

MITSUBISHI IGBT MODULES  
**CM300DU-12H**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE

**CM300DU-12H**



- Ic .....300A
- VCES .....600V
- Insulated Type
- 2-elements in a pack
- UL Recognized

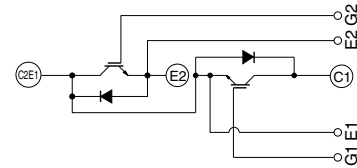
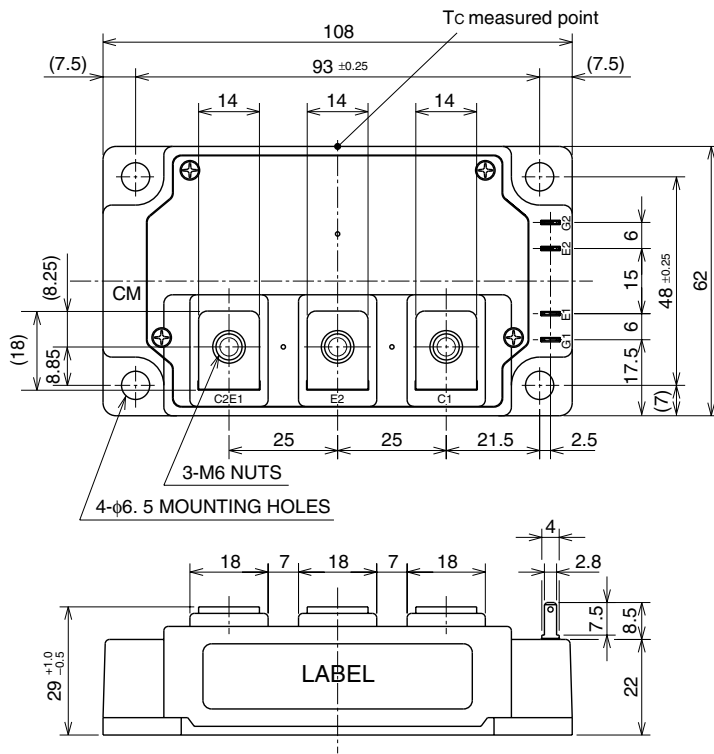
Yellow Card No. E80276  
 File No. E80271

**APPLICATION**

UPS, NC machine, AC-Drive control, Servo, Welders

**OUTLINE DRAWING & CIRCUIT DIAGRAM**

Dimensions in mm



CIRCUIT DIAGRAM

## CM300DU-12H

HIGH POWER SWITCHING USE  
INSULATED TYPEMAXIMUM RATINGS ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Item	Conditions	Ratings	Unit
VCES	Collector-emitter voltage	$V_{GE} = 0\text{V}$	600	V
VGES	Gate-emitter voltage	$V_{CE} = 0\text{V}$	$\pm 20$	V
IC	Collector current	$T_C = 25^\circ\text{C}$	300	A
ICM		Pulse (Note 1)	600	A
IE (Note 2)	Emitter current	$T_C = 25^\circ\text{C}$	300	A
IEM (Note 2)		Pulse (Note 1)	600	A
PC (Note 3)	Maximum collector dissipation	$T_C = 25^\circ\text{C}$	890	W
Tj	Junction temperature	—	$-40 \sim +150$	$^\circ\text{C}$
Tstg	Storage temperature	—	$-40 \sim +125$	$^\circ\text{C}$
Viso	Isolation voltage	Charged part to base plate, $f = 60\text{Hz}$ , AC 1 minute	2500	Vrms
—	Mounting torque	Main terminals M6 screw	$3.5 \sim 4.5$	N·m
—		Mounting M6 screw	$3.5 \sim 4.5$	N·m
—	Weight	Typical value	400	g

ELECTRICAL CHARACTERISTICS ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Item	Test Conditions	Limits			Unit
			Min	Typ	Max	
ICES	Collector cutoff current	$V_{CE} = V_{CES}$ , $V_{GE} = 0\text{V}$	—	—	1	mA
VGE(th)	Gate-emitter threshold voltage	$I_C = 30\text{mA}$ , $V_{CE} = 10\text{V}$	4.5	6	7.5	V
IGES	Gate-leakage current	$\pm V_{GE} = V_{GES}$ , $V_{CE} = 0\text{V}$	—	—	0.5	$\mu\text{A}$
VCE(sat)	Collector-emitter saturation voltage	$I_C = 300\text{A}$ , $V_{GE} = 15\text{V}$ (Note 4)	—	2.4	3.0	V
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	—	2.6	—	
Cies	Input capacitance	$V_{CE} = 10\text{V}$	—	—	26.4	nF
Coes	Output capacitance	$V_{GE} = 0\text{V}$	—	—	14.4	nF
Cres	Reverse transfer capacitance		—	—	4	nF
QG	Total gate charge	$V_{CC} = 300\text{V}$ , $I_C = 300\text{A}$ , $V_{GE} = 15\text{V}$	—	600	—	nC
td(on)	Turn-on delay time	$V_{CC} = 300\text{V}$ , $I_C = 300\text{A}$	—	—	250	ns
tr	Turn-on rise time	$V_{GE} = \pm 15\text{V}$	—	—	600	ns
td(off)	Turn-off delay time	$R_G = 2.1\Omega$	—	—	350	ns
tf	Turn-off fall time	Resistive load	—	—	300	ns
VEC(Note 2)	Emitter-collector voltage	$I_E = 300\text{A}$ , $V_{GE} = 0\text{V}$	—	—	2.6	V
t <sub>rr</sub> (Note 2)	Reverse recovery time	$I_E = 300\text{A}$ ,	—	—	160	ns
Q <sub>rr</sub> (Note 2)	Reverse recovery charge	$di_e / dt = -600\text{A} / \mu\text{s}$	—	0.72	—	$\mu\text{C}$
Rth(j-c)Q	Thermal resistance (Note 5)	Junction to case, IGBT part (Per 1/2 module)	—	—	0.14	K/W
Rth(j-c)R		Junction to case, FWDi part (Per 1/2 module)	—	—	0.24	K/W
Rth(c-f)	Contact thermal resistance	Case to heat sink, conductive grease applied (Per 1/2 module) (Note 6)	—	0.04	—	K/W

Note 1. Pulse width and repetition rate should be such that the device junction temperature ( $T_j$ ) does not exceed  $T_{jmax}$  rating.

2.  $I_E$ ,  $I_{EM}$ ,  $V_{EC}$ ,  $t_{rr}$ ,  $Q_{rr}$  &  $di_e/dt$  represent characteristics of the anti-parallel, emitter-collector free-wheel diode.

3. Junction temperature ( $T_j$ ) should not increase beyond  $150^\circ\text{C}$ .

4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

5. Case temperature ( $T_c$ ) measured point is shown in page OUTLINE DRAWING.

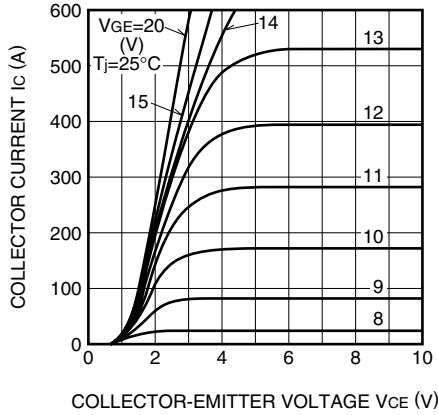
6. Typical value is measured by using thermally conductive grease of  $\lambda = 0.9[\text{W}/(\text{m} \cdot \text{K})]$ .

# CM300DU-12H

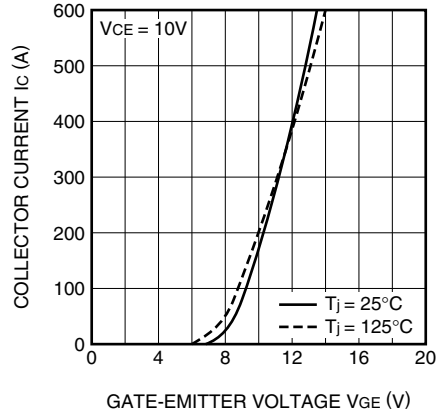
HIGH POWER SWITCHING USE  
INSULATED TYPE

## PERFORMANCE CURVES

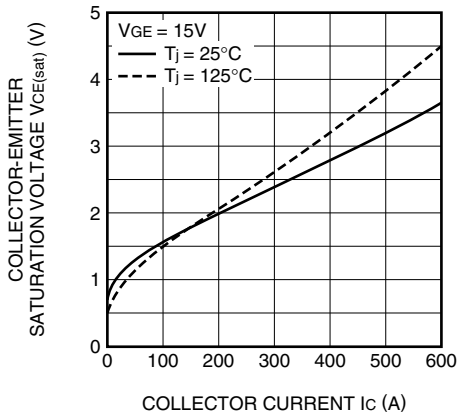
**OUTPUT CHARACTERISTICS (TYPICAL)**



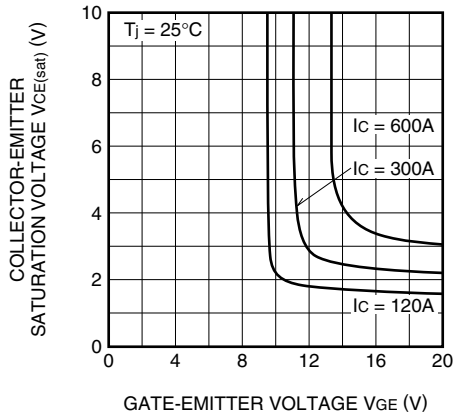
**TRANSFER CHARACTERISTICS (TYPICAL)**



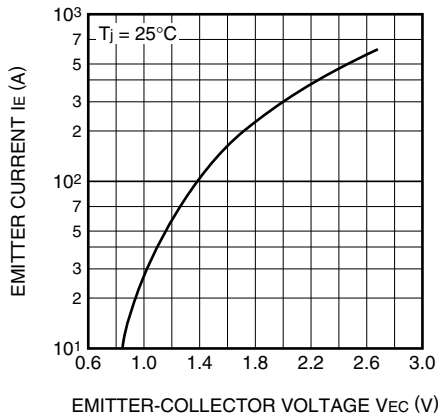
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



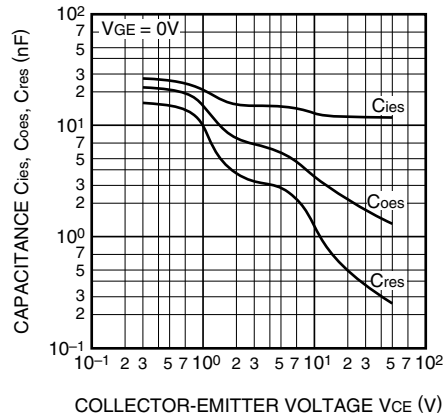
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



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



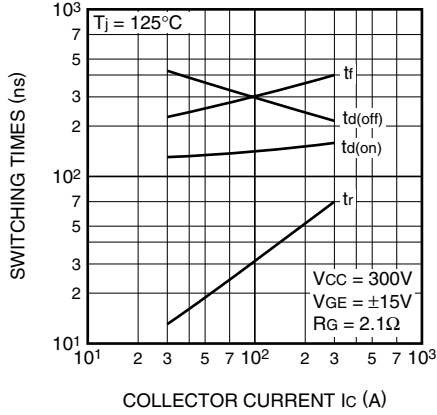
**CAPACITANCE CHARACTERISTICS (TYPICAL)**



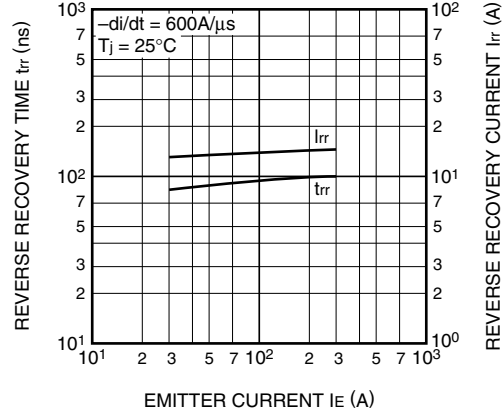
# CM300DU-12H

HIGH POWER SWITCHING USE  
INSULATED TYPE

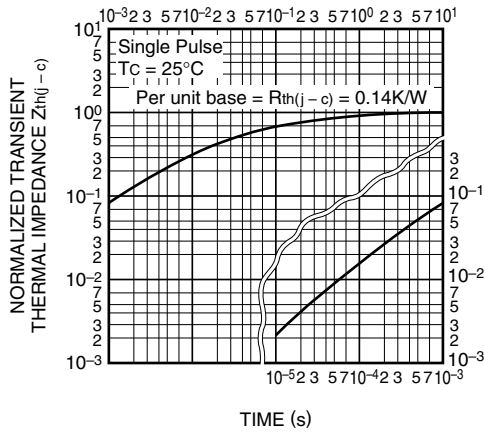
**HALF-BRIDGE SWITCHING TIME CHARACTERISTICS (TYPICAL)**



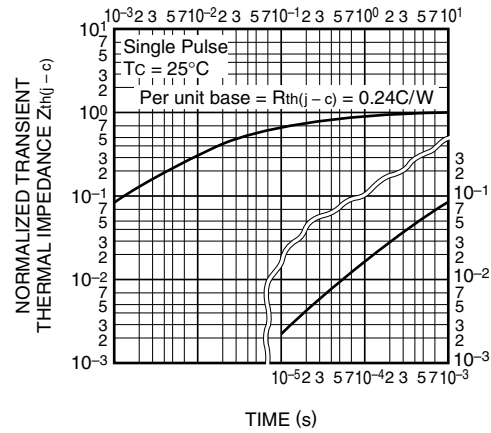
**REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)**



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



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



**GATE CHARGE CHARACTERISTICS (TYPICAL)**

