

# SPECIFICATION

Device Name : IGBT module

Type Name : 2MBI150NT-120-01

Spec. No. : **MS5F3937**

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Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN	Feb -21-97	J. Kobayashi	S.K.	DWG. NO.	<b>MS5F3937</b>
CHECKED	Feb -21-97	S. Miyajima			

# Revised Records

Date	Classification	Ind.	Content	Applied date	Drawn	Checked	Approved
Feb. 21. '97	enactment	—	—————	Issued date	—	J. Miyazaki	S. K.
Apr. 18. '97	Revision	a	P5/7 Revers gate bias voltage		J. Kobayashi	A. Miyazaki	S. K.

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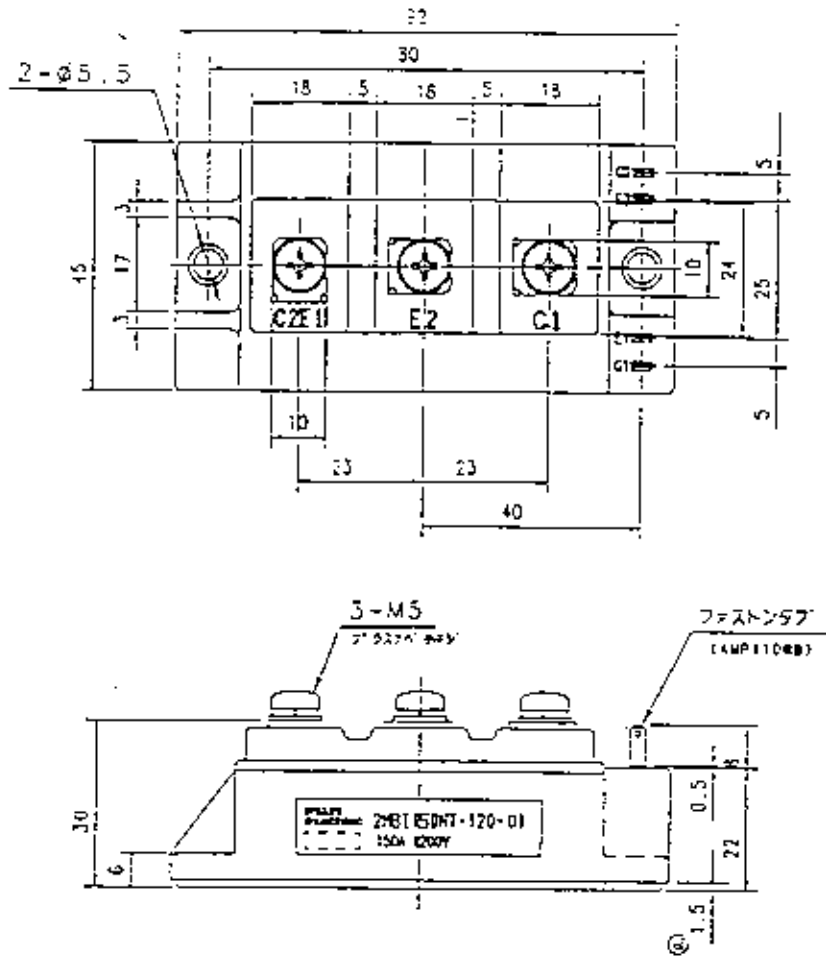
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2MBI150NT-120-01

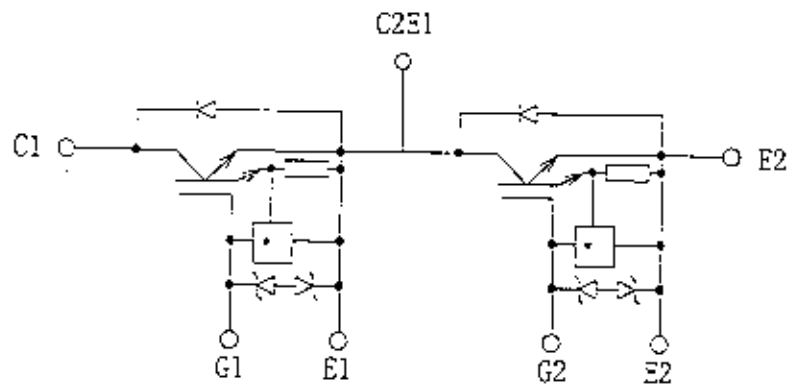
1. Outline Drawing

Unit : mm



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2. Equivalent circuit



\* NLU (Over Current Limiting Circuit)

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3. Absolute Maximum Ratings ( at Tc=25°C unless otherwise specified )

Items	Symbols	Ratings	Units
Collector-Emitter voltage	V <sub>CE</sub>	1200	V
Gate-Emitter voltage	V <sub>GE</sub>	±20	V
Collector current	Continuous	I <sub>c</sub>	150
	1ms	I <sub>c</sub> pulse	300
		-I <sub>c</sub>	150
	1ms	-I <sub>c</sub> pulse	300
Max. power dissipation	P <sub>C</sub>	1210	W
Operating temperature	T <sub>j</sub>	+150	°C
Storage temperature	T <sub>stg</sub>	-40~+125	°C
Isolation voltage	V <sub>is</sub>	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<sub>j</sub>=25°C unless otherwise specified)

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Zero gate voltage Collector current	I <sub>CE0</sub>			2.0	V <sub>GE</sub> =0V, V <sub>CE</sub> =1200V	mA
Gate-Emitter leakage current	I <sub>GES</sub>			30	V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V	μA
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	4.5		7.5	V <sub>CE</sub> =20V, I <sub>c</sub> =150mA	V
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>			3.5	V <sub>GE</sub> =15V, I <sub>c</sub> =150A	V
Input capacitance	C <sub>ies</sub>		27000		V <sub>GE</sub> =0V	pF
Output capacitance	C <sub>oes</sub>		12500		V <sub>CE</sub> =10V	
Reverse transfer capacitance	C <sub>res</sub>		10000		f=1MHz	
Turn-on time	t <sub>on</sub>		0.65	1.2	V <sub>cc</sub> =600V I <sub>c</sub> =150A	μs
	t <sub>r</sub>		0.25	0.6		
Turn-off time	t <sub>off</sub>		0.85	1.5	V <sub>GE</sub> =±15V R <sub>c</sub> =5.6Ω	
	t <sub>f</sub>		0.35	0.5		
Diode forward on voltage	V <sub>F</sub>			3.4	I <sub>F</sub> =150A, V <sub>GE</sub> =0V	V
Reverse recovery time	t <sub>rr</sub>			350	I <sub>F</sub> =150A	ns
Short-circuit withstand capability	P <sub>w</sub>	10			V <sub>cc</sub> =800V, V <sub>GE</sub> =-15V R <sub>c</sub> =2.7Ω	μs

5. Thermal resistance characteristics

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Thermal resistance	R <sub>th(j-c)</sub>			0.10	IGBT	°C/W
	R <sub>th(j-c)</sub>			0.30	Diode	
	※		0.025		the base to cooling fin	
	R <sub>th(c-f)</sub>					

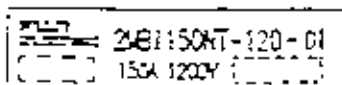
※ This is the value which is defined mounting on the additional cooling fin with thermal compound.

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Lot No.

Place of manufacturing (code)

7. Applicable category (適用範囲)

This specification is applied to IGBT module named 2MBI150NT-120-01.

本納入仕様書は、IGBTモジュール2MBI150NT-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%.  
常温保管が望ましい。(5~35°C、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 $\mu$ m or less and a warp between screw holes of 100 $\mu$ m or less.  
本モジュールを取り付ける冷卻体の取付面の仕上げは、粗さ10 $\mu$ m以下、取付ネジ間  
で平坦度100 $\mu$ 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のトルクで仮締を行った後、規定のトルクで本締を行って下さい。
- 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運用した場合、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。

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

- ④ • Recommendable value of the revers gate bias voltage : -7V(typ.), -5V(min.) R $\theta$ =5.6 $\Omega$   
ゲート逆バイアス電圧の推奨値 : -7V(typ.), -5V(min.) R $\theta$ =5.6 $\Omega$
- ④ • 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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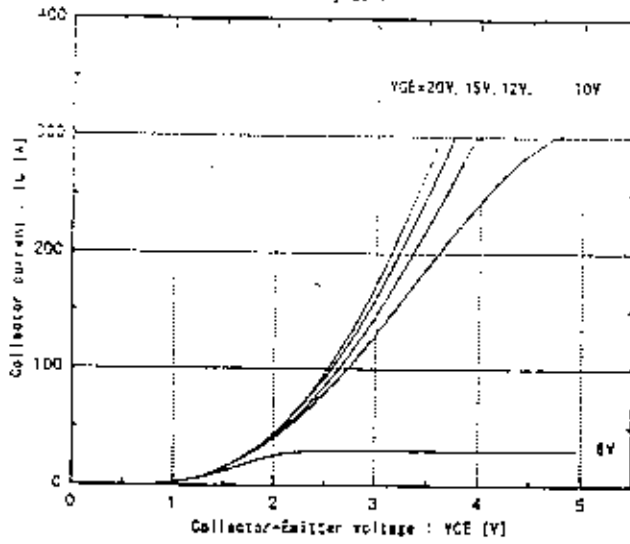
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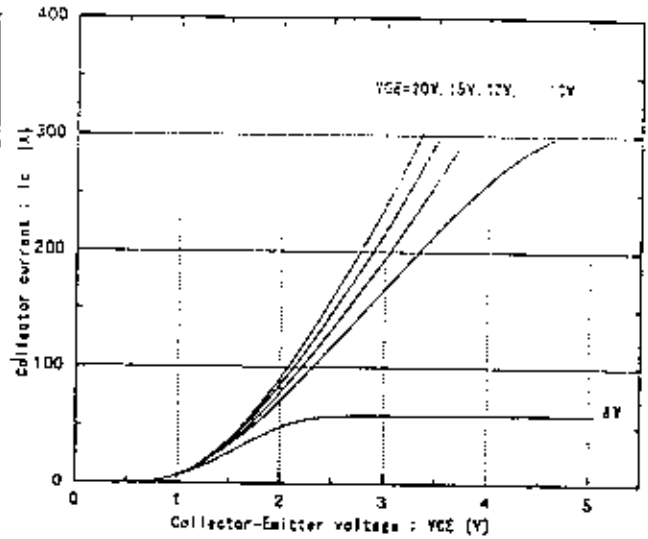
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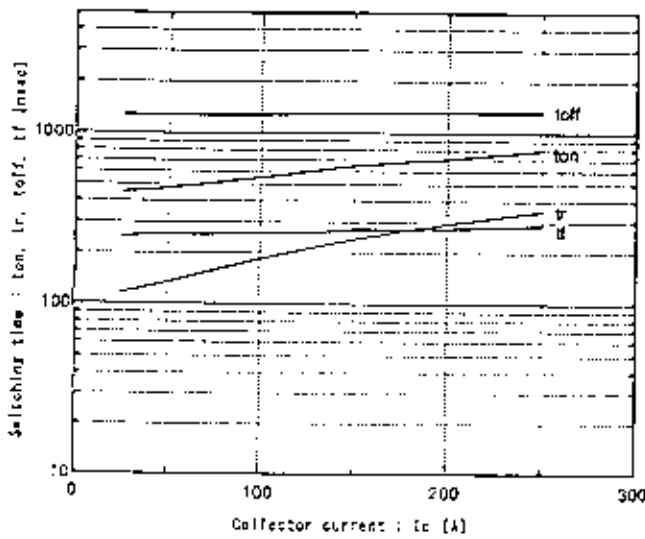
Collector current vs. Collector-Emitter voltage  
Tj=25°C



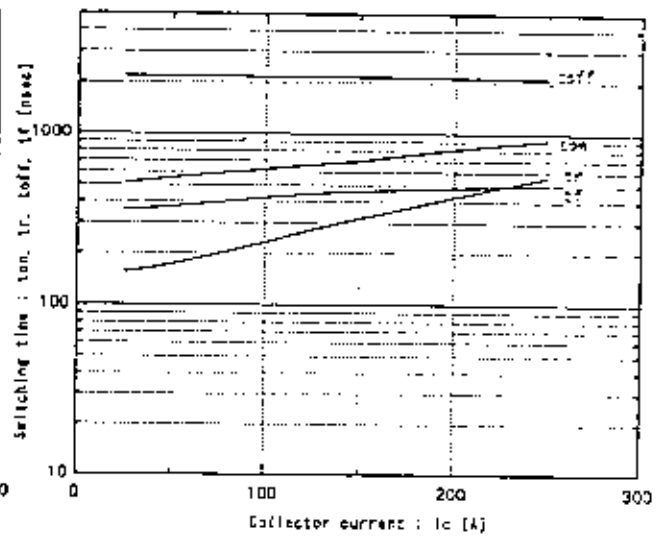
Collector current vs. Collector-Emitter voltage  
Tj=135°C



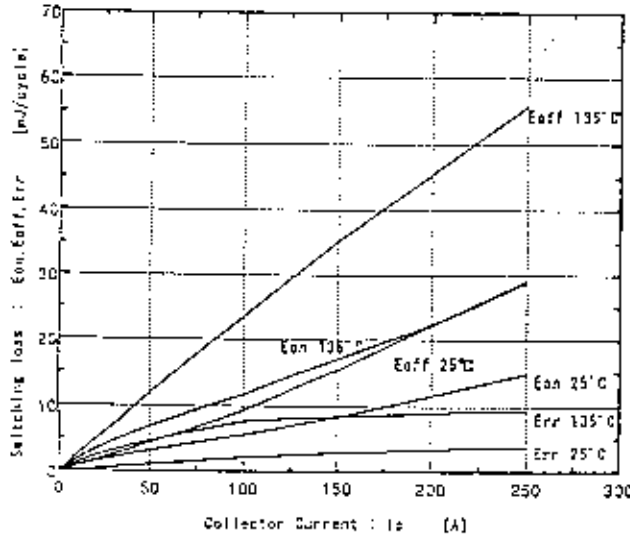
Switching time vs. Collector current  
Vcc=700V, Rθ=5.6Ω, VGE=15V/-5V, Tj=25°C



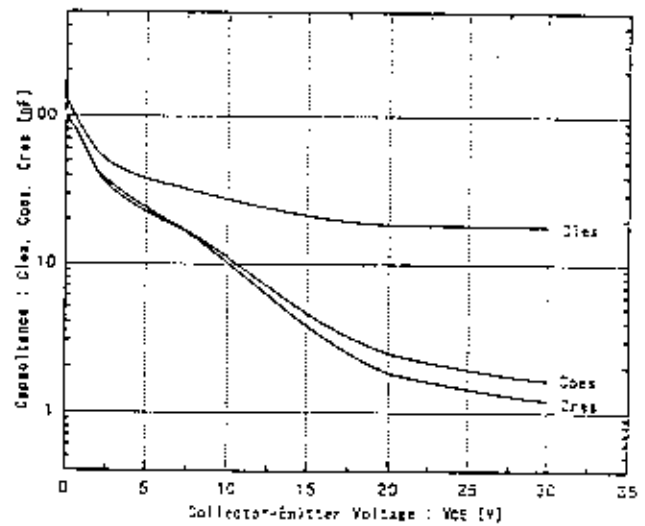
Switching time vs. Collector current  
Vcc=700V, Rθ=5.6Ω, VGE=15V/-5V, Tj=135°C



Switching loss vs. Collector current  
Vcc=700V, Rθ=5.6Ω, VGE=15V/-5V



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



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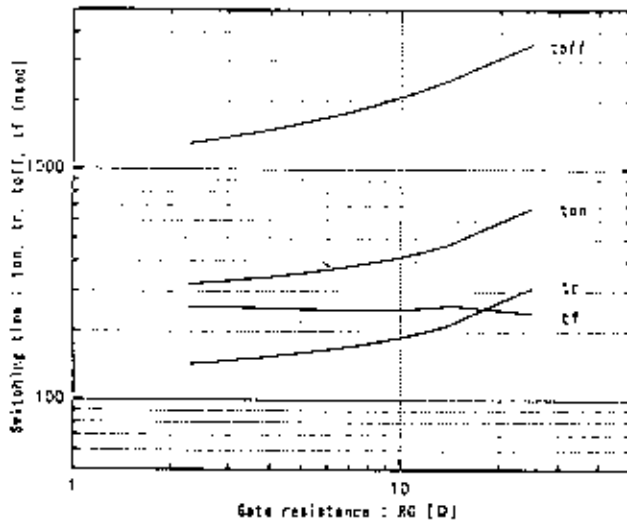
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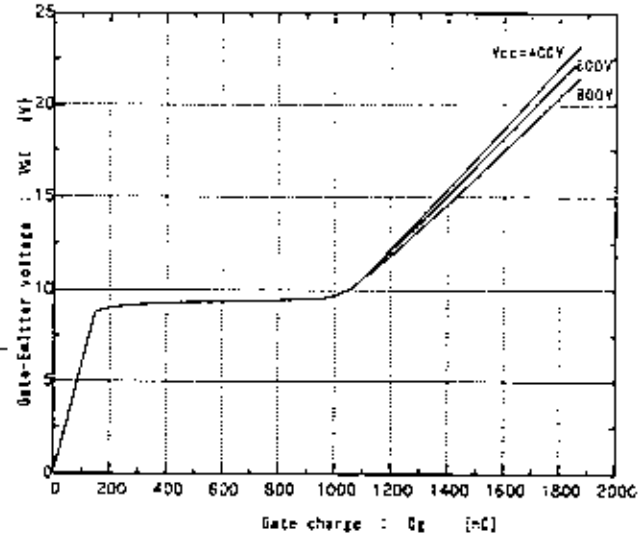
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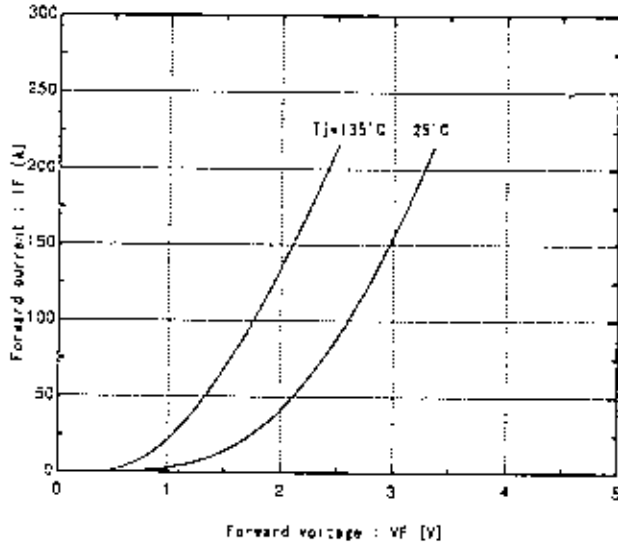
Switching time vs.  $R_G$   
 $V_{CC}=700V$ ,  $I_C=150A$ ,  $V_{GE}=+15V/-5V$ ,  $T_J=25^\circ C$



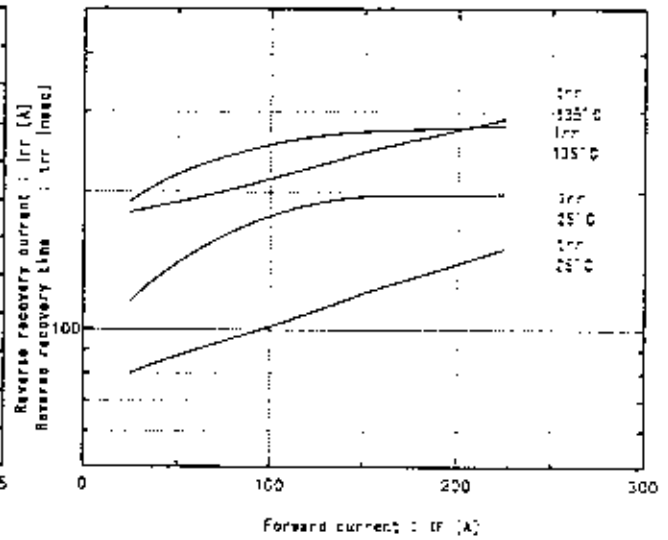
Dynamic input characteristics  
 $T_J=25^\circ C$



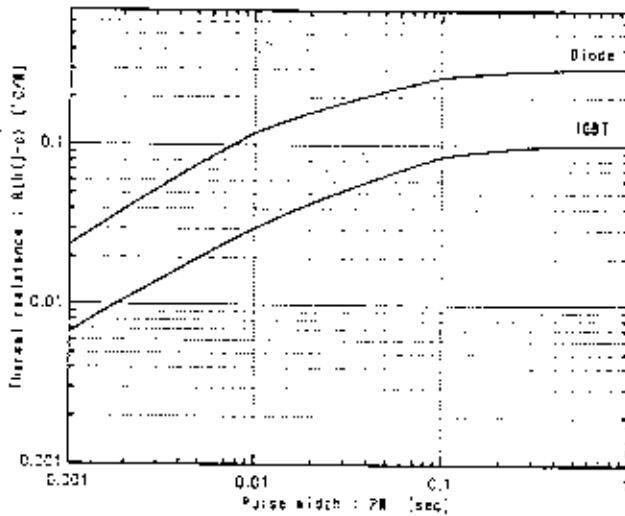
Forward current vs. Forward voltage  
 $V_{GE}=0V$



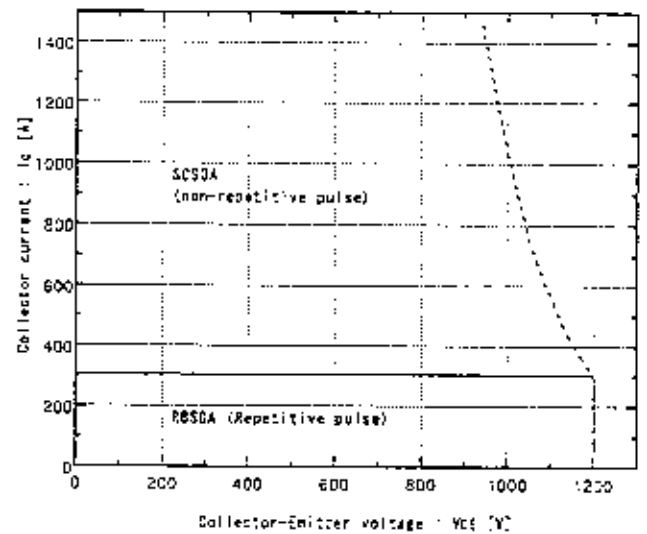
Reverse recovery characteristics  
 $I_{rr}$ ,  $t_{rr}$  vs.  $I_F$



Transient thermal resistance



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



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