

To all our customers

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## **Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.**

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The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003


**PRELIMINARY**  
 Notice: This is not a final specification.  
 Some parametric limits are subject to change.

MITSUBISHI INSULATED GATE BIPOLAR TRANSISTOR

**CT15SM-24**

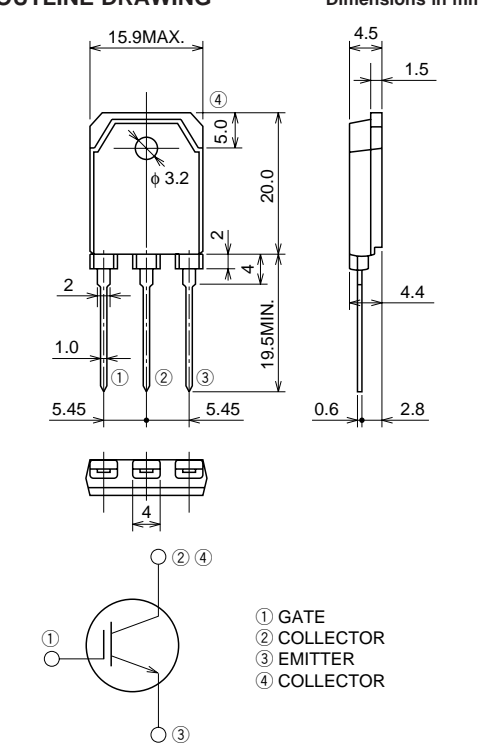
GENERAL INVERTER • UPS USE

**CT15SM-24**



- VCES ..... 1200V
- IC ..... 15A
- High Speed Switching
- Low VCE Saturation Voltage

**OUTLINE DRAWING** Dimensions in mm



① GATE  
 ② COLLECTOR  
 ③ EMITTER  
 ④ COLLECTOR

**TO-3P**

**APPLICATION**

AC & DC motor controls, General purpose inverters, UPS, Power supply switching, Servo controls, etc.

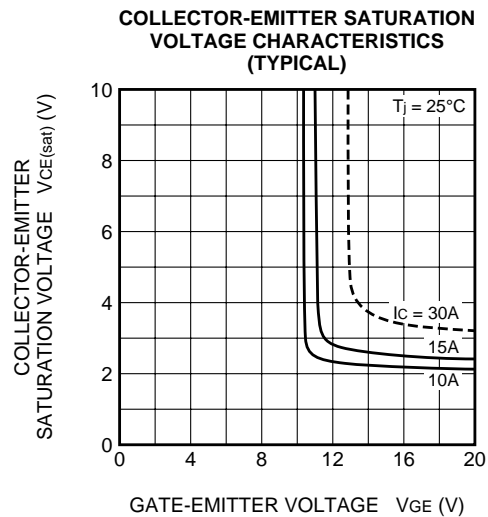
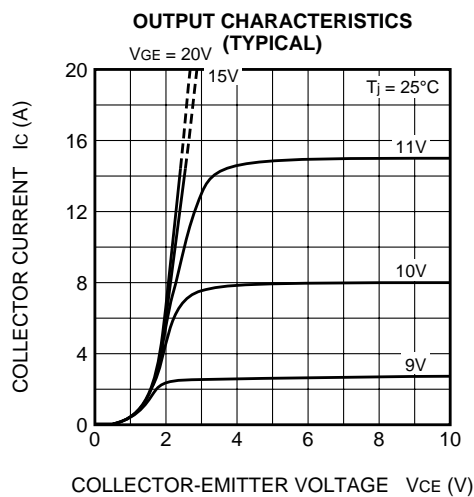
**MAXIMUM RATINGS** (Tc = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CE</sub> S	Collector-emitter voltage	V <sub>GE</sub> = 0V	1200	V
V <sub>GE</sub> S	Gate-emitter voltage	V <sub>CE</sub> = 0V	±20	V
V <sub>GEM</sub>	Peak gate-emitter voltage	V <sub>CE</sub> = 0V	±30	V
I <sub>C</sub>	Collector current		15	A
I <sub>CM</sub>	Collector current (Pulsed)		30	A
P <sub>C</sub>	Maximum power dissipation		250	W
T <sub>j</sub>	Junction temperature		-40 ~ +150	°C
T <sub>stg</sub>	Storage temperature		-40 ~ +150	°C
—	Weight	Typical value	4.8	g

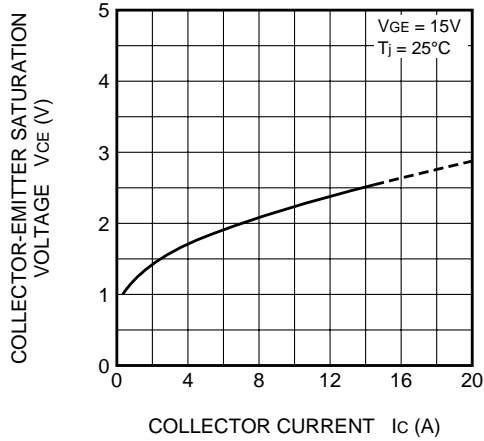
**ELECTRICAL CHARACTERISTICS** ( $T_j = 25^\circ\text{C}$ )

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
V (BR) CES	Collector-emitter breakdown voltage	$I_C = 1\text{mA}, V_{GE} = 0\text{V}$	1200	—	—	V
IGES	Collector-emitter leakage current	$V_{GE} = \pm 30\text{V}, V_{CE} = 0\text{V}$	—	—	$\pm 0.5$	$\mu\text{A}$
ICES	Gate-emitter leakage current	$V_{CE} = 1200\text{V}, V_{GE} = 0\text{V}$	—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C = 1.5\text{mA}, V_{CE} = 10\text{V}$	4.5	6.0	7.5	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_C = 15\text{A}, V_{GE} = 15\text{V}$	—	2.7	3.6	V
$C_{ies}$	Input capacitance	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$	—	1600	—	pF
$C_{oes}$	Output capacitance		—	150	—	pF
$C_{res}$	Reverse transfer capacitance		—	45	—	pF
$t_d(on)$	Turn-on delay time	$V_{CC} = 600\text{V}, \text{Resistance load}, I_C = 15\text{A}, V_{GE} = 15\text{V}, R_{GE} = 20\Omega$	—	50	—	ns
$t_r$	Rise time		—	150	—	ns
$t_d(off)$	Turn-off delay time		—	150	—	ns
$t_f$	Fall time		—	250	—	ns
$R_{th(j-c)}$	Thermal resistance	Junction to case	—	—	0.50	$^\circ\text{C/W}$

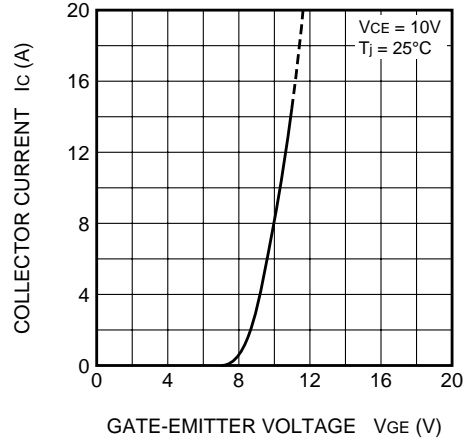
**PERFORMANCE CURVES**



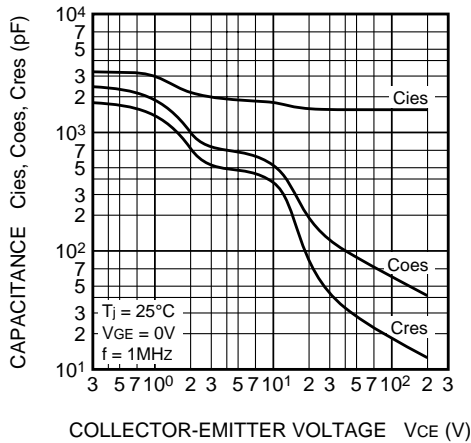
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



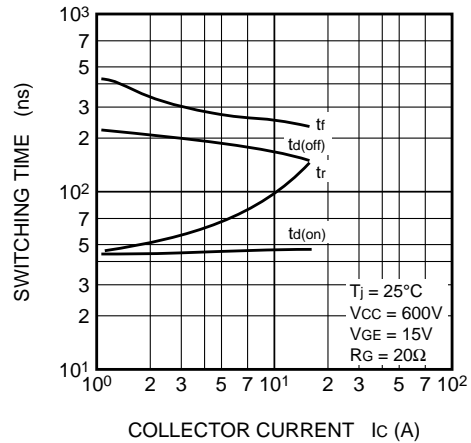
**COLLECTOR CURRENT VS. GATE EMITTER VOLTAGE CHARACTERISTIC (TYPICAL)**



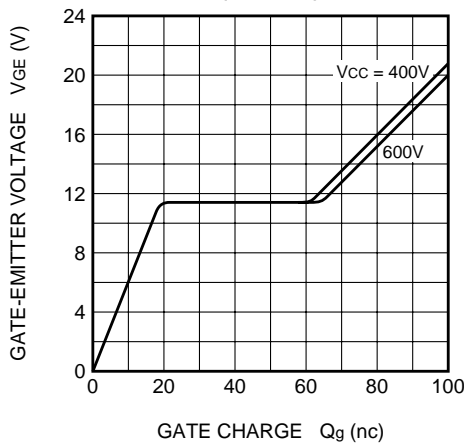
**CAPACITANCE VS. COLLECTOR-EMITTER VOLTAGE CHARACTERISTIC (TYPICAL)**



**SWITCHING TIME-COLLECTOR CURRENT CHARACTERISTIC (TYPICAL)**



**GATE-EMITTER VOLTAGE VS. GATE CHARGE CHARACTERISTIC (TYPICAL)**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TYPICAL)**

