

MITSUBISHI IGBT MODULES
CM600DU-5F

HIGH POWER SWITCHING USE

CM600DU-5F



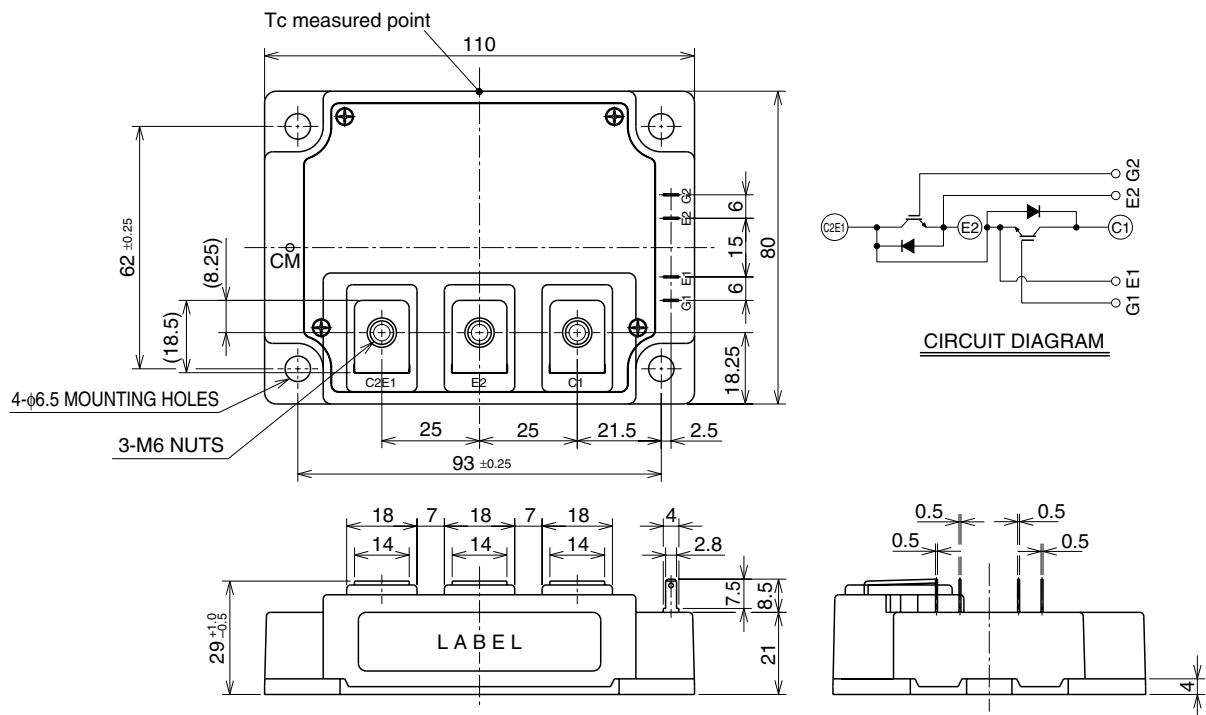
- Ic 600A
- VCES 250V
- Insulated Type
- 2-elements in a pack

APPLICATION

AC motor control of forklift (battery power source)

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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MAXIMUM RATINGS (Tj = 25°C, unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V _{CES}	Collector-emitter voltage	G-E Short	250	V
V _{GES}	Gate-emitter voltage	C-E Short	±20	V
I _C	Collector current	T _C = 25°C	600	A
I _{C(rms)}			350	A _(rms)
I _{CM}		Pulse (Note 2)	1200	A
I _E (Note 1)	Emitter current	T _C = 25°C	600	A
I _{E(rms)} (Note 1)			350	A _(rms)
I _{EM} (Note 1)		Pulse (Note 2)	1200	A
P _C (Note 3)	Maximum collector dissipation	T _C = 25°C	1100	W
T _j	Junction temperature		-40 ~ +150	°C
T _{stg}	Storage temperature		-40 ~ +125	°C
V _{iso}	Isolation voltage	Terminals to base plate, f = 60Hz, AC 1 minute	2500	V _{rms}
—	Torque strength	Main terminals M6 screw	3.5 ~ 4.5	N • m
		Mounting M6 screw	3.5 ~ 4.5	N • m
—	Weight	Typical value	580	g

ELECTRICAL CHARACTERISTICS (Tj = 25°C, unless otherwise specified)

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 = 60mA, V _{CE} = 10V	3.0	4.0	5.0	V	
I _{GES}	Gate leakage current	±V _{GE} = V _{GES} , V _{CE} = 0V	—	—	0.5	μA	
V _{CE(sat)}	Collector-emitter saturation voltage	I _C = 600A, V _{GE} = 10V	T _j = 25°C	—	1.2	1.7	V
			T _j = 125°C	—	1.1	—	
C _{ies}	Input capacitance	V _{CE} = 10V V _{GE} = 0V	—	—	170	nF	
C _{oes}	Output capacitance		—	—	11		
C _{res}	Reverse transfer capacitance		—	—	5.7		
Q _G	Total gate charge	V _{CC} = 100V, I _C = 600A, V _{GE} = 10V	—	2200	—	nC	
t _{d(on)}	Turn-on delay time	V _{CC} = 100V, I _C = 600A V _{GE} = ±10V R _G = 4.2Ω, Inductive load I _E = 600A	—	—	850	ns	
t _r	Turn-on rise time		—	—	600		
t _{d(off)}	Turn-off delay time		—	—	1100		
t _f	Turn-off fall time		—	—	500		
t _{rr} (Note 1)	Reverse recovery time		—	—	300		
Q _{rr} (Note 1)	Reverse recovery charge		—	20.0	—		μC
V _{EC} (Note 1)	Emitter-collector voltage	I _E = 600A, V _{GE} = 0V	—	—	2	V	
R _{th(j-c)Q}	Thermal resistance ^{*1}	IGBT part (1/2 module)	—	—	0.11	K/W	
R _{th(j-c)R}		FWDi part (1/2 module)	—	—	0.20		
R _{th(c-f)}	Contact thermal resistance	Case to heat sink, Thermal compound applied ^{*2} (1/2 module)	—	0.02	—		
R _{th(j-c)Q}	Thermal resistance ^{*3}	Case temperature measured point is just under the chips	—	—	0.05		

Note 1. I_E, V_{EC}, t_{rr}, Q_{rr} & die/dt represent characteristics of the anti-parallel, emitter-collector free-wheel diode (FWDi).

2. Pulse width and repetition rate should be such that the device junction temperature (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.

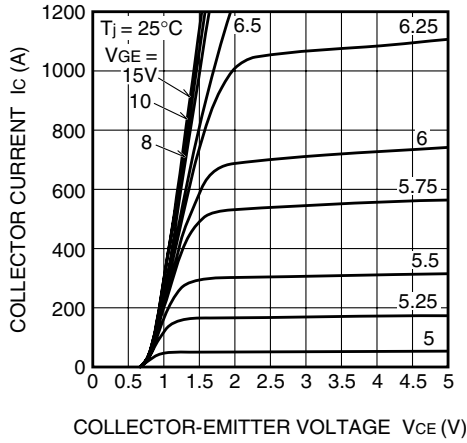
*1 : Case temperature (T_c) measured point is indicated in OUTLINE DRAWING.

*2 : Typical value is measured by using thermally conductive grease of λ = 0.9[W/(m • K)].

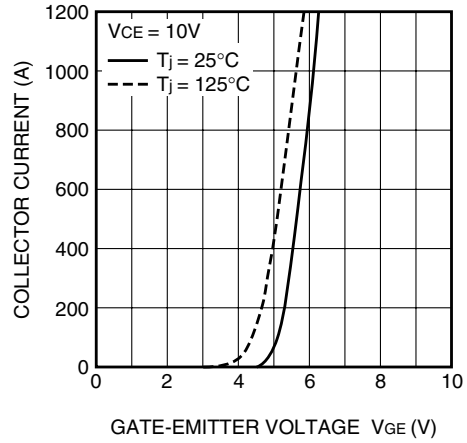
*3 : If you use this value, R_{th(f-a)} should be measured just under the chips.

PERFORMANCE CURVES

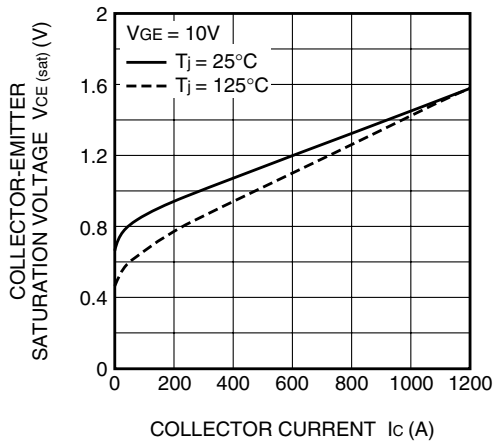
OUTPUT CHARACTERISTICS (TYPICAL)



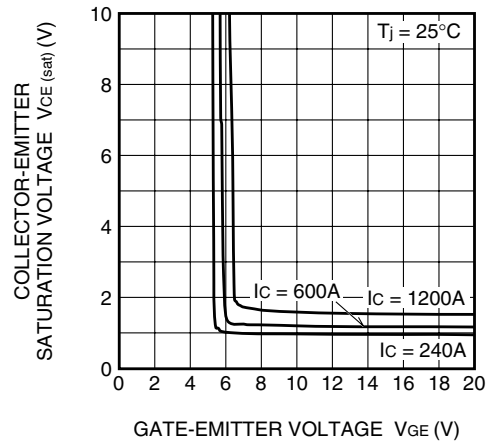
TRANSFER CHARACTERISTICS (TYPICAL)



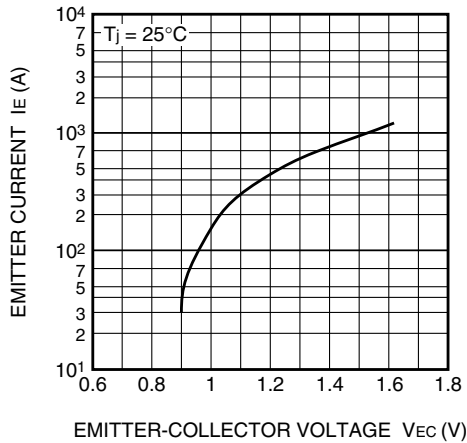
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



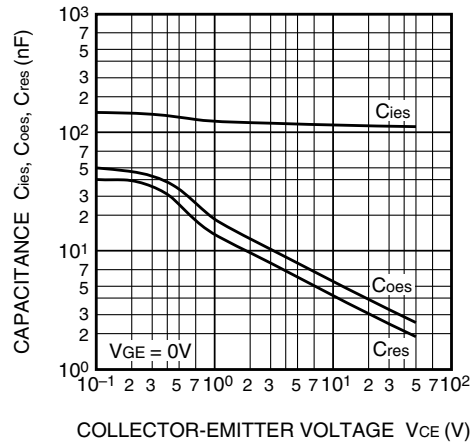
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



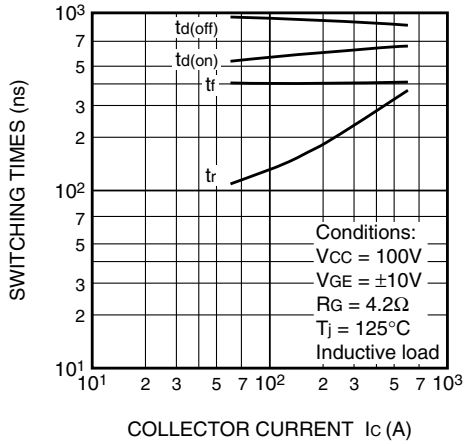
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



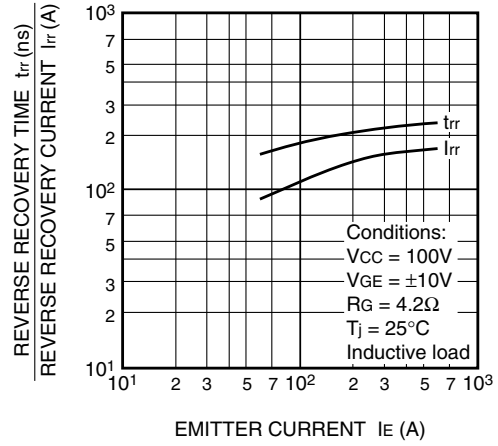
CAPACITANCE-VCE CHARACTERISTICS (TYPICAL)



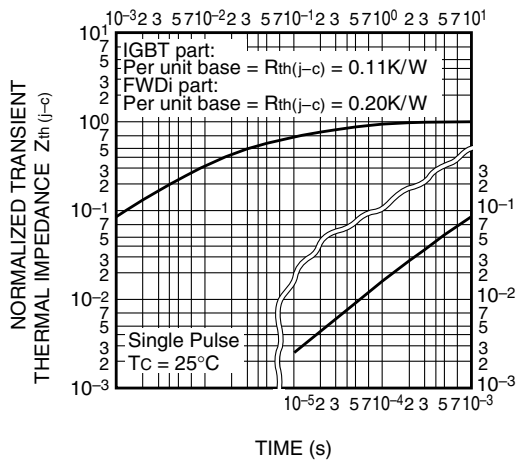
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part)



GATE CHARGE CHARACTERISTICS (TYPICAL)

