

**CM300DU-12NFH**

HIGH POWER SWITCHING USE

**CM300DU-12NFH**

- $I_C$  ..... 300A
- $V_{CES}$  ..... 600V
- Insulated Type
- 2-elements in a pack

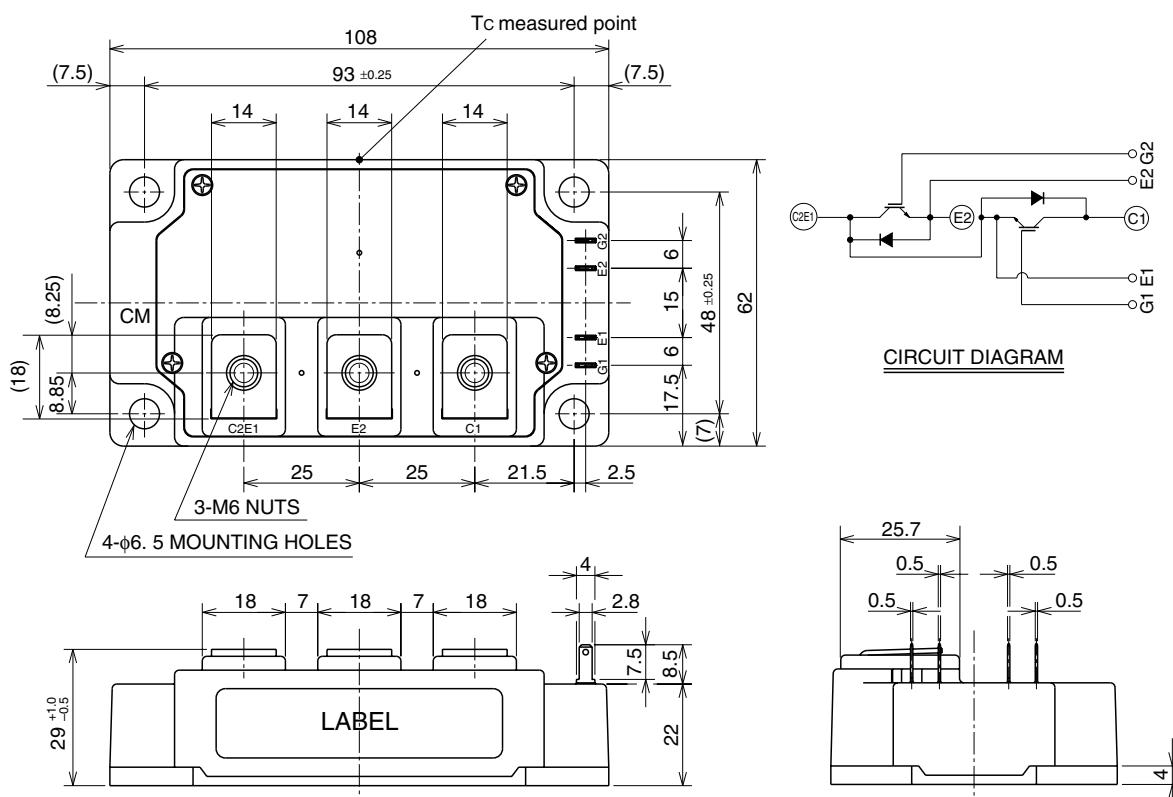
**APPLICATION**

High frequency switching use (30kHz to 60kHz).

Gradient amplifier, Induction heating, power supply, etc.

**OUTLINE DRAWING & CIRCUIT DIAGRAM**

Dimensions in mm



Feb. 2009

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

Symbol	Parameter	Conditions	Ratings	Unit
$V_{CES}$	Collector-emitter voltage	G-E Short	600	V
$V_{GES}$	Gate-emitter voltage	C-E Short	$\pm 20$	V
$I_C$	Collector current	Operation	300	A
$I_{CM}$		Pulse	(Note 2) 600	A
$I_{E}$ (Note 1)	Emitter current	Operation	300	A
$I_{EM}$ (Note 1)		Pulse	(Note 2) 600	A
$P_C$ (Note 3)	Maximum collector dissipation	$T_C = 25^\circ\text{C}$	780	W
$P_C'$ (Note 3)	Maximum collector dissipation	$T_C' = 25^\circ\text{C}^{*4}$	1250	W
$T_j$	Junction temperature		-40 ~ +150	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-40 ~ +125	$^\circ\text{C}$
$V_{iso}$	Isolation voltage	Terminals to base plate, $f = 60\text{Hz}$ , AC 1 minute	2500	Vrms
—	Mounting torque	Main terminals M6 screw	3.5 ~ 4.5	N • m
—		Mounting M6 screw	3.5 ~ 4.5	N • m
—	Weight	Typical value	400	g

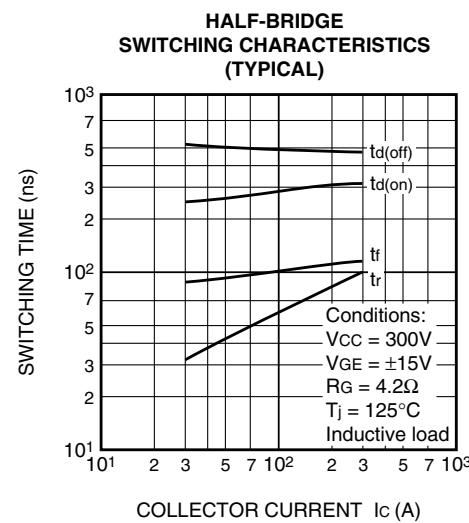
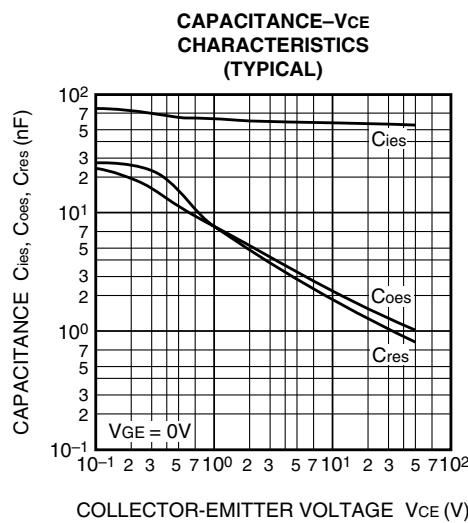
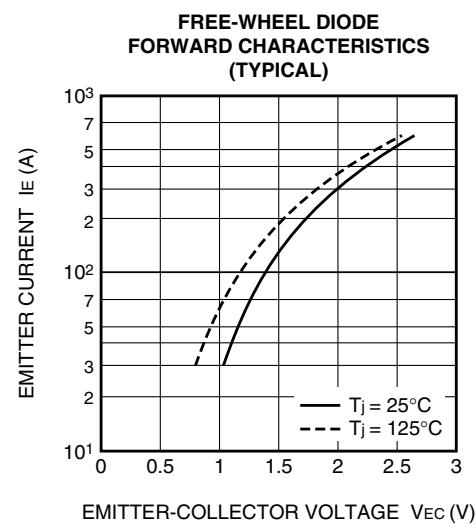
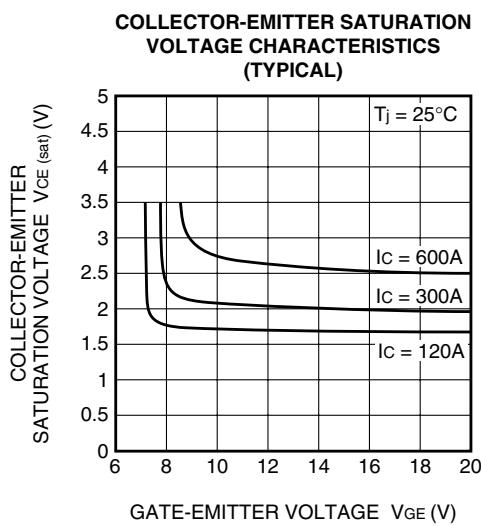
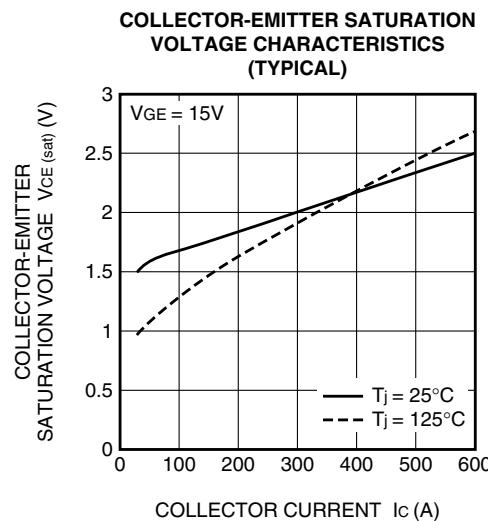
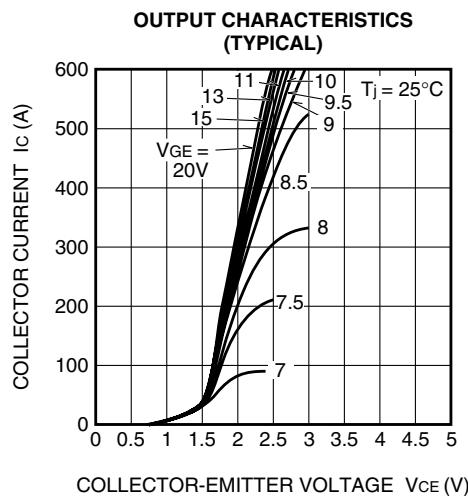
ELECTRICAL CHARACTERISTICS ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)

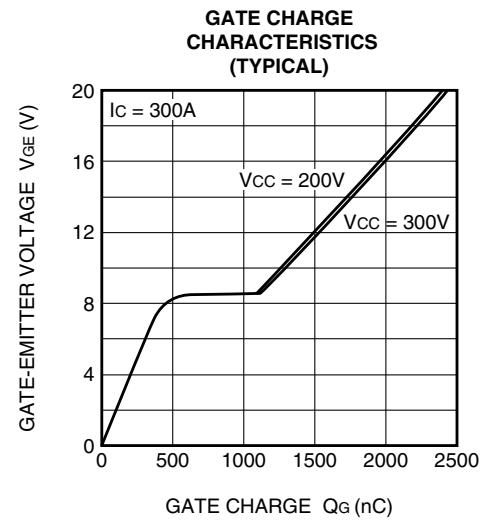
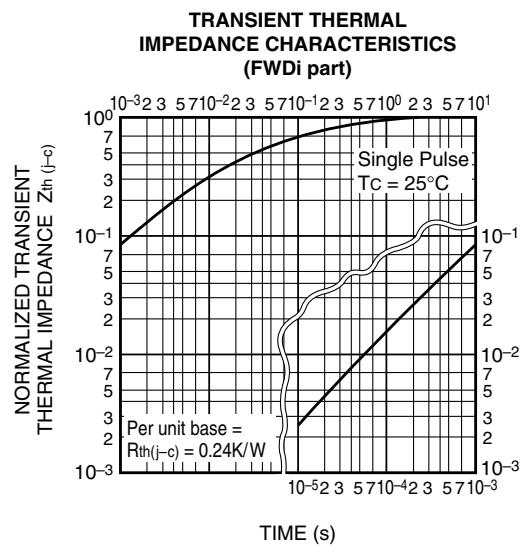
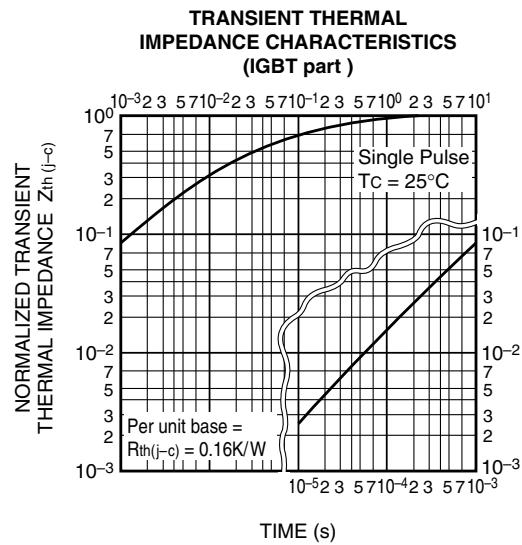
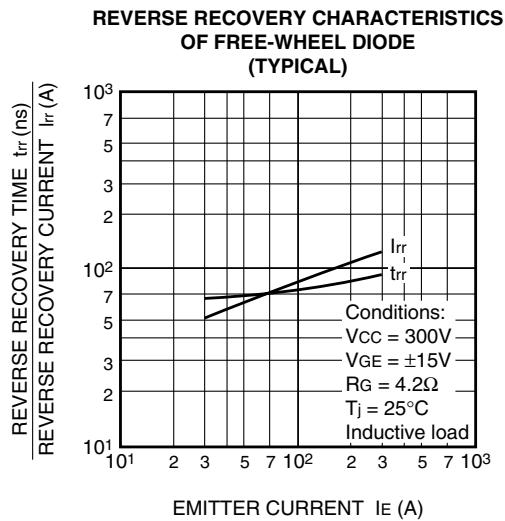
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$I_{CES}$	Collector cutoff current	$V_{CE} = V_{CES}$ , $V_{GE} = 0\text{V}$	—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C = 30\text{mA}$ , $V_{CE} = 10\text{V}$	5	6	7	V
$I_{GES}$	Gate leakage current	$\pm V_{GE} = V_{GES}$ , $V_{CE} = 0\text{V}$	—	—	0.5	$\mu\text{A}$
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_C = 300\text{A}$ , $V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$	2.0	2.7	V
				1.95	—	
$C_{ies}$	Input capacitance	$V_{CE} = 10\text{V}$	—	—	83	nF
$C_{oes}$	Output capacitance		—	—	5.4	nF
$C_{res}$	Reverse transfer capacitance		—	—	3.0	nF
$Q_G$	Total gate charge	$V_{CC} = 300\text{V}$ , $I_C = 300\text{A}$ , $V_{GE} = 15\text{V}$	—	1860	—	nC
$t_{d(on)}$	Turn-on delay time	$V_{CC} = 300\text{V}$ , $I_C = 300\text{A}$ $V_{GE} = \pm 15\text{V}$	—	—	350	ns
$t_r$	Turn-on rise time		—	—	150	ns
$t_{d(off)}$	Turn-off delay time		—	—	700	ns
$t_f$	Turn-off fall time		—	—	150	ns
$t_{rr}$ (Note 1)	Reverse recovery time	$I_E = 300\text{A}$	—	—	200	ns
$Q_{rr}$ (Note 1)	Reverse recovery charge		—	5.5	—	$\mu\text{C}$
$V_{EC}$ (Note 1)	Emitter-collector voltage	$I_E = 300\text{A}$ , $V_{GE} = 0\text{V}$	—	—	2.6	V
$R_{th(j-c)Q}$	Thermal resistance <sup>*1</sup>	IGBT part (1/2 module)	—	—	0.16	K/W
$R_{th(j-c)R}$		FWDi part (1/2 module)	—	—	0.24	K/W
$R_{th(c-f)}$	Contact thermal resistance	Case to heat sink, Thermal compound Applied <sup>*2</sup> (1/2 module)	—	0.04	—	K/W
$R_{th(j-c)Q}$	Thermal resistance	Case temperature measured point is just under the chips (1/2 module)	—	—	$0.10^{*3}$	K/W
$R_G$	External gate resistance		2.1	—	21	$\Omega$

\*1 : Case temperature ( $T_C$ ) measured point is shown in page OUTLINE DRAWING.\*2 : Typical value is measured by using thermally conductive grease of  $\lambda = 0.9\text{W}/(\text{m} \cdot \text{K})$ .\*3 : If you use this value,  $R_{th(j-a)}$  should be measured just under the chips.\*4 : Case temperature ( $T_C'$ ) measured point is just under the chips.Note 1.  $I_E$ ,  $I_{EM}$ ,  $V_{EC}$ ,  $t_{rr}$  &  $Q_{rr}$  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  $150^\circ\text{C}$ .

4. No short circuit capability is designed.

PERFORMANCE CURVES





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