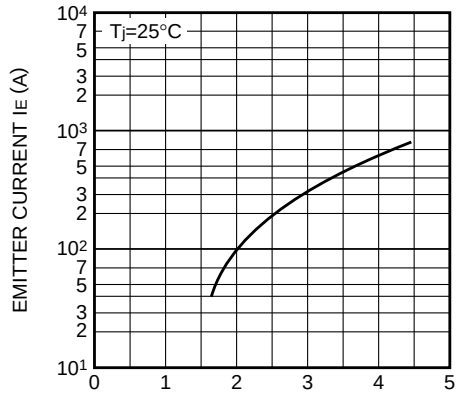
COLLECTOR CURRENT I_C (A)

COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



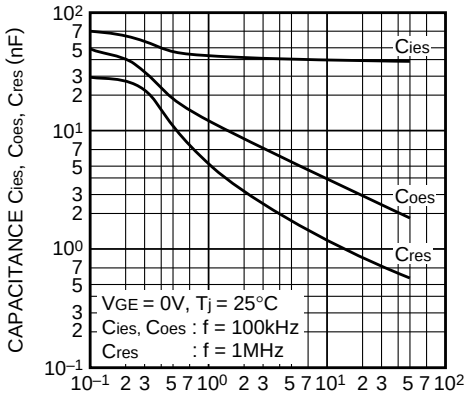
GATE-EMITTER VOLTAGE V_{GE} (V)

FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



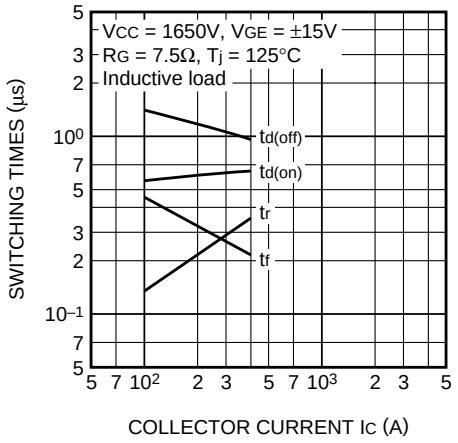
EMITTER-COLLECTOR VOLTAGE V_{EC} (V)

CAPACITANCE VS. V_{CE} (TYPICAL)

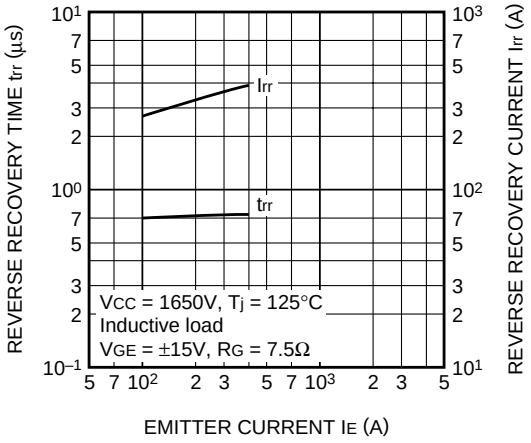


COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

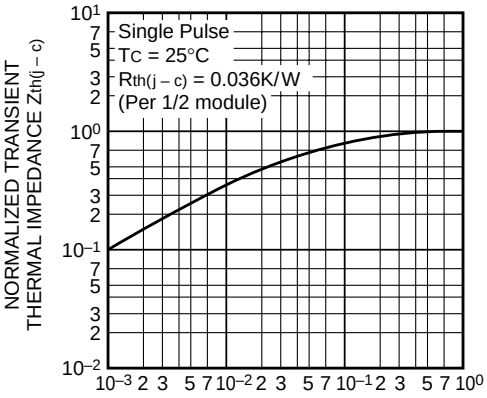
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



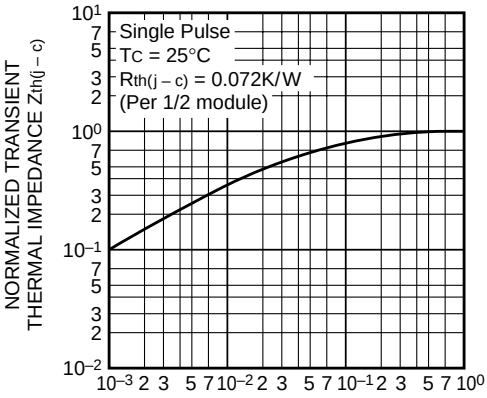
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi part)



VGE – GATE CHARGE (TYPICAL)