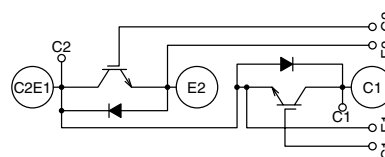


- IC 1400A
- VCES 1200V
- Insulated Type
- 2-elements in a pack

UPS & General purpose inverters, etc

Dimensions in mm

Diagram showing a label on a tray. The label is labeled "LABEL". A dimension line indicates a height of 25.1.



CIRCUIT DIAGRAM

CM1400DU-24NF

HIGH POWER SWITCHING USE

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

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 ' = 94°C*1	1400	A
I _{CM}		Pulse (Note 2)	2800	
I _E (Note 1)	Emitter current	T _C = 25°C	1400	A
I _{EM} (Note 1)		Pulse (Note 2)	2800	
P _C (Note 3)	Maximum collector dissipation	T _C = 25°C	3900	W
T _j	Junction temperature		−40 ~ +150	°C
T _{stg}	Storage temperature*4		−40 ~ +125	°C
V _{iso}	Isolation voltage	Terminals to base plate, f = 60Hz, AC 1 minute	2500	Vrms
—	Torque strength	Main terminals M6 screw	3.5 ~ 4.5	N • m
		Mounting M6 screw	3.5 ~ 4.5	N • m
—	Weight	Typical value	1400	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 = 140mA, V _{CE} = 10V	6	7	8	V
I _{GES}	Gate leakage current	±V _{GE} = V _{GES} , V _{CE} = 0V	—	—	1.5	μA
V _{CE(sat)} (chip)	Collector-emitter saturation voltage (without lead resistance)	I _C = 1400A, V _{GE} = 15V (Note 4)	—	1.8	2.5	V
		T _j = 125°C	—	2.0	—	
R _(lead)	Module lead resistance	I _C = 1400A, terminal-chip	—	0.286	—	mΩ
C _{ies}	Input capacitance	V _{CE} = 10V V _{GE} = 0V	—	—	220	nF
C _{oes}	Output capacitance		—	—	25	
C _{res}	Reverse transfer capacitance		—	—	4.7	
Q _G	Total gate charge	V _{CC} = 600V, I _C = 1400A, V _{GE} = 15V	—	7200	—	nC
t _{d(on)}	Turn-on delay time	V _{CC} = 600V, I _C = 1400A V _{GE} = ±15V R _G = 0.22Ω, Inductive load	—	—	800	ns
t _r	Turn-on rise time		—	—	300	
t _{d(off)}	Turn-off delay time		—	—	1000	
t _f	Turn-off fall time		—	—	300	
t _{rr} (Note 1)	Reverse recovery time		—	—	700	
Q _{rr} (Note 1)	Reverse recovery charge	I _E = 1400A	—	90	—	μC
V _{EC} (Note 1) (chip)	Emitter-collector voltage (without lead resistance)	I _E = 1400A, V _{GE} = 0V	—	—	3.2	V
R _{th(j-c)Q}	Thermal resistance*3	IGBT part (1/2 module)	—	—	0.032	K/W
R _{th(j-c)R}		FWDi part (1/2 module)	—	—	0.053	
R _{th(c-f)}	Contact thermal resistance*2	Case to heat sink, Thermal compound applied (1/2 module)	—	0.016	—	
R _{th(j-c')Q}	Thermal resistance*1	Case temperature measured point is just under the chips (IGBT part)	—	—	0.014	
R _{th(j-c')R}		Case temperature measured point is just under the chips (FWDi part)	—	—	0.023	
R _G	External gate resistance		0.22	—	2.2	Ω

Note 1. I_E, V_{EC}, t_{rr} & Q_{rr} 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 just under the chips.

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

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

*3 : Case temperature (T_c) measured point is shown in page OUTLINE DRAWING.

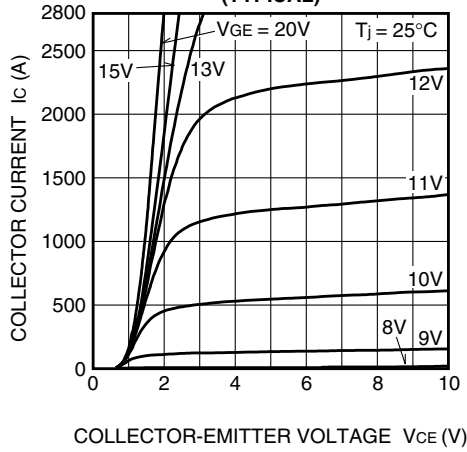
*4 : The operation temperature is restrained by the permission temperature of female connector.

CM1400DU-24NF

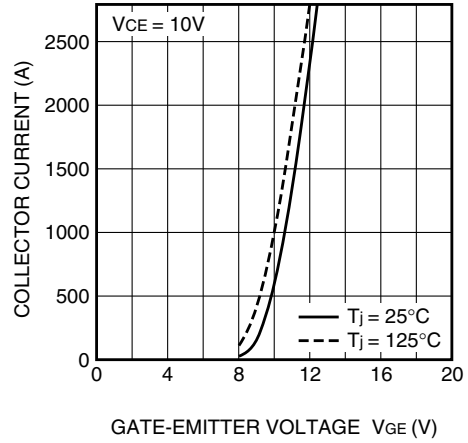
HIGH POWER SWITCHING USE

PERFORMANCE CURVES

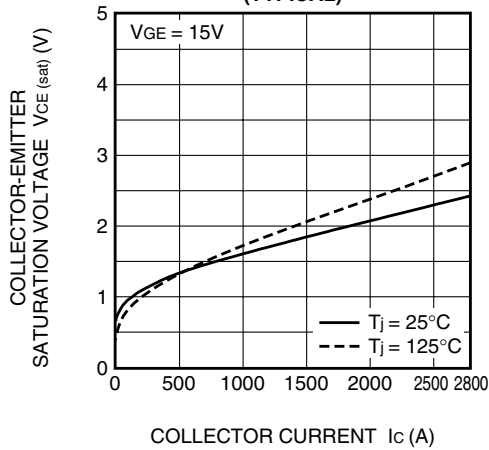
**OUTPUT CHARACTERISTICS
(TYPICAL)**



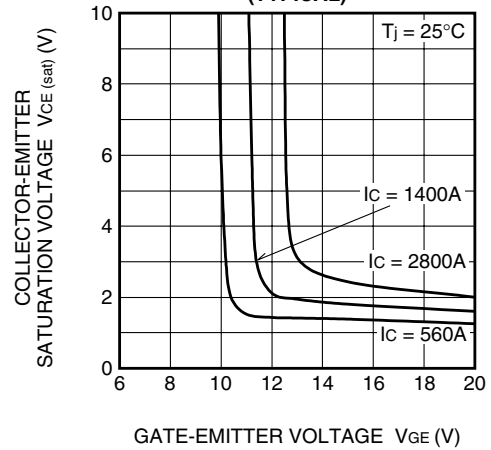
**TRANSFER CHARACTERISTICS
(TYPICAL)**



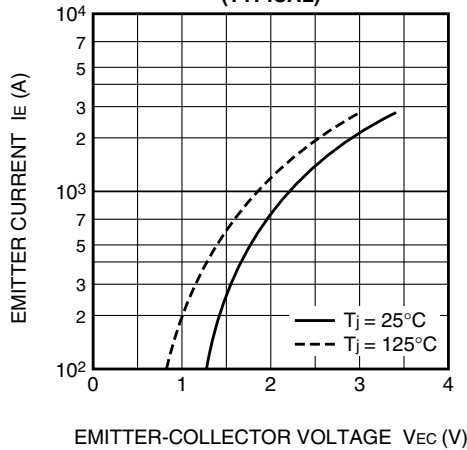
**COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)**



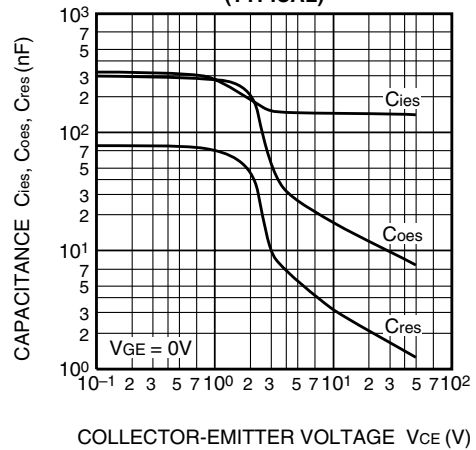
**COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)**



**FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)**



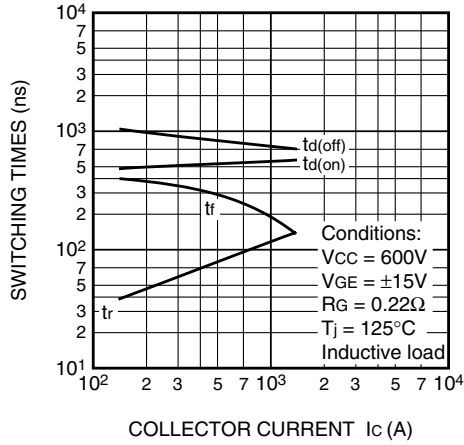
**CAPACITANCE- V_{ce}
CHARACTERISTICS
(TYPICAL)**



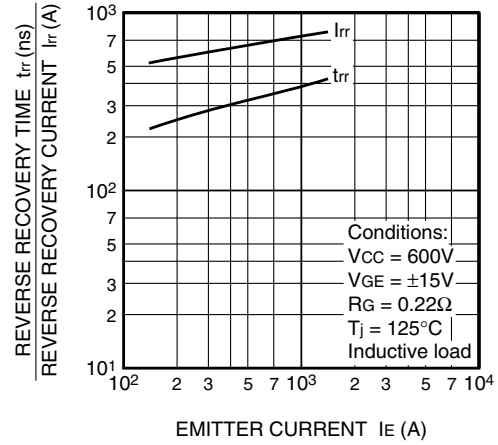
CM1400DU-24NF

HIGH POWER SWITCHING USE

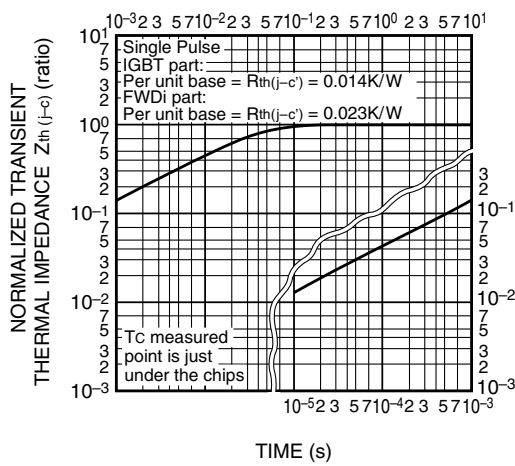
**HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)**



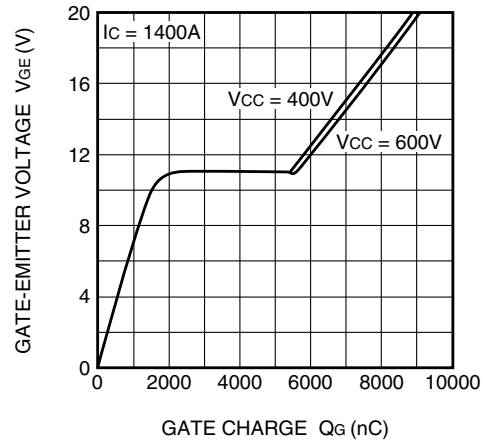
**REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE
(TYPICAL)**



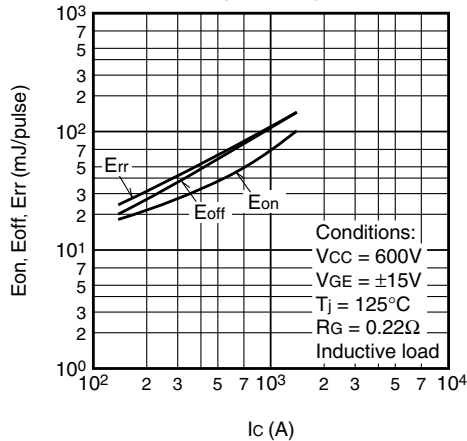
**TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(IGBT part & FWDi part)**



**GATE CHARGE
CHARACTERISTICS
(TYPICAL)**



**I_c -Esw
(TYPICAL)**



**R_G -Esw
(TYPICAL)**

