

FEG) Thomas Sam.

SPECIFICATION

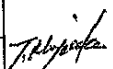
Device Name : IGBT MODULE

Type Name : 1MBI600S-120

Spec. No. : MS5F 5055

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Matsumoto Factory

		DATE	NAME	APPROVED	Fuji Electric Co., Ltd.		
DRAWN	Aug. -30-'01	J. Kobayashi			DWG. NO.	MS5F 5055	1/8
CHECKED	Aug. -30-'01	N. Kato					

H04-004-07

Revised Records

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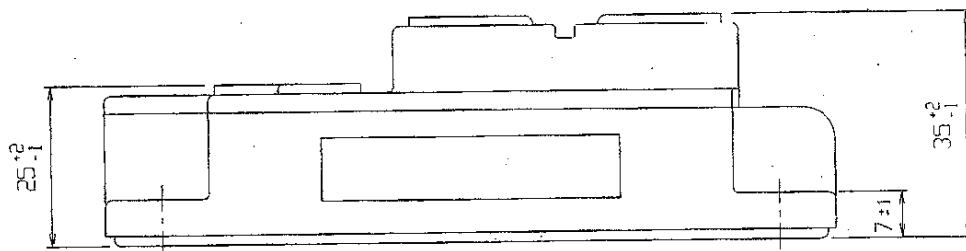
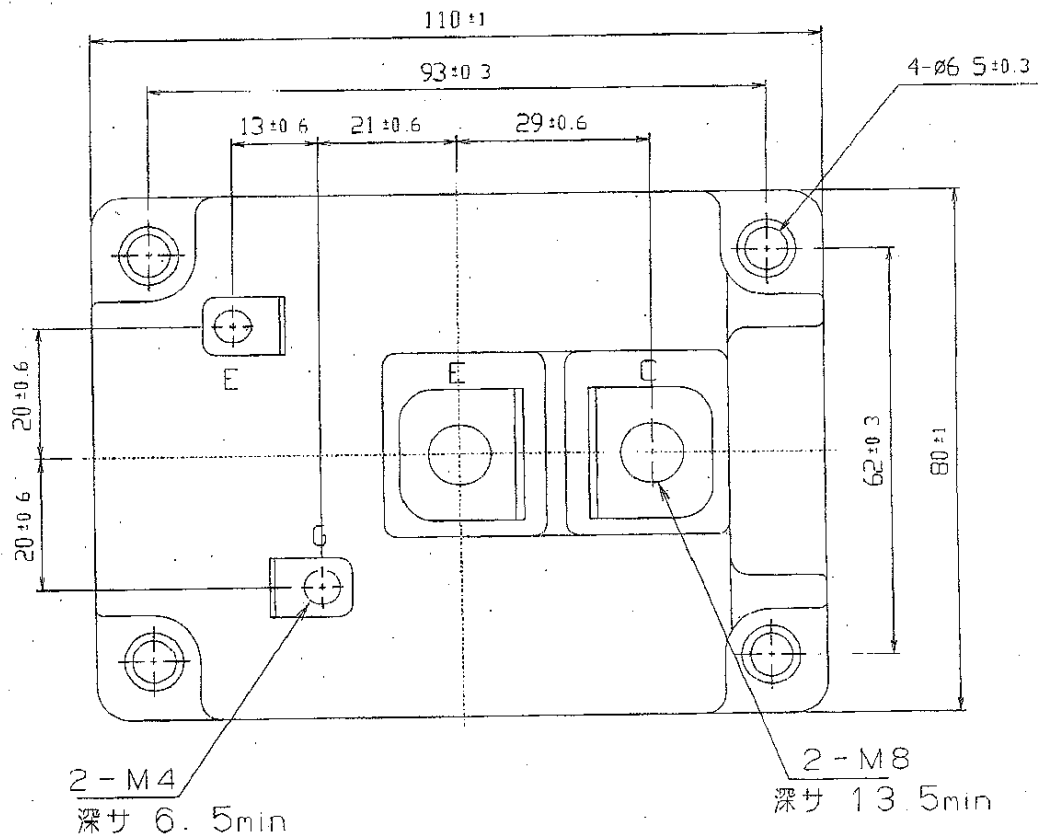
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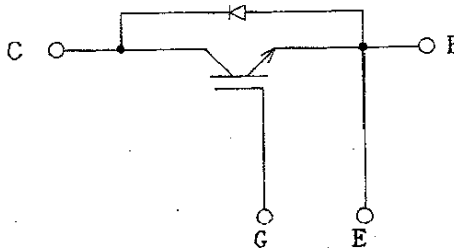
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1MBI600S-120

1. Outline Drawing (Unit : mm)



2. Equivalent circuit



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

Items	Symbols	Conditions		Maximum Ratings	Units
Collector-Emitter voltage	V_{CES}			1200	V
Gate-Emitter voltage	V_{GES}			± 20	V
Collector current	I_c	Continuous	$T_c=25^{\circ}\text{C}$	900	A
			$T_c=80^{\circ}\text{C}$	600	
	I_c pulse	1ms	$T_c=25^{\circ}\text{C}$	1800	
			$T_c=80^{\circ}\text{C}$	1200	
	$-I_c$			600	
	$-I_c$ pulse	1ms		1200	
Collector Power Dissipation	P_c	1 device		4150	W
Junction temperature	T_j			150	$^{\circ}\text{C}$
Storage temperature	T_{stg}			$-40-+125$	$^{\circ}\text{C}$
Isolation voltage ^(*)	V_{iso}	AC : 1min.		2500	V
Screw Torque	Mounting ^(*)			4.5	N·m
	Terminals ^(*)			11.0	
	Terminals ^(*)			1.7	

(*) All terminals should be connected together when isolation test will be done.

(*)2 Recommendable Value: Mounting $4.0 \pm 0.5\text{N}\cdot\text{m}$ (M6)

Terminal $10.0 \pm 1.0\text{N}\cdot\text{m}$ (M8), $1.5 \pm 0.2\text{N}\cdot\text{m}$ (M4)

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

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Zero gate voltage Collector current	I_{CES}	$V_{GE} = 0\text{V}$, $V_{CE} = 1200\text{V}$	-	-	2.0	mA
Gate-Emitter leakage current	I_{GES}	$V_{CE} = 0\text{V}$, $V_{GE} = \pm 20\text{V}$	-	-	1.6	μA
Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 20\text{V}$, $I_c = 600\text{mA}$	5.5	7.2	8.5	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15\text{V}$, $T_j = 25^\circ\text{C}$	-	2.8	2.6	V
		$I_c = 600\text{A}$, $T_j = 125^\circ\text{C}$	-	2.8	-	
Input capacitance	C_{ies}	$V_{GE} = 0\text{V}$	-	72000	-	pF
Output capacitance	C_{oes}	$V_{CE} = 10\text{V}$	-	15000	-	
Reverse transfer capacitance	C_{res}	$f = 1\text{MHz}$	-	13200	-	
Turn-on time	t_{on}	$V_{cc} = 600\text{V}$	-	0.8	1.2	μs
	t_r	$I_c = 600\text{A}$	-	0.25	0.6	
	$t_{r(0)}$	$V_{GE} = \pm 15\text{V}$	-	0.1	-	
Turn-off time	t_{off}	$R_G = 1.5\Omega$	-	0.7	1.0	
	t_f		-	0.1	0.3	
			-	0.1	0.3	
Forward on voltage	V_F	$I_F = 600\text{A}$, $T_j = 25^\circ\text{C}$	-	2.8	3.4	V
		$T_j = 125^\circ\text{C}$	-	2.4	-	
Reverse recovery time	t_{rr}	$I_F = 600\text{A}$	-	-	0.35	μs

5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Thermal resistance (1 device)	$R_{th(j-c)}$	IGBT	-	-	0.03	$^\circ\text{C/W}$
		FWD	-	-	0.06	
Contact Thermal resistance	$R_{th(c-f)}$	with Thermal Compound ^(*)	-	0.0063	-	

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

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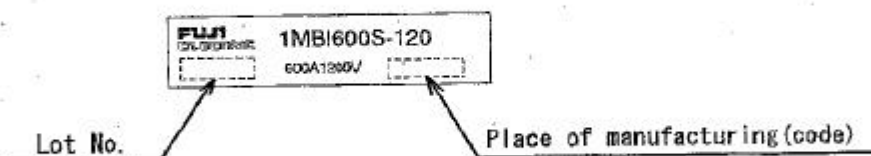
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6. Indication on module



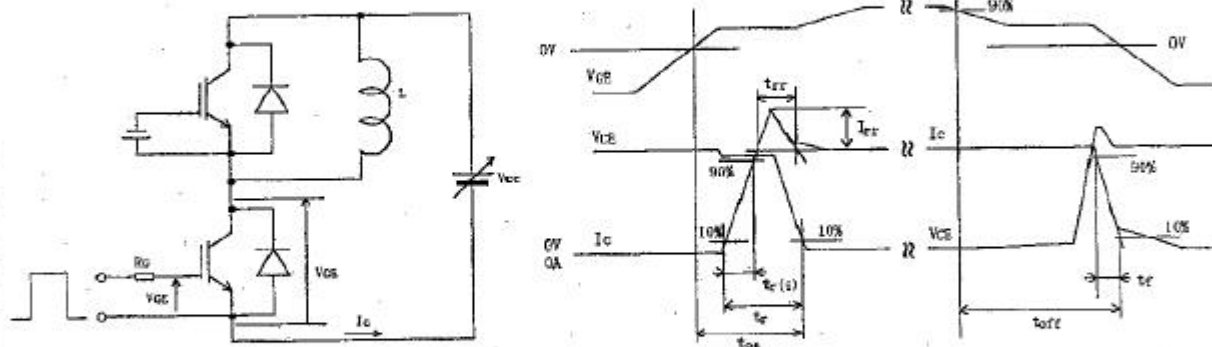
7. Applicable category

This specification is applied to IGBT Module named 1MBI600S-120.

8. Storage and transportation notes

- The module should be stored at a standard temperature of 5 to 35°C and humidity of 45 to 75%.
- Store modules in a place with few temperature changes in order to avoid condensation on the module surface.
- Avoid exposure to corrosive gases and dust.
- Avoid excessive external force on the module.
- Store modules with unprocessed terminals.
- Do not drop or otherwise shock the modules when transporting.
- Please connect adequate fuse or protector of circuit between three-phase line and this product to prevent the equipment from causing secondary destruction.

9. Definitions of switching time



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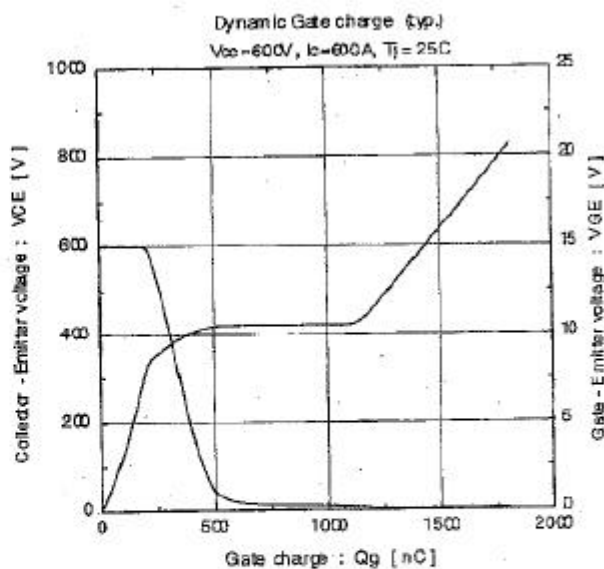
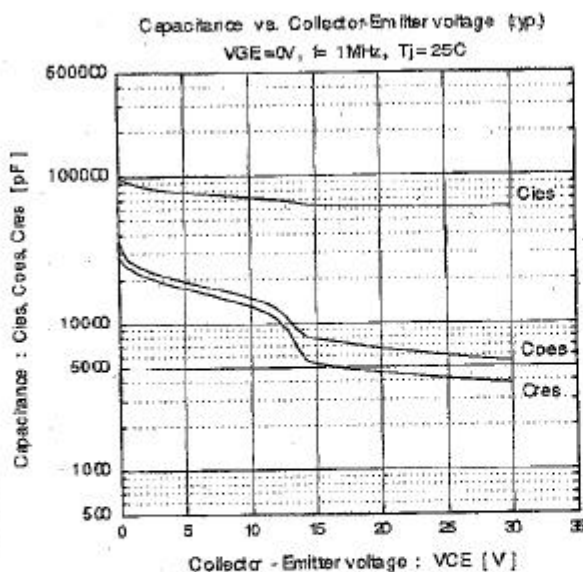
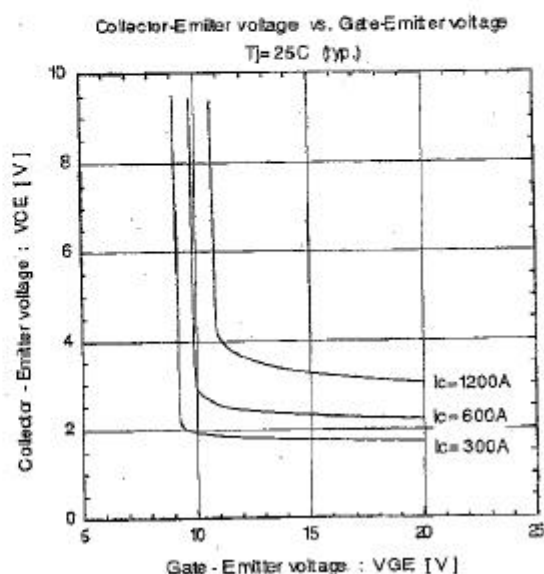
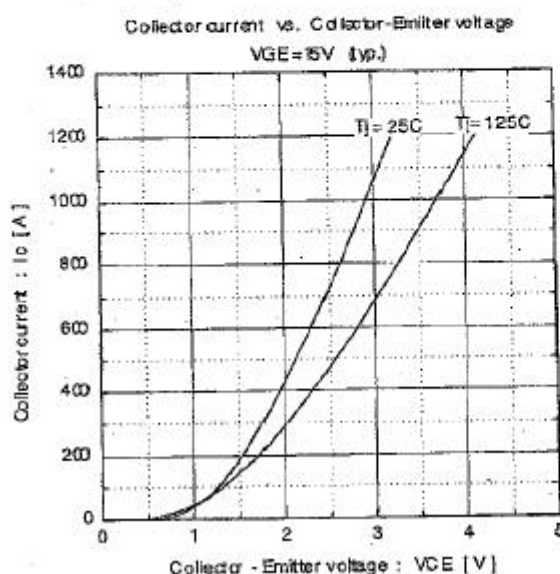
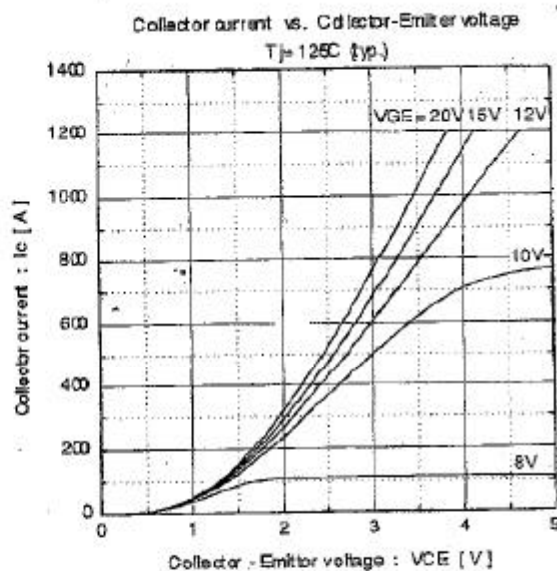
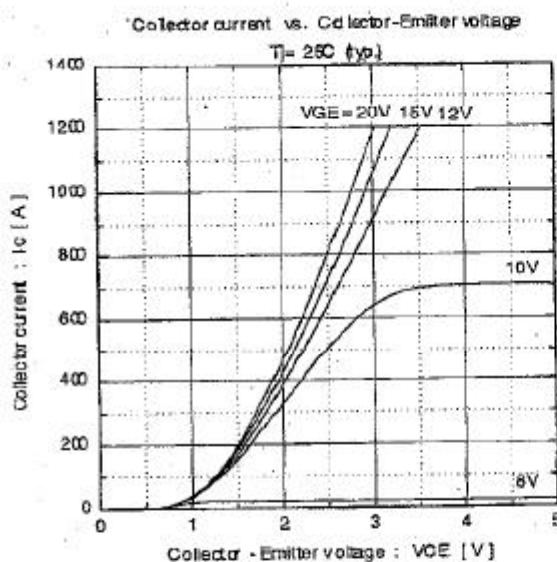
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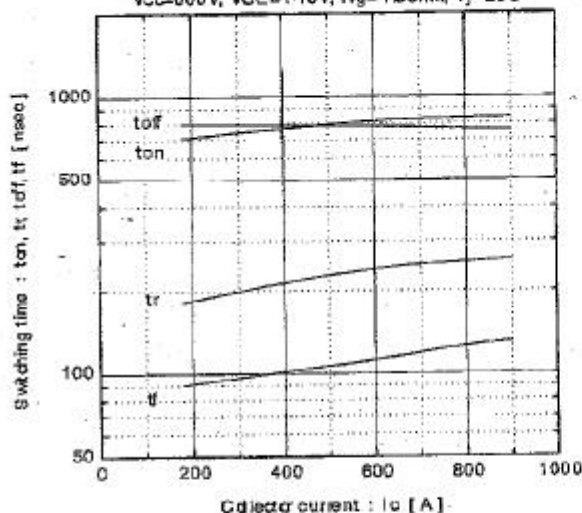
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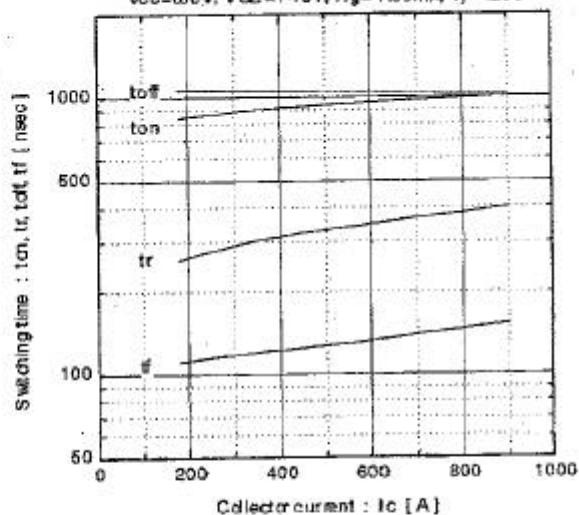
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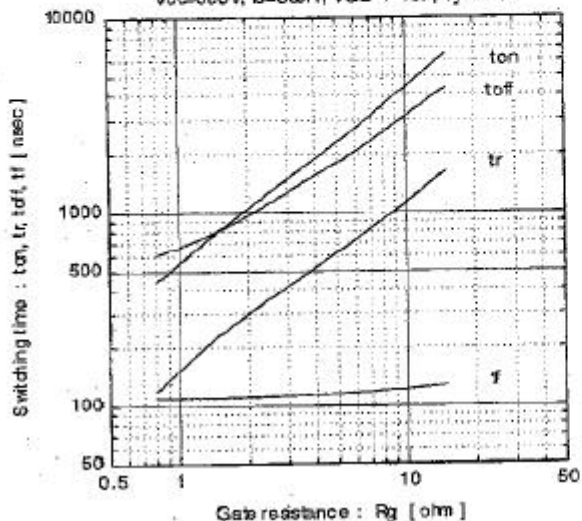
Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=+15V$, $R_g=1.5\Omega$, $T_j=25^\circ C$



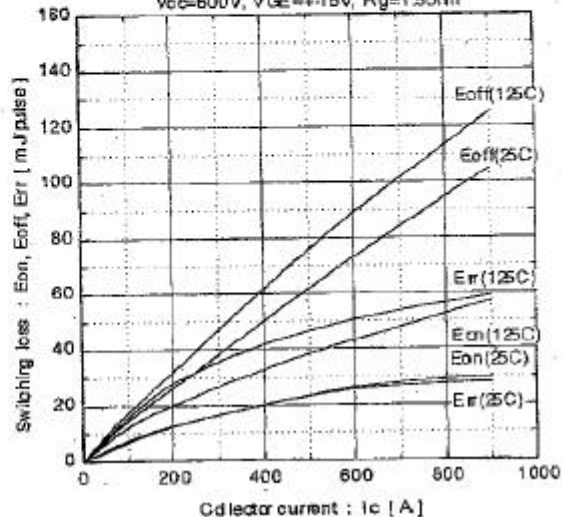
Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=+15V$, $R_g=1.5\Omega$, $T_j=125^\circ C$



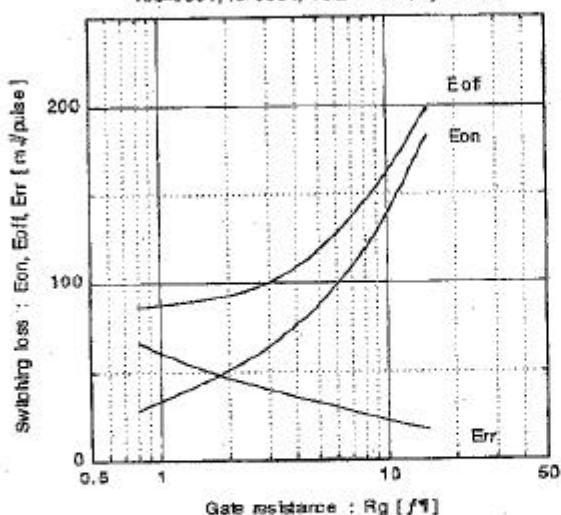
Switching time vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_c=600A$, $V_{GE}=+15V$, $T_j=25^\circ C$



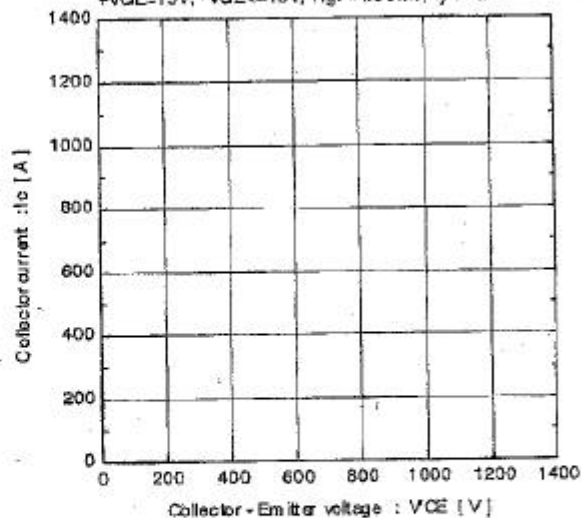
Switching loss vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=+15V$, $R_g=1.5\Omega$



Switching loss vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_c=600A$, $V_{GE}=+15V$, $T_j=125^\circ C$



Reverse bias safe operating area
 $+V_{GE}=15V$, $-V_{GE}\leq 15V$, $R_g\geq 1.5\Omega$, $T_j\leq 125^\circ C$



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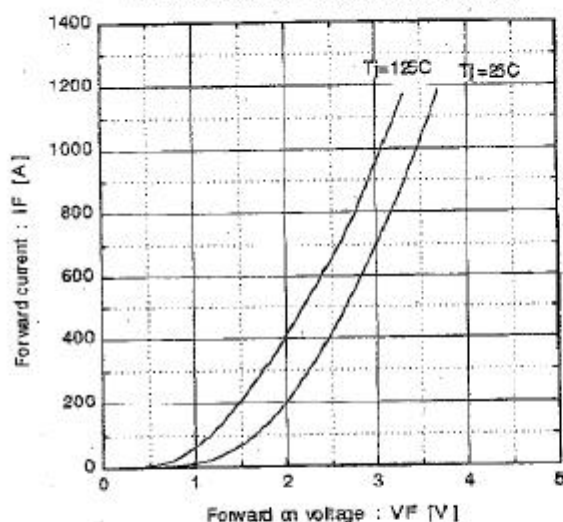
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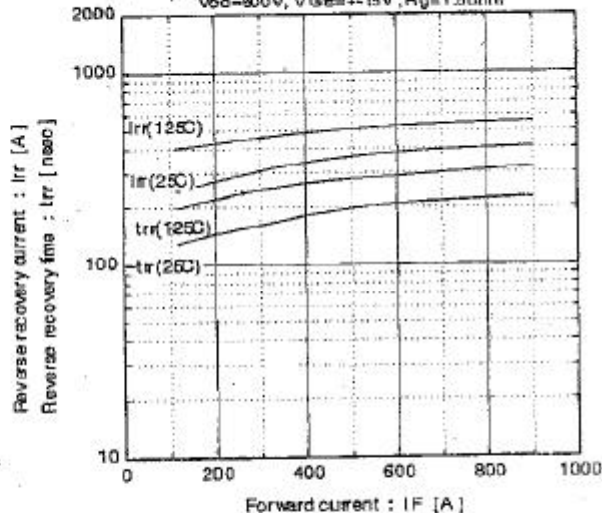
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Forward current vs. Forward on voltage (typ)

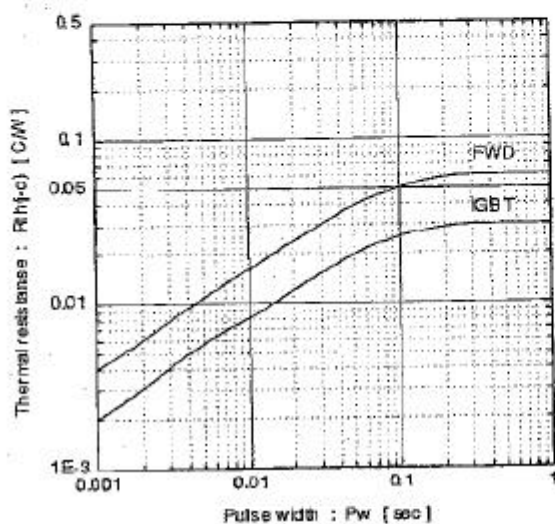


Reverse recovery characteristics (typ)

Vod=800V, VGE=-15V, Rg=1.5ohm



Transient thermal resistance



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