CM200E3U-24F

HIGH POWER SWITCHING USE

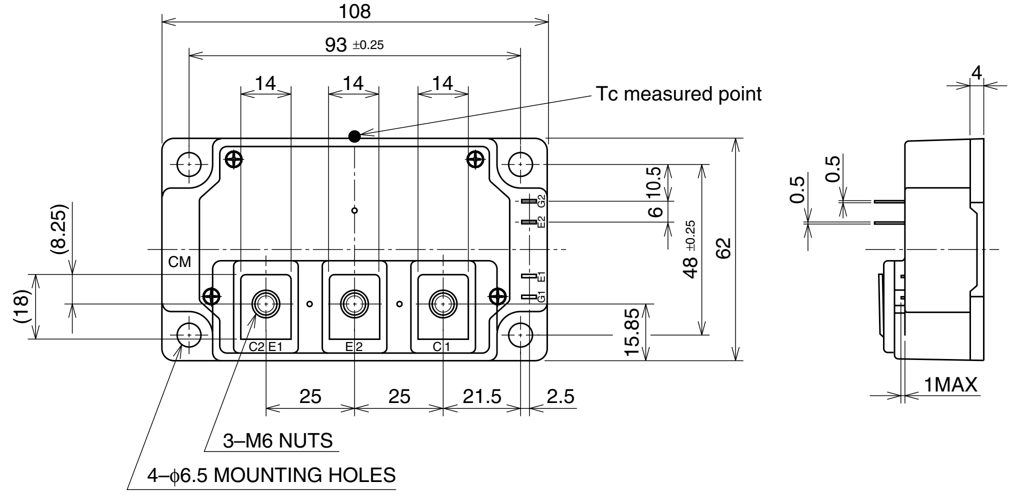
CM200E3U-24F

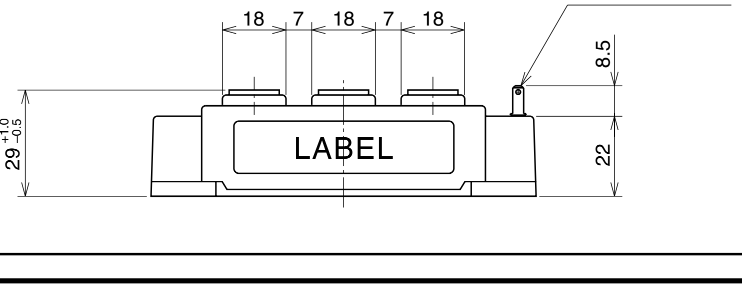
- I_C 200A
- V_{CES} 1200V
- Insulated Type
- 1-element in a pack

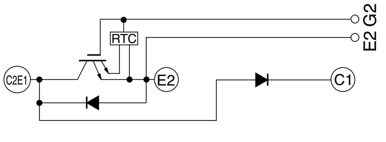
APPLICATION

Brake

OUTLINE DRAWING & CIRCUIT DIAGRAM Dimensions in mm







CIRCUIT DIAGRAM

MAXIMUM RATINGS (T_j = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	G-E Short	1200	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	V
I_C	Collector current	T_C = 25°C	200	A
I_{CM}		Pulse (Note 2)	400	
I_E (Note 1)	Emitter current	T_C = 25°C	200	A
I_{EM} (Note 1)		Pulse (Note 2)	400	
P_C (Note 3)	Maximum collector dissipation	T_C = 25°C	830	W
V_{RRM}	Repetitive peak reverse voltage	Clamp diode part	1200	V
I_F	Forward current	T_C = 25°C Clamp diode part	200	A
I_{FM}		Pulse Clamp diode part (Note 2)	400	
T_j	Junction temperature		–40 ~ +150	°C
T_{stg}	Storage temperature		–40 ~ +125	°C
V_{iso}	Isolation voltage	Main terminal to base plate, AC 1 min.	2500	V
—	Torque strength	Main Terminal M6	3.5 ~ 4.5	N • m
		Mounting holes M6	3.5 ~ 4.5	N • m
—	Weight	Typical value	400	g

ELECTRICAL CHARACTERISTICS (T_j = 25°C)

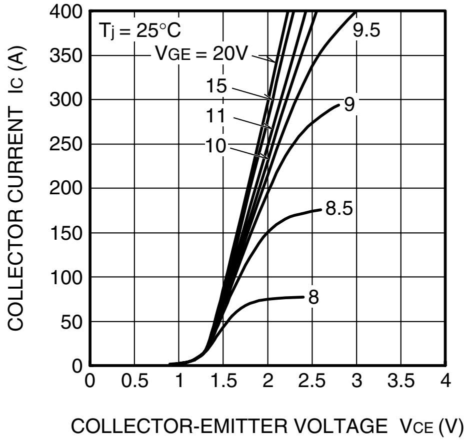
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I_{CES}	Collector cutoff current	V_{CE} = V_{CES}, V_{GE} = 0V	—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C = 20mA, V_{CE} = 10V	5	6	7	V
I_{GES}	Gate leakage current	V_{GE} = V_{CES}, V_{CE} = 0V	—	—	40	µA
$V_{CE(sat)}$	Collector-emitter saturation voltage	T_j = 25°C I_C = 200A, V_{GE} = 15V	—	1.8	2.4	V
		T_j = 125°C	—	1.9	—	
C_{ies}	Input capacitance	V_{CE} = 10V V_{GE} = 0V	—	—	78	nF
C_{oes}	Output capacitance		—	—	3.4	
C_{res}	Reverse transfer capacitance		—	—	2.0	
Q_G	Total gate charge	V_{CC} = 600V, I_C = 200A, V_{GE} = 15V	—	2200	—	nC
$t_{d(on)}$	Turn-on delay time	V_{CC} = 600V, I_C = 200A V_{GE1} = V_{GE2} = 15V R_G = 1.6Ω, Inductive load switching operation I_E = 200A	—	—	300	ns
t_r	Turn-on rise time		—	—	80	
$t_{d(off)}$	Turn-off delay time		—	—	500	
t_f	Turn-off fall time		—	—	300	
t_{rr} (Note 1)	Reverse recovery time		—	—	200	ns
Q_{rr} (Note 1)	Reverse recovery charge		—	12.2	—	µC
V_{EC}(Note 1)	Emitter-collector voltage	I_E = 200A, V_{GE} = 0V	—	—	3.2	V
R_G	External gate resistance		1.6	—	16	Ω
$R_{th(j-c)}Q$	Thermal resistance[*1]	IGBT part	—	—	0.15	°C/W
$R_{th(j-c)}R$		FWDi part	—	—	0.18	
$R_{th(j-c')}Q$	Thermal resistance	Tc measured point is just under the chips	—	—	0.091[*3]	
V_{FM}	Forward voltage drop	I_F = 200A, Clamp diode part	—	—	3.2	V
t_{rr}	Reverse recovery time	I_F = 200A V_{CC} = 600V, V_{GE1} = V_{GE2} = 15V R_G = 1.6Ω, Inductive load switching operation, Clamp diode part	—	—	200	ns
Q_{rr}	Reverse recovery charge		—	12.2	—	µC
$R_{th(j-c)}R$	Thermal resistance[*1]	Clamp diode part	—	—	0.18	°C/W
$R_{th(c-f)}$	Contact thermal resistance	Case to fin, Thermal compound applied[*2] (1/2 module)	—	0.04	—	

Note 1. I_E, V_{EC}, t_{rr}, Q_{rr}, die/dt represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWDi).
2. Pulse width and repetition rate should be such that the device junction temp. (T_j) does not exceed T_{jmax} rating.
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.

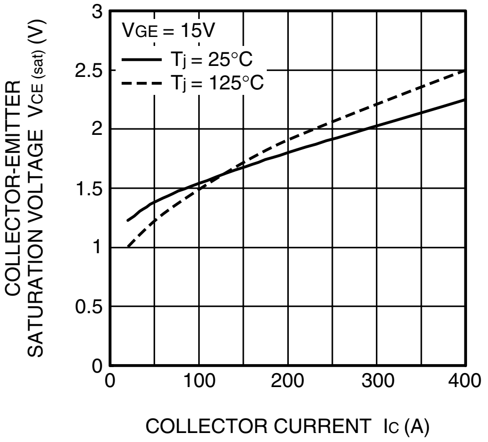
*1 : Tc measured point is indicated in OUTLINE DRAWING.
*2 : Typical value is measured by using Shin-etsu Silicone “G-746”.
*3 : If you use this value, $R_{th(f-a)}$ should be measured just under the chips.

PERFORMANCE CURVES

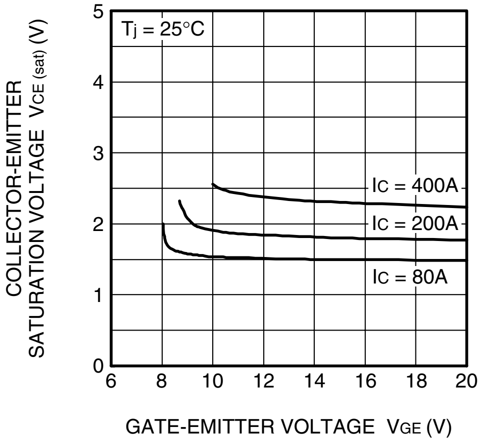
OUTPUT CHARACTERISTICS (TYPICAL)



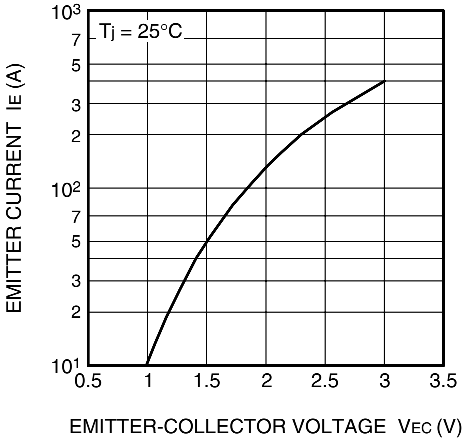
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



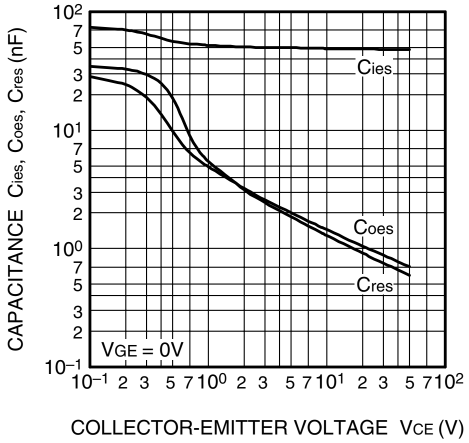
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



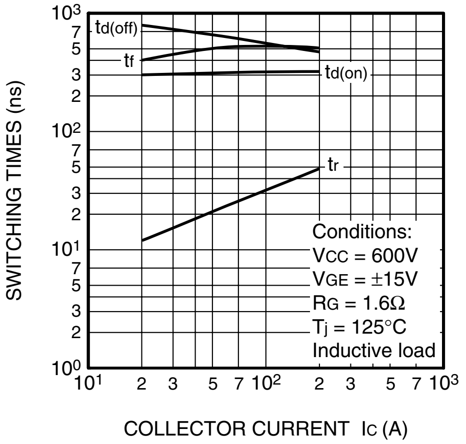
FREE-WHEEL DIODE AND CLAMP DIODE FORWARD CHARACTERISTICS (TYPICAL)



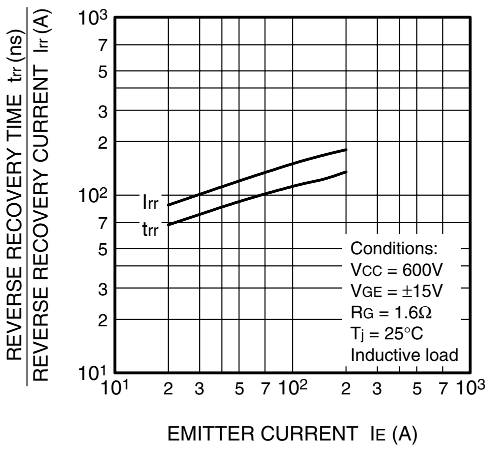
CAPACITANCE–VCE CHARACTERISTICS (TYPICAL)



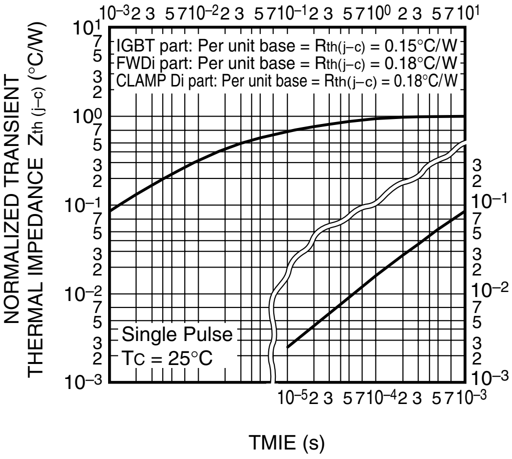
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



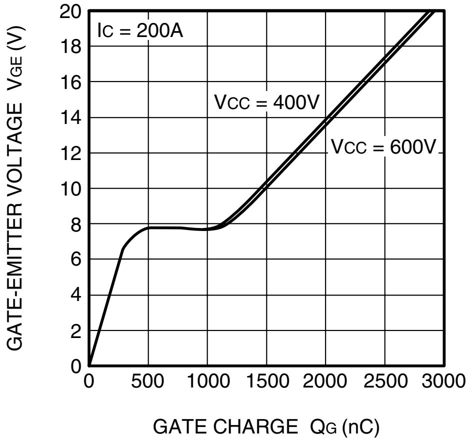
REVERSE RECOVERY CHARACTERISTICS OF CLAMP DIODE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part & CLAMP DIODE part)



GATE CHARGE CHARACTERISTICS (TYPICAL)



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