CM600DY-24A

HIGH POWER SWITCHING USE

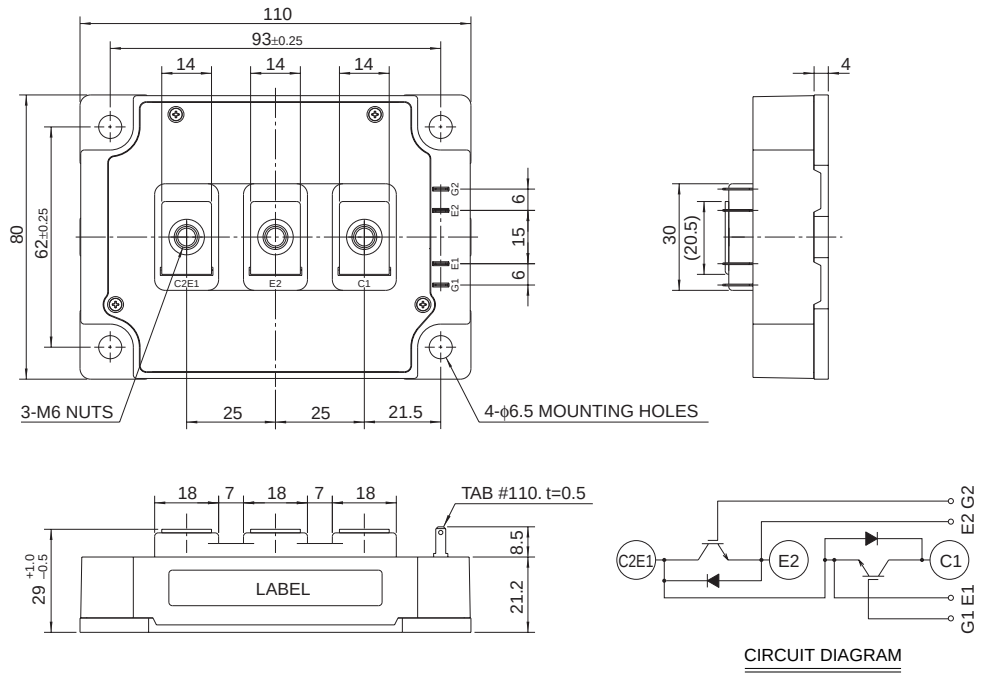
CM600DY-24A

- I_C 600A
- V_{CES} 1200V
- Insulated Type
- 2-elements in a pack

APPLICATION

AC drive inverters & Servo controls, etc

OUTLINE DRAWING & CIRCUIT DIAGRAM **Dimensions in mm**



Mar. 2004

MITSUBISHI ELECTRIC

ABSOLUTE 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	DC, T_C = 78°C*1	600	A
I_{CM}		Pulse (Note 2)	1200	
I_E (Note 1)	Emitter current		600	A
I_{EM} (Note 1)		Pulse (Note 2)	1200	
P_C (Note 3)	Maximum collector dissipation	T_C = 25°C*1	3670	W
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	
—	Weight	Typical value	580	g

ELECTRICAL CHARACTERISTICS (Tj = 25°C)

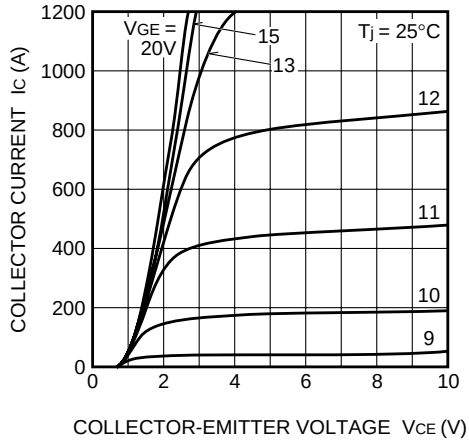
Symbol	Parameter	Test conditions		Limits			Unit
				Min.	Typ.	Max.	
I_{CES}	Collector cutoff current	V_{CE} = V_{CES}, V_{GE} = 0V		—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C = 60mA, V_{CE} = 10V		6	7	8	V
I_{GES}	Gate leakage current	V_{GE} = V_{GES}, V_{CE} = 0V		—	—	0.5	µA
$V_{CE(sat)}$	Collector-emitter saturation voltage	T_j = 25°C	I_C = 600A, V_{GE} = 15V	—	2.1	3.0	V
		T_j = 125°C		—	2.4	—	
C_{ies}	Input capacitance	V_{CE} = 10V, V_{GE} = 0V		—	—	94	nF
C_{oes}	Output capacitance			—	—	8	
C_{res}	Reverse transfer capacitance			—	—	1.8	
Q_G	Total gate charge	V_{CC} = 600V, I_C = 600A, V_{GE} = 15V		—	2700	—	nC
$t_{d(on)}$	Turn-on delay time	V_{CC} = 600V, I_C = 600A, V_{GE1} = V_{GE2} = 15V, R_G = 0.52Ω, Inductive load switching operation, I_E = 600A		—	—	660	ns
t_r	Turn-on rise time			—	—	190	
$t_{d(off)}$	Turn-off delay time			—	—	700	
t_f	Turn-off fall time			—	—	350	
t_{rr} (Note 1)	Reverse recovery time			—	—	250	ns
Q_{rr} (Note 1)	Reverse recovery charge			—	19	—	µC
V_{EC}(Note 1)	Emitter-collector voltage	I_E = 600A, V_{GE} = 0V		—	—	3.8	V
$R_{th(j-c)Q}$	Thermal resistance	IGBT part (1/2 module)*1		—	—	0.034	°C/W
$R_{th(j-c)R}$		FWDi part (1/2 module)*1		—	—	0.062	
$R_{th(c-f)}$	Contact thermal resistance	Case to fin, Thermal compound Applied (1/2 module)*2		—	0.018	—	
R_G	External gate resistance			0.52	—	7.8	Ω

*1 : Tc, Tf measured point is just under the chips.
*2 : Typical value is measured by using Shin-etsu Silicone “G-746”.

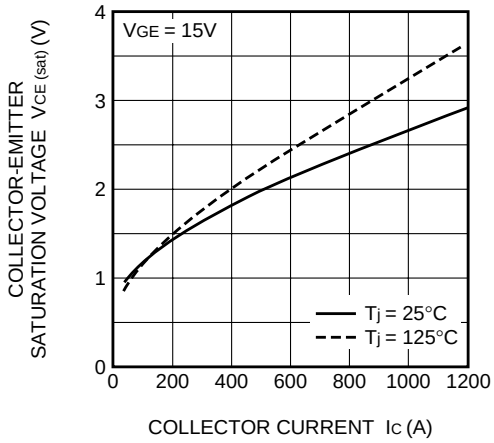
Note 1. I_E, V_{EC}, t_{rr} & Q_{rr} represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWDi).
2. Pulse width and repetition rate should be such that the device junction temp. (T_j) does not exceed T_{jmax} rating.
3. Junction temperature (T_j) should not increase beyond 150°C.

PERFORMANCE CURVES

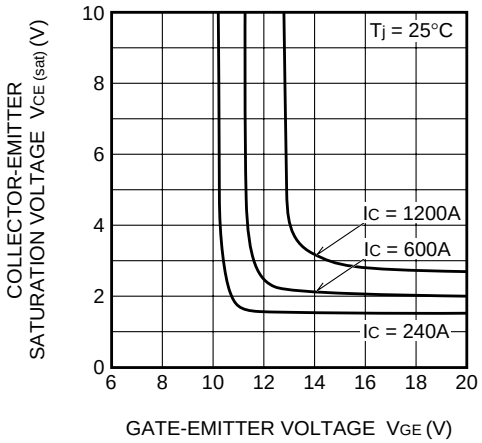
OUTPUT CHARACTERISTICS (TYPICAL)



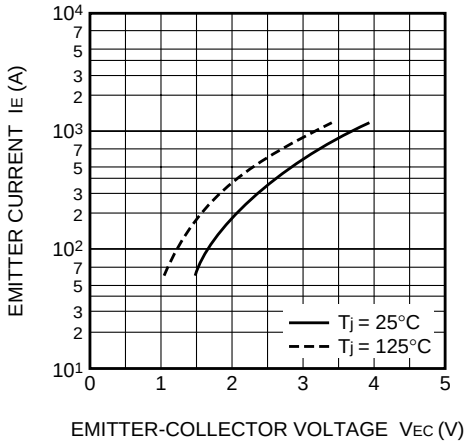
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



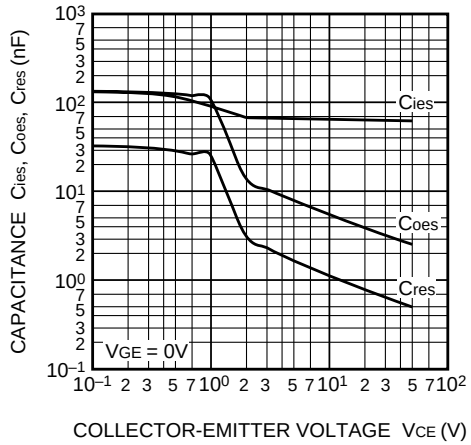
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



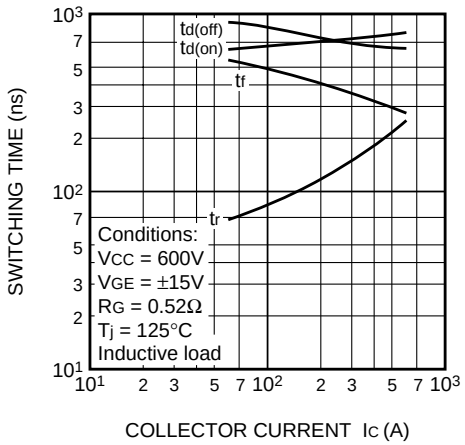
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



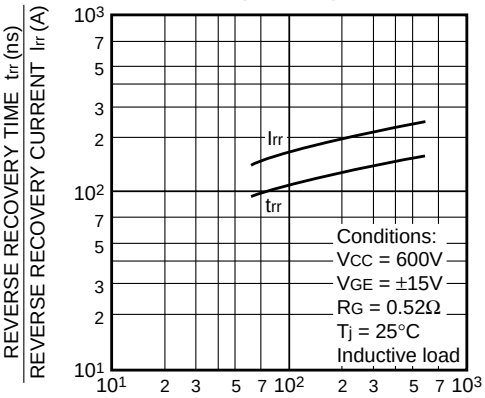
CAPACITANCE–VCE CHARACTERISTICS (TYPICAL)



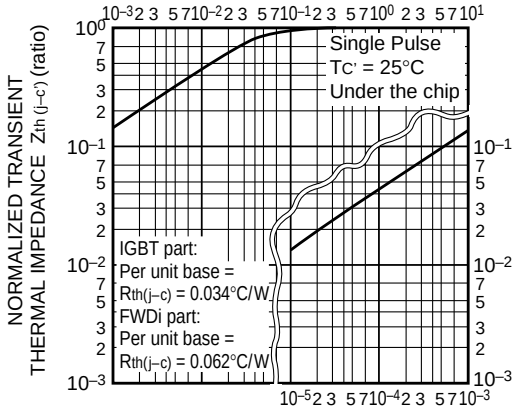
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



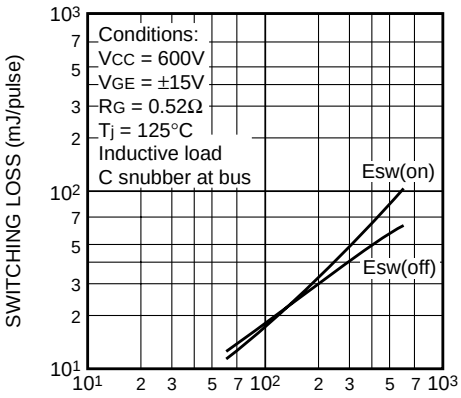
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



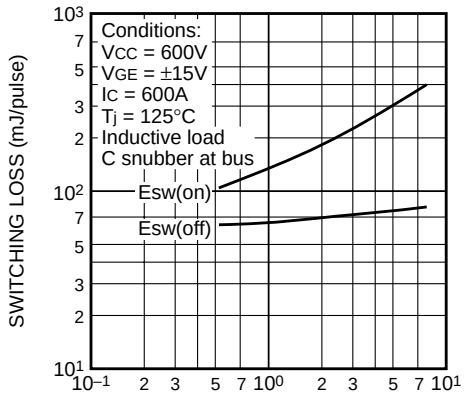
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part)



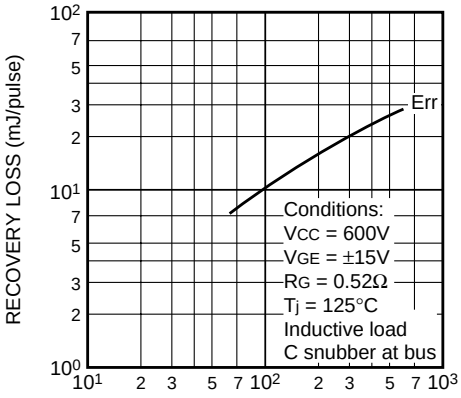
SWITCHING LOSS vs. COLLECTOR CURRENT (TYPICAL)



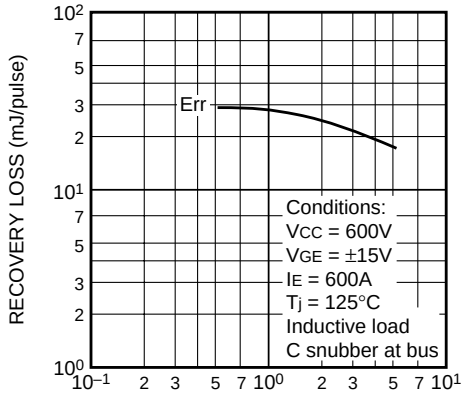
SWITCHING LOSS vs. GATE RESISTANCE (TYPICAL)



RECOVERY LOSS vs. IE (TYPICAL)



RECOVERY LOSS vs. GATE RESISTANCE (TYPICAL)



GATE CHARGE CHARACTERISTICS (TYPICAL)