CM100E3U-24F

HIGH POWER SWITCHING USE

CM100E3U-24F

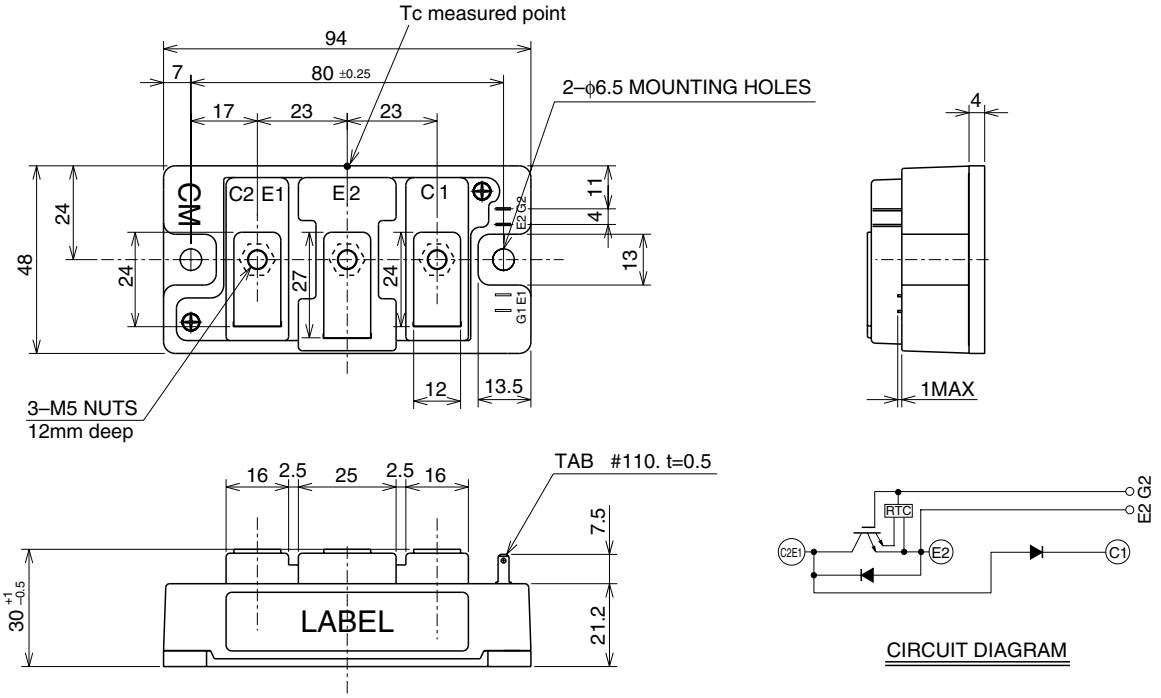
- I_C 100A
- V_{CES} 1200V
- Insulated Type
- 1-element in a pack

APPLICATION

Brake

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



MITSUBISHI ELECTRIC

MAXIMUM RATINGS (Tj = 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	100	A
I_{CM}		Pulse (Note 2)	200	A
I_E (Note 1)	Emitter current	T_C = 25°C	100	A
I_{EM} (Note 1)		Pulse (Note 2)	200	A
P_C (Note 3)	Maximum collector dissipation	T_C = 25°C	500	W
V_{RRM}	Repetitive peak reverse voltage	Clamp diode part	1200	V
I_F	Forward current	T_C = 25°C Clamp diode part	100	A
I_{FM}		Pulse Clamp diode part (Note 2)	200	A
T_j	Junction temperature		–40 ~ +150	°C
T_{stg}	Storage temperature		–40 ~ +125	°C
V_{iso}	Isolation voltage	Charged part to base plate, AC 1 min.	2500	V
—	Torque strength	Main Terminal M5	2.5 ~ 3.5	N • m
		Mounting holes M6	3.5 ~ 4.5	N • m
—	Weight	Typical value	310	g

ELECTRICAL CHARACTERISTICS (Tj = 25°C)

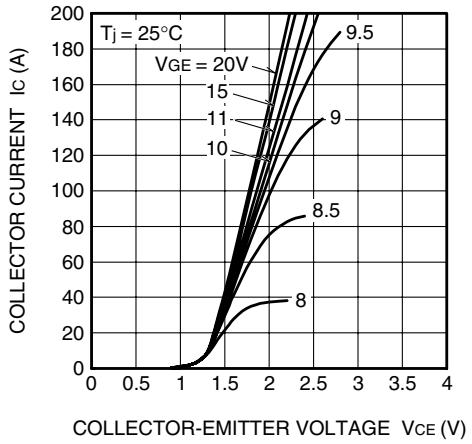
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I_{CES}	Collector cutoff current	V_{CE} = V_{CES}, V_{GE} = 0V	—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C = 10mA, V_{CE} = 10V	5	6	7	V
I_{GES}	Gate leakage current	V_{GE} = V_{CES}, V_{CE} = 0V	—	—	20	µA
$V_{CE(sat)}$	Collector-emitter saturation voltage	T_j = 25°C, I_C = 100A, V_{GE} = 15V	—	1.8	2.4	V
		T_j = 125°C, I_C = 100A, V_{GE} = 15V	—	1.9	—	
C_{ies}	Input capacitance	V_{CE} = 10V, V_{GE} = 0V	—	—	39	nF
C_{oes}	Output capacitance		—	—	1.7	nF
C_{res}	Reverse transfer capacitance		—	—	1.0	nF
Q_G	Total gate charge	V_{CC} = 600V, I_C = 100A, V_{GE} = 15V	—	1100	—	nC
$t_{d(on)}$	Turn-on delay time	V_{CC} = 600V, I_C = 100A, V_{GE1} = V_{GE2} = 15V, R_G = 3.1Ω, Inductive load switching operation, I_E = 100A	—	—	100	ns
t_r	Turn-on rise time		—	—	50	ns
$t_{d(off)}$	Turn-off delay time		—	—	400	ns
t_f	Turn-off fall time		—	—	300	ns
t_{rr} (Note 1)	Reverse recovery time		—	—	150	ns
Q_{rr} (Note 1)	Reverse recovery charge		—	4.1	—	µC
V_{EC}(Note 1)	Emitter-collector voltage	I_E = 100A, V_{GE} = 0V	—	—	3.2	V
R_G	External gate resistance		3.1	—	31	Ω
$R_{th(j-c)Q}$	Thermal resistance*1	IGBT part	—	—	0.25	°C/W
$R_{th(j-c)R}$		FWDi part	—	—	0.35	°C/W
$R_{th(j-c')Q}$	Thermal resistance	Tc measured point is just under the chips	—	—	0.18*3	°C/W
V_{FM}	Forward voltage drop	I_F = 100A, Clamp diode part	—	—	3.2	V
t_{rr}	Reverse recovery time	I_F = 100A, V_{CC} = 600V, V_{GE1} = V_{GE2} = 15V	—	—	150	ns
Q_{rr}	Reverse recovery charge	R_G = 3.1Ω, Inductive load switching operation, Clamp diode part	—	4.1	—	µC
$R_{th(j-c)R}$	Thermal resistance*1	Clamp diode part	—	—	0.35	°C/W
$R_{th(c-f)}$	Contact thermal resistance	Case to fin, Thermal compound applied*2 (1/2 module)	—	0.07	—	°C/W

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.

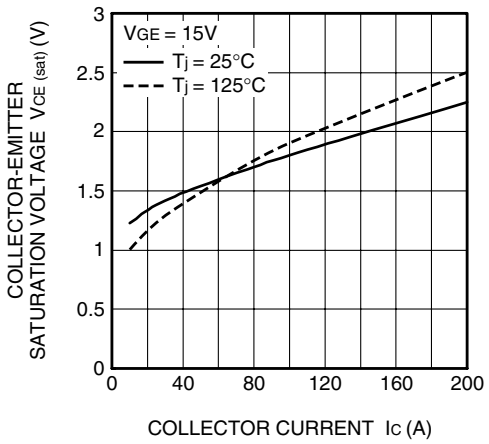
*1 : Tc measured point is indicated in OUTLINE DRAWING.
*2 : Typical value is measured by using Shin-etsu Silicone "G-746".
*3 : If you use this value, $R_{th(f-a)}$ should be measured just under the chips.

PERFORMANCE CURVES

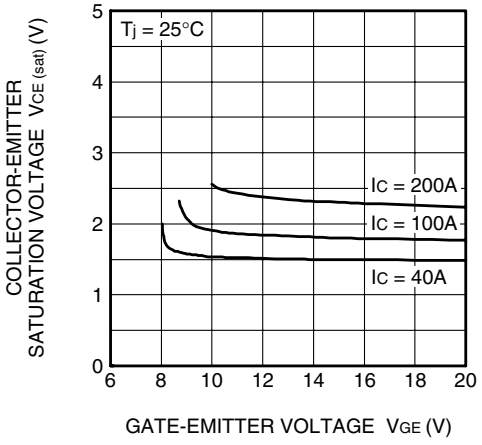
OUTPUT CHARACTERISTICS (TYPICAL)



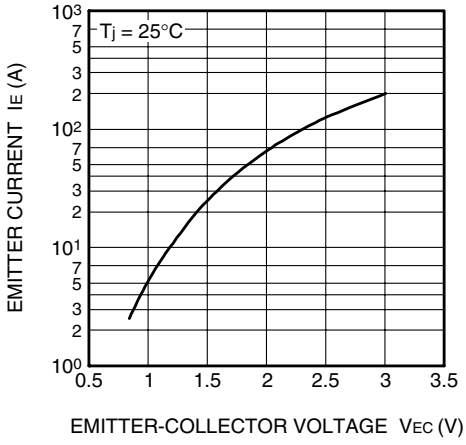
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



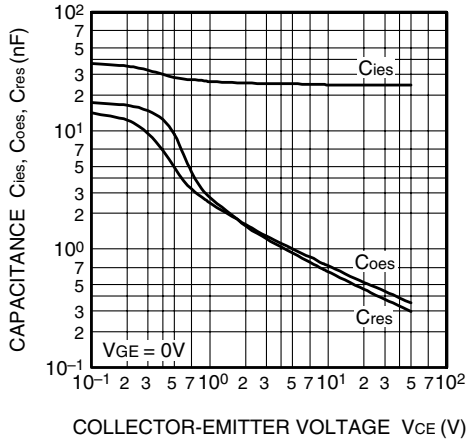
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



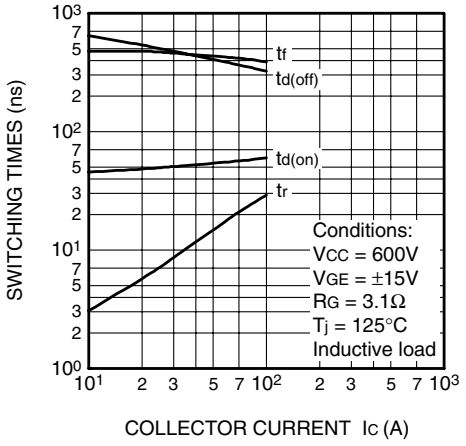
FREE-WHEEL DIODE AND CLAMP DIODE FORWARD CHARACTERISTICS (TYPICAL)



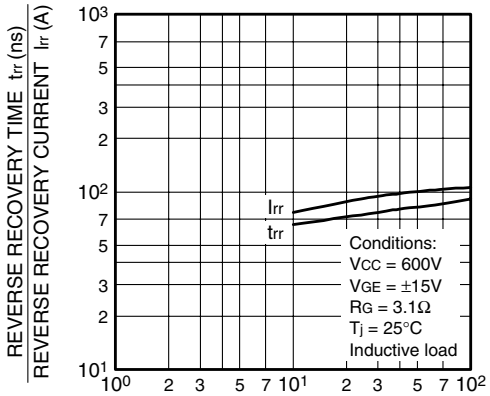
CAPACITANCE–VCE CHARACTERISTICS (TYPICAL)



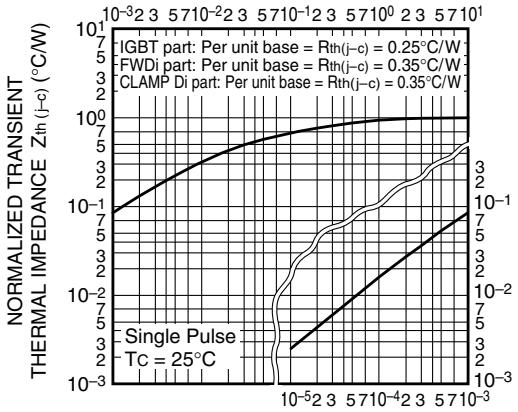
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS OF CLAMP DIODE (TYPICAL)



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



GATE CHARGE CHARACTERISTICS (TYPICAL)