

SPECIFICATION

Device Name : IGBT module

Type Name : 2MBI100NT-120-01

Spec. No. : **MS5F3936**

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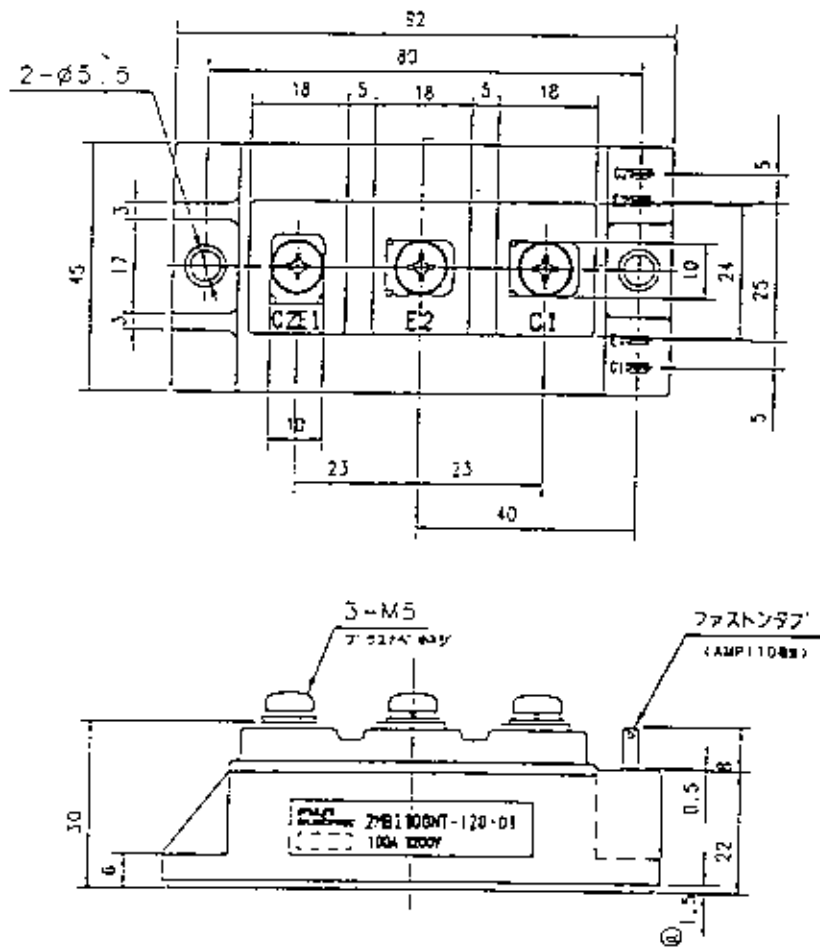
	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN	Feb. 21 '97	S. Kojima	S.K	DWG. NO.	MS5F3936
CHECKED	Feb. 21 '97	S. Miyoshi			
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Revised Records

Date	Classification	Ind.	Content	Applied date	Drawn	Checked	Approved
Feb. 21, '97	enactment	—	—	Issued date	—	S. Koyata	S. K.
Apr. 18, '97	Revision	a	P5/7 Revers gate bias voltage		T. Kobayashi	S. Koyata	S. K.

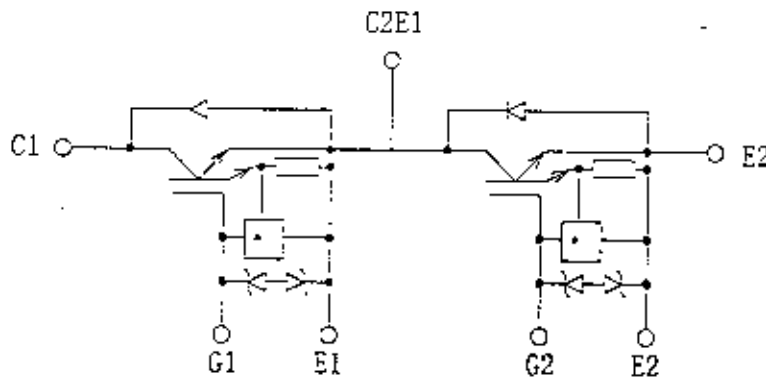
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1. Outline Drawing
Unit : mm



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2. Equivalent circuit



* NLU (Over Current Limiting Circuit)

3. Absolute Maximum Ratings (at $T_c=25^\circ\text{C}$ unless otherwise specified)

Items	Symbols	Ratings	Units
Collector-Emitter voltage	V_{CES}	1200	V
Gate-Emitter voltage	V_{GEs}	± 20	V
Collector current	Continuous	I_c	100
	1ms	I_c pulse	200
		$-I_c$	100
	1ms	$-I_c$ pulse	200
Max. power dissipation	PC	850	W
Operating temperature	T_j	+150	$^\circ\text{C}$
Storage temperature	- T_{stg}	-40~+125	$^\circ\text{C}$
Isolation voltage	V_{is}	AC 2500 (1min.)	V
Screw torque	Mounting *1	3.5	N·m
	Terminals *2	4.5	

Note : *1 Recommendable value : 2.5~3.5 N·m (M5) or (M6)

*2 Recommendable value : 3.5~4.5 N·m (M6)

4. Electrical characteristics (at $T_j=25^\circ\text{C}$ unless otherwise specified)

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Zero gate voltage Collector current	I_{CES}			2.0	$V_{GE}=0V, V_{CE}=1200V$	μA
Gate-Emitter leakage current	I_{GES}			30	$V_{CE}=0V, V_{GE}=\pm 20V$	μA
Gate-Emitter threshold voltage	$V_{GE(th)}$	4.5		7.5	$V_{CE}=20V, I_c=100\text{mA}$	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$			3.5	$V_{GE}=15V, I_c=100A$	V
Input capacitance	C_{ies}		18000		$V_{GE}=0V$	pF
Output capacitance	C_{oes}		8400		$V_{CE}=10V$	
Reverse transfer capacitance	C_{res}		6700		$f=1\text{MHz}$	
Turn-on time	t_{on}		0.65	1.2	$V_{ce}=800V$	μs
	t_r		0.25	0.6	$I_c=100A$	
Turn-off time	t_{off}		0.85	1.5	$V_{GE}=\pm 15V$	μs
	t_f		0.35	0.5	$R_G=9.1\Omega$	
Diode forward on voltage	V_f			3.4	$I_f=100A, V_{GE}=0V$	V
Reverse recovery time	t_{rr}			350	$I_f=100A$	μs
Short-circuit withstand capability	P_w	10			$V_{ce}=800V, V_{GE}=-15V$ $R_G=3.9\Omega$	μs

5. Thermal resistance characteristics

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Thermal resistance	$R_{th(j-c)}$			0.15	IGBT	$^\circ\text{C/W}$
	$R_{th(j-c)}$			0.39	Diode	
	※		0.025		the base to cooling fin	
	$R_{th(c-f)}$					

※ This is the value which is defined mounting on the additional cooling fin with thermal compound.

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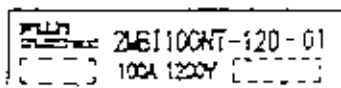
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6. Indication on module (モジュール上で)



Lot No.

Place of manufacturing (code)

7. Applicable category (適用範囲)

This specification is applied to IGBT module named 2MB1100NT-120-01.
 本納入仕様書は、IGBTモジュール 2MB1100NT-120-01 に適用する。

8. Storage and transportation notes (保管、運搬上の注意事項)

- The IGBT module should be stored at a standard temperature of 5 to 35°C and humidity of 45 to 75%.
 常温保存が望ましい。(5~35℃、45~75%)
- Store modules in a place with few temperature changes in order to avoid condensation on the module surface.
 急激な温度変化の無きこと。(モジュール表面が結露しないこと)
- Avoid exposure to corrosive gases and dust.
 腐蝕性ガスの発生場所、塵埃の多い場所は避けること。
- Avoid excessive external force on the module.
 製品に荷重がかからないように十分注意すること。
- Store modules with unprocessed terminals.
 モジュールの端子は未加工の状態での保管すること。
- Do not drop or otherwise shock the modules when transporting.
 製品の運搬時に衝撃を与えたり、落下させたりしないこと。

9. Heat sink mounting notes (ヒートシンク取り付け上の注意事項)

- The mounting surface of the heat sink should be finished to a roughness of 10 μ m or less and a warp between screw holes of 100 μ m or less.
 本モジュールを取り付ける冷却体の取付面の仕上げは、粗さ10 μ m以下、取付ネジ間で平度度100 μ m以下とする。
- Each mounting screw should be fastened using a specified torque after pre-fastening using a 1/3 specified torque.
 取付けネジは、規定の1/3のトルクで仮締めを行った後、規定のトルクで本締めを行って下さい。
- If the above notes are not met, it has a possibility to break the insulation between the IGBT module's chips and metal base.
 上記注意事項の範囲外で御使用した場合、IGBTモジュールのチップと金属ベース間の絶縁破壊を生ずる可能性があります。

⑩ 10. Revers gate bias voltage (ゲート逆バイアス電圧)

- ① • Recommendable value of the revers gate bias voltage : -7V(typ.), -5V(min.) $R_G=9.1\Omega$
 ゲート逆バイアス電圧の推奨値 : -7V(typ.), -5V(min.) $R_G=9.1\Omega$
- ② • The revers gate bias voltage means the voltage between the gate terminal and the auxiliary emitter terminal of the modules.
 ゲート逆バイアス電圧は、モジュールのゲート端子と補助エミッタ端子間の電圧である。

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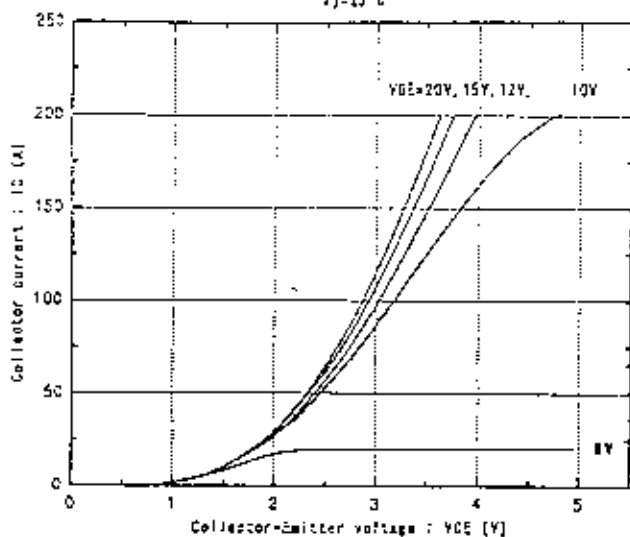
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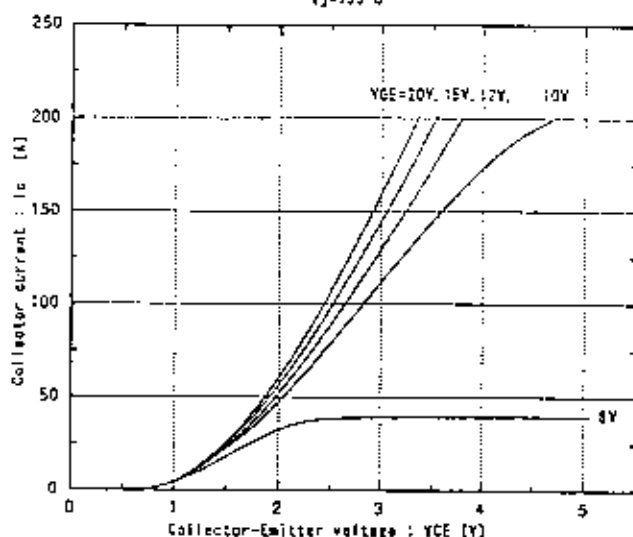
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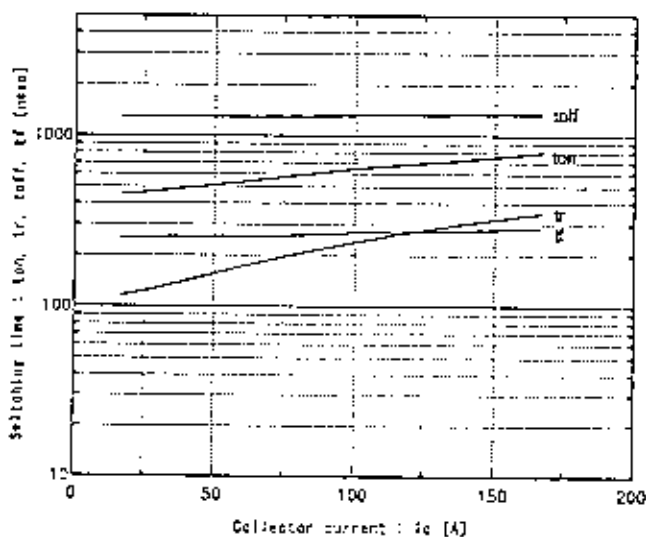
Collector current vs. Collector-Emitter voltage
T_j=25°C



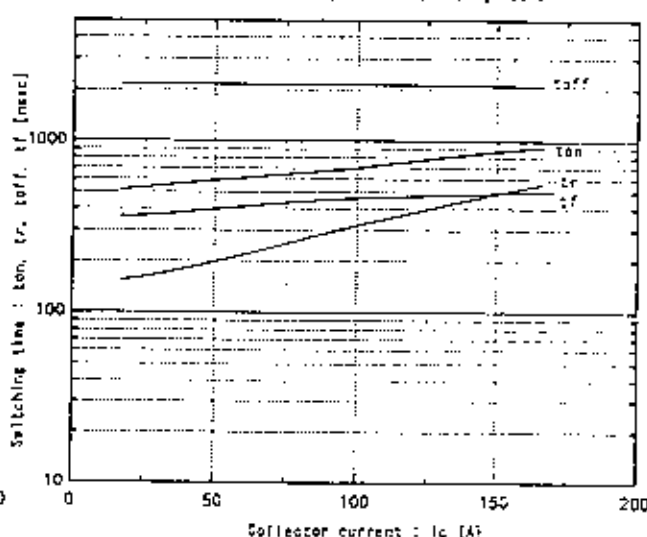
Collector current vs. Collector-Emitter voltage
T_j=135°C



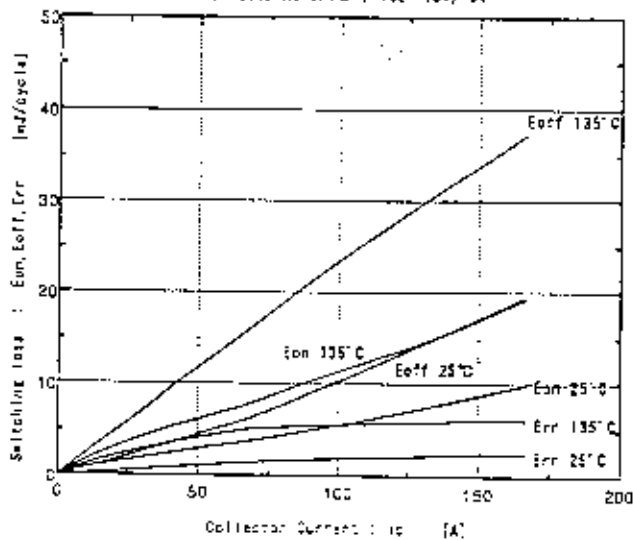
Switching time vs. Collector current
V_{CE}=200V, R_θ=9.1°C, V_{GE}=15V/-5V, T_j=25°C



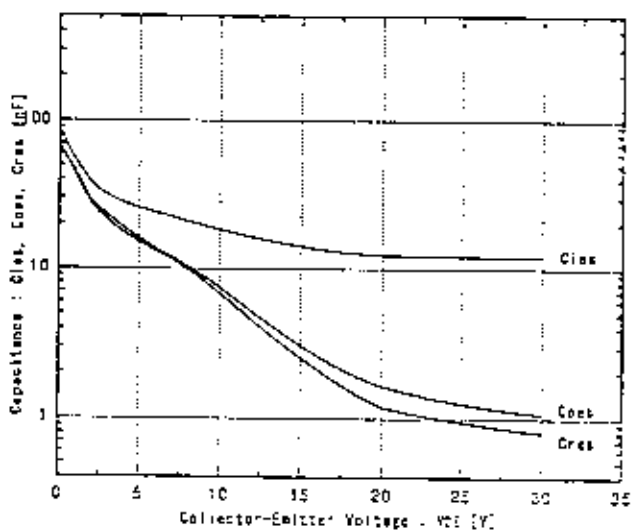
Switching time vs. Collector current
V_{CE}=200V, R_θ=9.1°C, V_{GE}=15V/-5V, T_j=135°C



Switching loss vs. Collector current
V_{CE}=200V, R_θ=9.1°C, V_{GE}=15V/-5V



Capacitance vs. Collector-Emitter voltage
T_j=25°C



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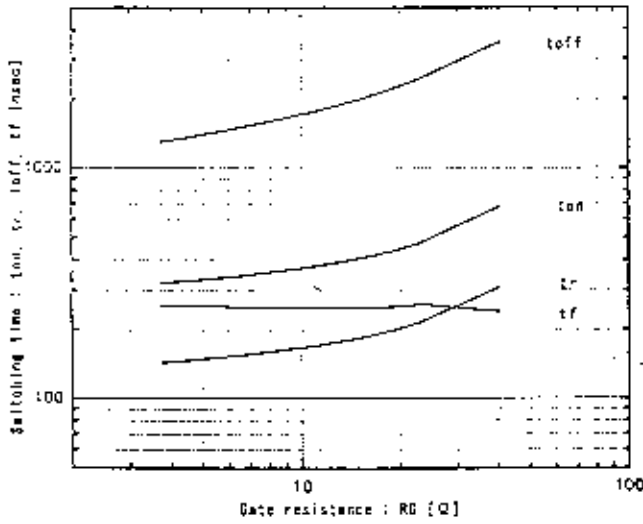
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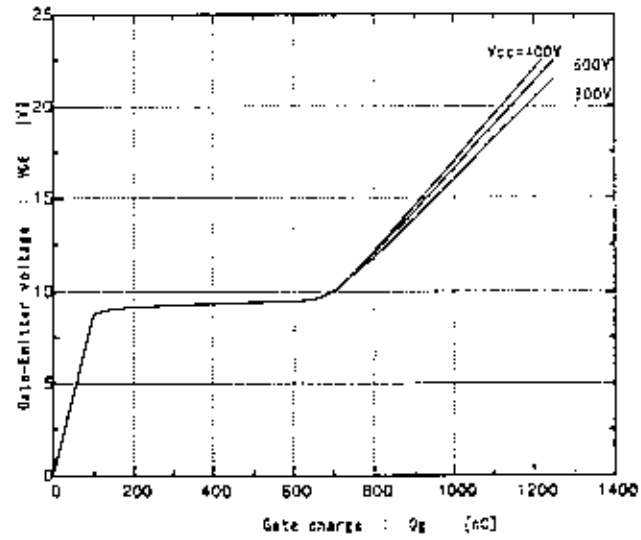
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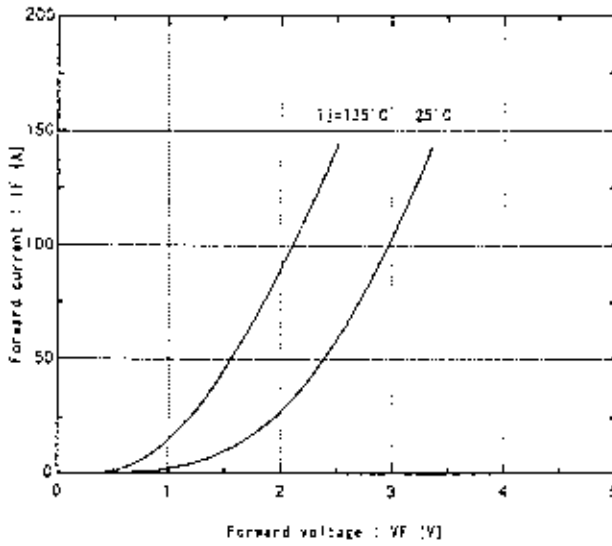
Switching time vs. R_G
 $V_{CC}=700V, I_c=100A, V_{GE}=-15V/-5V, T_j=25^\circ C$



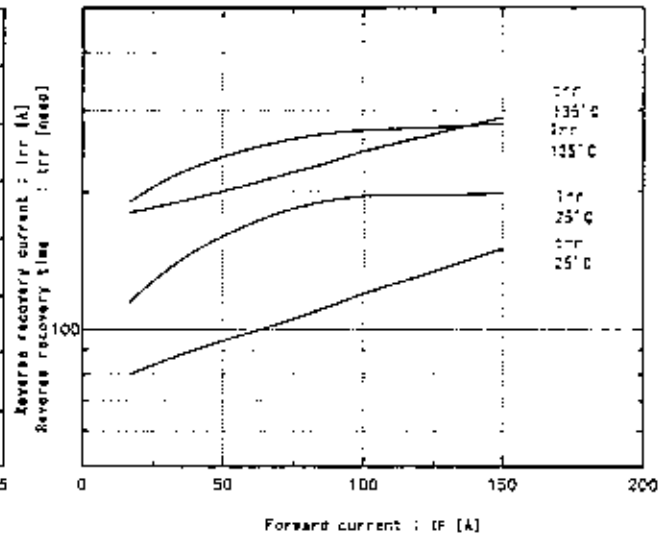
Dynamic input characteristics
 $T_j=25^\circ C$



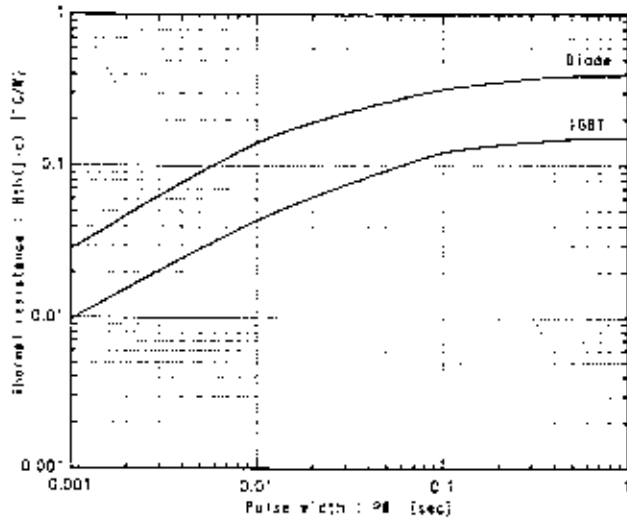
Forward current vs. Forward voltage
 $V_{GE}=0V$



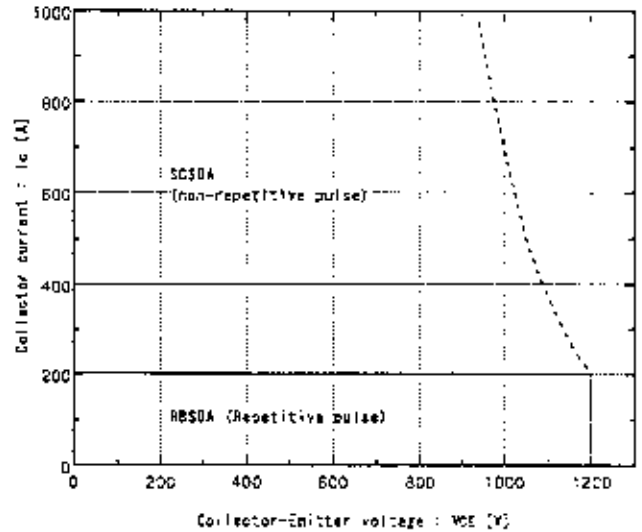
Reverse recovery characteristics
 $t_{rr}, t_{rr} vs. I_F$



Transient thermal resistance



Reversed biased safe operating area
 $-V_{GE}=15V, -V_{CE} \le 15V, T_j \le 135^\circ C$



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