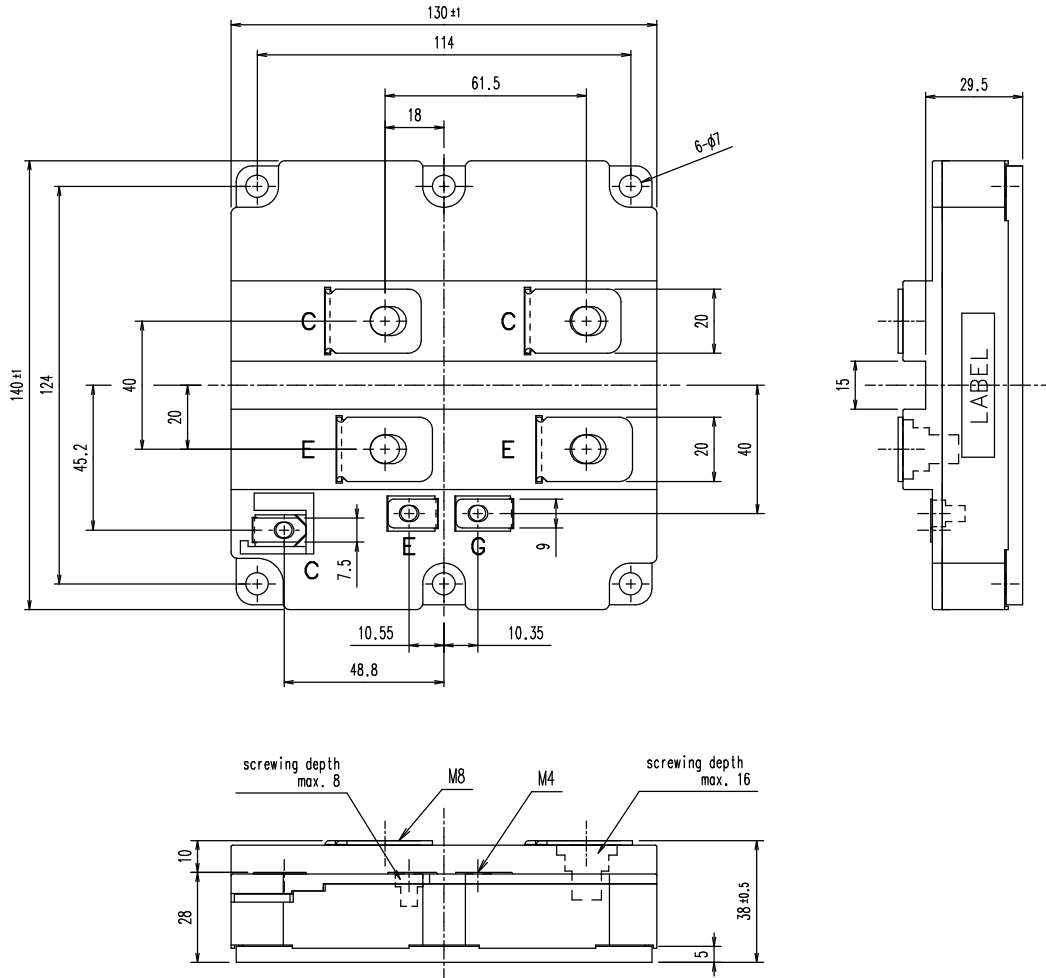


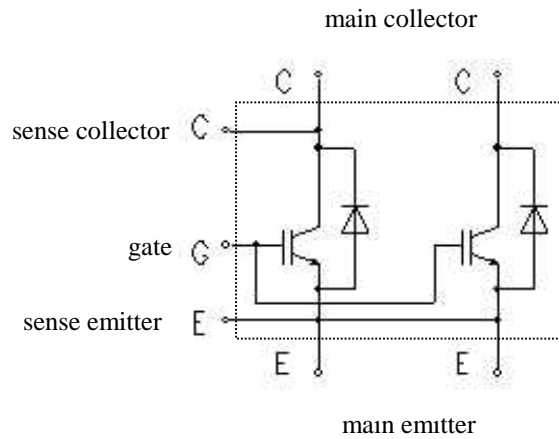
1MBI800UG-330

1. Outline drawing (Unit : mm)



This material and the information herein is the property of Fuji Electric Co.,Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co.,Ltd.

2. Equivalent circuit



REVISIONS

Fuji Electric Systems Co., Ltd.

DWG.No.

MT5F22460

2 / 9

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

Items		Symbols	Conditions	Maximum Ratings	Units
Collector-Emitter voltage		VCES		3300	V
Gate-Emitter voltage		VGES		±20	V
Collector current	Ic	Continuous	Tc=25°C	1330	A
			Tc=80°C	800	
	Icp	1ms	Tc=25°C	2660	
			Tc=80°C	1600	
	-Ic			800	
-Ic pulse	1ms		1600		
Collector Power Dissipation		Pc	1 device	9600	W
Junction temperature		Tj		150	°C
Storage temperature		Tstg		-40 ~ +125	
Isolation voltage	between terminal and base (*1)	Viso	AC : 1min.	6.0	kVAC
Screw Torque (*2)	Mounting	-		5.75	N m
	Main Terminals			10	
	Sense Terminals			2.5	

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

(*2) Recommendable Value : Mounting 4.25 ~ 5.75 Nm (M6)

Main Terminals 8 ~ 10 Nm (M8)

Sense Terminals 1.70 ~ 2.15 Nm (M4)

4. Electrical characteristics (at Tj= 25°C unless otherwise specified)

Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	max.		
Zero gate voltage Collector current	ICES	VGE = 0V VCE=3300V	-	-	1.0	mA	
Gate-Emitter leakage current	IGES	VCE = 0V VGE=±20V	-	-	3200	nA	
Gate-Emitter threshold voltage	VGE(th)	VCE = 20V Ic=800mA	5.5	6.5	7.5	V	
Collector-Emitter saturation voltage	VCE(sat) (terminal)	VGE=15V Ic=800A	Tj= 25°C	-	2.70	3.00	V
			Tj=125°C	-	3.15	-	
	VCE(sat) (chip)	Tj= 25°C	-	2.60	2.90		
		Tj=125°C	-	3.05	-		
Input capacitance	Cies	VCE=10V, VGE=0V, f=1MHz	-	160	-	nF	
Turn-on time	ton	Vcc=1800V, Ic=800A	-	2.65	-	µs	
	tr	VGE=±15V	-	1.50	-		
Turn-off time	toff	Rg=2.4 Ω, Ls=225nH	-	2.30	-		
	tf	Tj=125°C	-	0.40	-		
Forward on voltage	VF (terminal)	VGE=0V IF=800A	Tj= 25°C	-	2.60	2.90	V
			Tj=125°C	-	2.95	3.25	
	VF (chip)	Tj= 25°C	-	2.50	2.80		
		Tj=125°C	-	2.85	3.15		
Reverse recovery time	trr	IF=800A, Tj=125°C	-	0.85	-	µs	
Lead resistance, terminal-chip	R lead		-	0.15	-	mΩ	

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

REVISIONS

Fuji Electric Systems Co., Ltd.

DWG. No.

MT5F22460

3 / 9

5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	Rth(j-c)	IGBT	-	10.7	13.0	°C/kW
		FWD	-	21.9	25.0	
Contact Thermal resistance (1device) (*3)	Rth(c-f)	IGBT	-	9.0	-	
		FWD	-	18.0	-	

(*3) This is the value which is defined mounting on the additional cooling fin with thermal compound (1W/m).

6. Indication on module

Display on the module label

- Logo of production
- Type name: 1MBI800UG-330
- I_C, V_{CES} rating : 800A 3300V
- Lot No (5 digits)
- Place of manufacturing (code)
- Bar code with serial No.

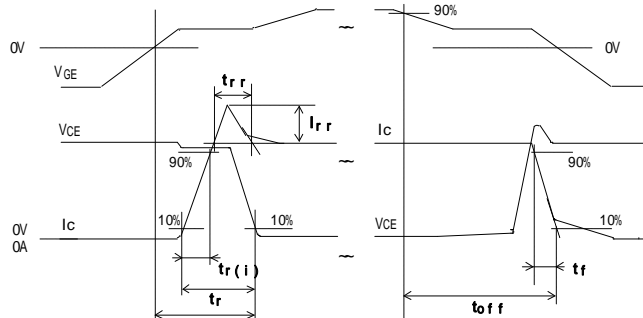
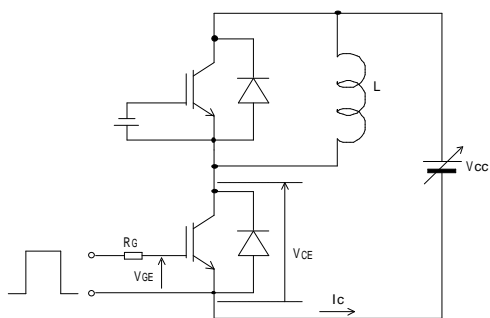
7.Applicable category

This specification is applied to Power Integrated Module named 1MBI800UG-330 .

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.

9. Definitions of switching time



10. Packing and labeling

Display on the packing box

- Logo of production
- Type name
- Lot No
- Products quantity in a packing box

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, lent, or disclosed in any way whatsoever for the use of a third party nor used for the manufacturing purposes with the express written consent of Fuji Electric Co., Ltd.

REVISIONS			

Fuji Electric Systems Co., Ltd.

DWG. No.

MT5F22460

4 / 9

11. Reliability test results

Reliability Test Items

Test categories	Test items	Test methods and conditions	Reference norms EIAJ ED-4701 (Aug.-2001 edition)	Number of sample	Acceptance number
Mechanical	1 Terminal Strength (Pull test)	Pull force : 40N Test time : 10±1 sec.	Test Method 401 Method	5	(0:1)
	2 Mounting Strength	Screw torque : 1.8 ~ 2.1 N·m (M4) 4.25 ~ 5.75 N·m (M6) 8.0~ 10.0 N·m (M8) Test time : 10±1 sec.	Test Method 402 method	5	(0:1)
	3 Vibration	Range of frequency : 10 ~ 500Hz Sweeping time : 15 min. Acceleration : 100m/s ² Sweeping direction : Each X,Y,Z axis Test time : 6 hr. (2hr./direction)	Test Method 403 Reference 1 Condition code B	5	(0:1)
	4 Shock	Maximum accelerat : 1000m/s ² Pulse width : 6.0msec. Direction : Each X,Y,Z axis Test time : 3 times/direction	Test Method 404 Condition code A	5	(0:1)
Environment Tests	1 High Temperature Storage	Storage temp. : 125±5 Test duration : 1000hr.	Test Method 201	5	(0:1)
	2 Low Temperature Storage	Storage temp. : -40±5 Test duration : 1000hr.	Test Method 202	5	(0:1)
	3 Temperature Humidity Storage	Storage temp. : 85±2 Relative humidity : 85±5% Test duration : 1000hr.	Test Method 103 Test code C	5	(0:1)
	4 Unsaturated Pressurized Vapor	Test temp. : 120 ± 2 Test humidity : 85±5% Test duration : 96hr.	Test Method 103 Test code E	5	(0:1)
	5 Temperature Cycle	Test temp. : ┌ Low temp. -40 ± 5 ├ High temp. 125 ± 5 └ RT 5 ~ 35 Dwell time : High ~ RT ~ Low ~ RT 1hr. 0.5hr. 1hr. 0.5hr. Number of cycles : 100 cycles	Test Method 105	5	(0:1)
	6 Thermal Shock	Test temp. : ┌ High temp. 100 ⁺⁰ ₋₅ └ Low temp. 0 ⁺⁵ ₋₀ Used liquid : Water with ice and boiling water Dipping time : 5 min. par each temp. Transfer time : 10 sec. Number of cycles : 10 cycles	Test Method 307 method Condition code A	5	(0:1)

This material and the information herein is the property of Fuji Electric Co.,Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co.,Ltd.

REVISIONS			

Fuji Electric Systems Co., Ltd.

DWG.No.

MT5F22460

5 / 9

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

Reliability Test Items

Test categories	Test items	Test methods and conditions	Reference norms EIAJ ED-4701 (Aug.-2001 edition)	Number of sample	Acceptance number
Endurance Tests	1 High temperature Reverse Bias	Test temp. : Ta = 125°C ± 5°C (Tj 150°C) Bias Voltage : VC = 0.8xVCES Bias Method : Applied DC voltage to C-E VGE = 0V Test duration : 1000hr.	Test Method 101	5	(0 : 1)
	2 High temperature Bias (for gate)	Test temp. : Ta = 125°C ± 5°C (Tj 150°C) Bias Voltage : VC = VGE = +20V or -20V Bias Method : Applied DC voltage to G-E VCE = 0V Test duration : 1000hr.	Test Method 101	5	(0 : 1)
	3 Temperature Humidity Bias	Test temp. : 85±2 °C Relative humidity : 85±5% Bias Voltage : VC = 0.8xVCES Bias Method : Applied DC voltage to C-E VGE = 0V Test duration : 1000hr.	Test Method 102 Condition code C	5	(0 : 1)
	4 Intermitted Operating Life (Power cycle) (for IGBT)	ON time : 2 sec. OFF time : 18 sec. Test temp. : ΔTj=100±5°C Tj 150°C, Ta=25±5°C Number of cycles : 15000 cycles	Test Method 106	5	(0 : 1)

Failure Criteria

Item	Characteristic	Symbol	Failure criteria		Unit	Note	
			Lower limit	Upper limit			
Electrical characteristic	Leakage current	ICES	-	USLx2	mA		
		±IGES	-	USLx2	μA		
	Gate threshold voltage	VGE(th)	LSLx0.8	USLx1.2	mA		
	Saturation voltage	VCE(sat)	-	USLx1.2	V		
	Forward voltage	VF	-	USLx1.2	V		
	Thermal resistance	IGBT	Δ VGE or Δ VCE	-	USLx1.2	mV	
			FWD	Δ VF	-	USLx1.2	mV
	Isolation voltage	Viso	Broken insulation		-		
Visual inspection	Visual inspection Peeling Plating and the others	-	The visual sample		-		

LSL : Lower specified limit.
USL : Upper specified limit.

Note : Each parameter measurement read-outs shall be made after stabilizing the components at room ambient for 2 hours minimum, 24 hours maximum after removal from the tests. And in case of the wetting tests, for example, moisture resistance tests, each component shall be made wipe or dry completely before the measurement.

REVISIONS

Fuji Electric Systems Co., Ltd.

DWG.No.

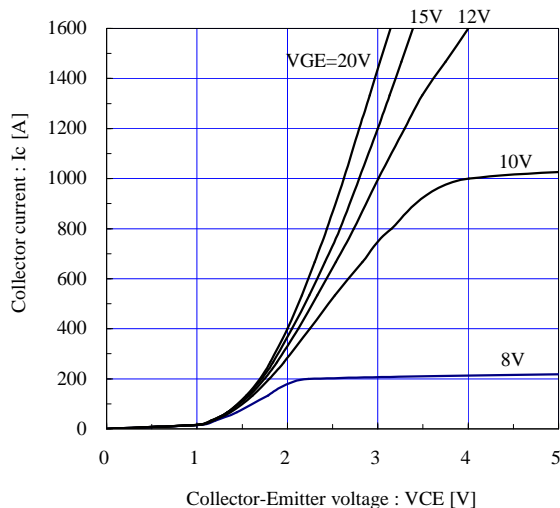
MT5F22460

6 / 9

This material and the information herein is the property of Fuji Electric Co.,Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

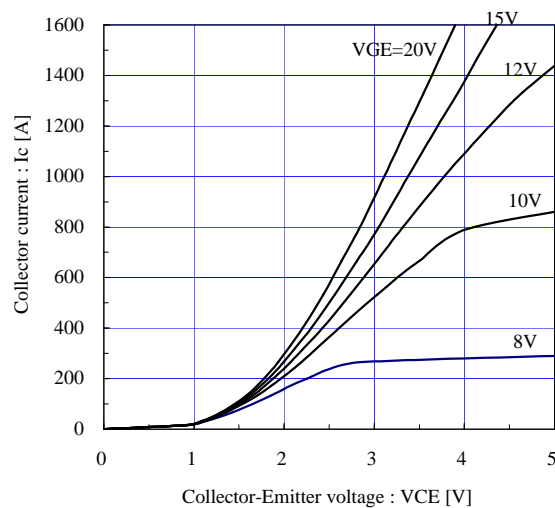
Collector current vs. Collector-Emittor voltage (typ.)

$T_j = 25^\circ\text{C} / \text{chip}$



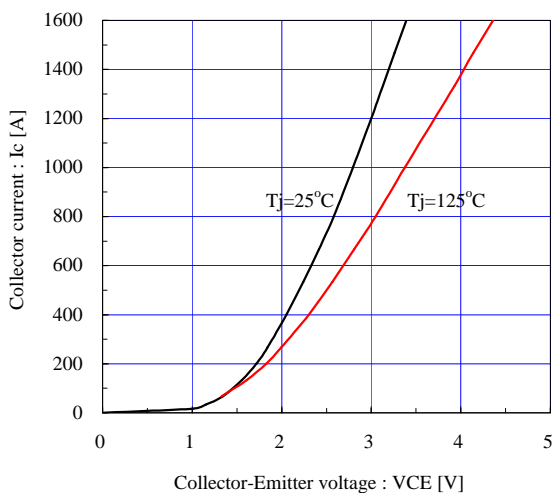
Collector current vs. Collector-Emittor voltage (typ.)

$T_j = 125^\circ\text{C} / \text{chip}$



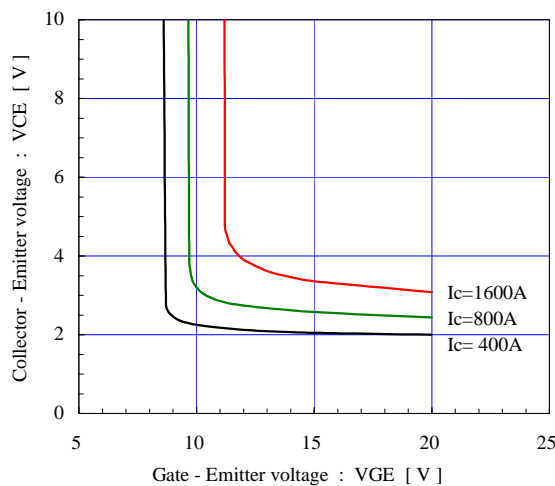
Collector current vs. Collector-Emittor voltage (typ.)

$V_{GE} = 15\text{V} / \text{chip}$



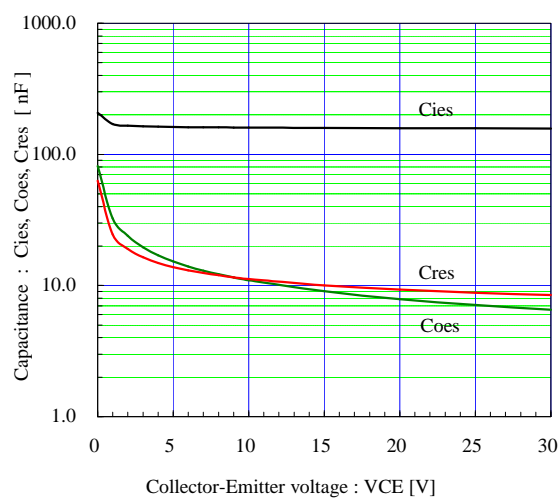
Collector-Emittor voltage vs. Gate-Emittor voltage (typ.)

$T_j = 25^\circ\text{C} / \text{chip}$



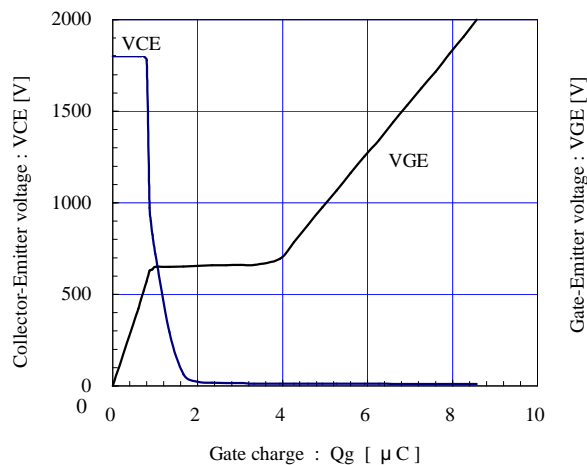
Capacitance vs. Collector-Emittor voltage (typ.)

$V_{GE} = 0\text{V}, f = 1\text{MHz}, T_j = 25^\circ\text{C}$



Dynamic Gate charge (typ.)

$V_{CC} = 1800\text{V}, I_C = 800\text{A}, T_j = 25^\circ\text{C}$



Fuji Electric Systems Co., Ltd.

DWG.No.

MT5F22460

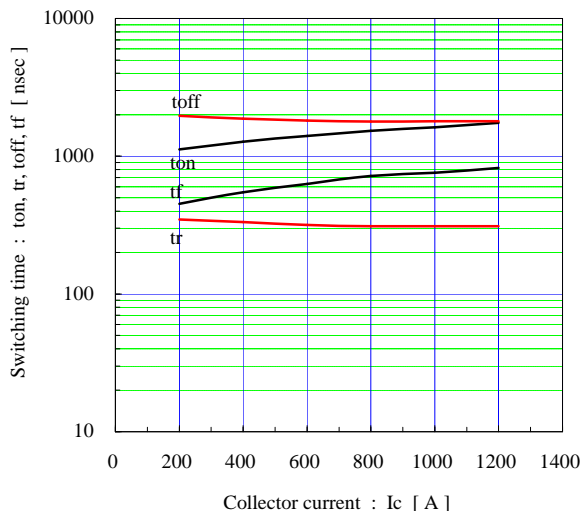
7 / 9

REVISIONS

This material and the information herein is the property of Fuji Electric Co.,Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co.,Ltd.

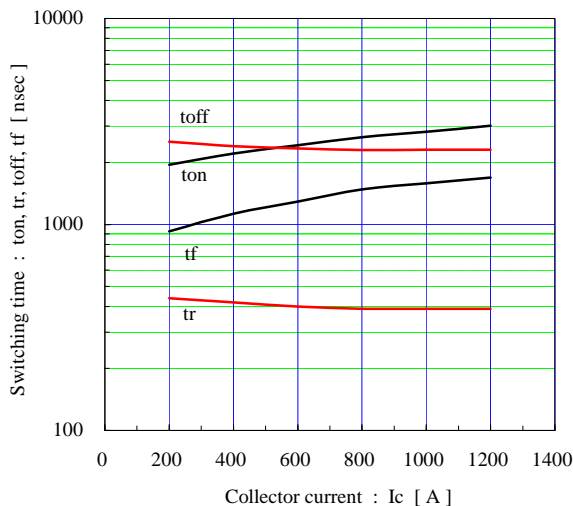
Switching time vs. Collector current (typ.)

$V_{cc}=1800V, V_{GE}=\pm 15V, T_j=25^\circ C$



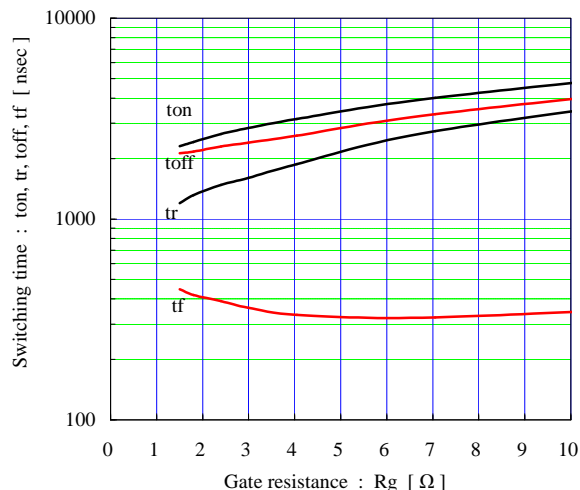
Switching time vs. Collector current (typ.)

$V_{cc}=1800V, V_{GE}=\pm 15V, T_j=125^\circ C$



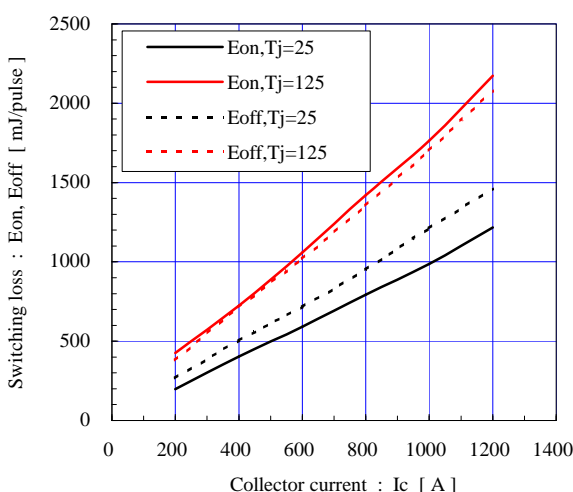
Switching time vs. Gate resistance (typ.)

$V_{cc}=1800V, I_c=800A, V_{GE}=\pm 15V, T_j=125^\circ C$



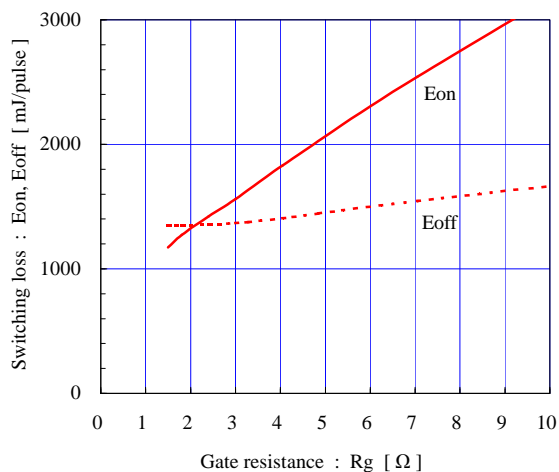
Switching loss vs. Collector current (typ.)

$V_{cc}=1800V, V_{GE}=\pm 15V$



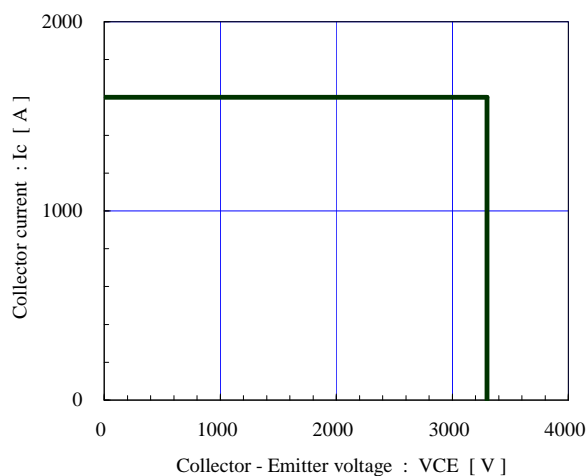
Switching loss vs. Gate resistance (typ.)

$V_{cc}=1800V, I_c=800A, V_{GE}=\pm 15V$



Reverse bias safe operating area (max.)

$\pm V_{GE}=15V, T_j=125^\circ C / \text{chip}$



REVISIONS

Fuji Electric Systems Co., Ltd.

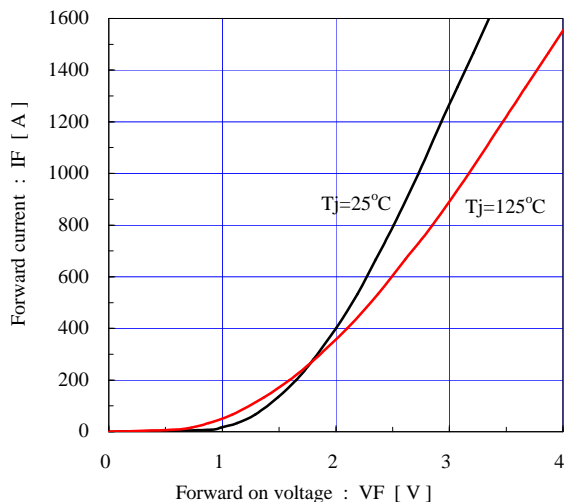
DWG.No.

MT5F22460

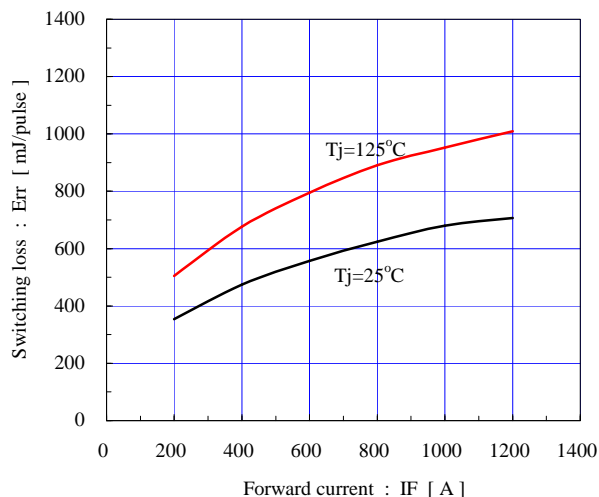
8 / 9

This material and the information herein is the property of Fuji Electric Co.,Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co.,Ltd.

Forward current vs. Forward on voltage (typ.)
chip

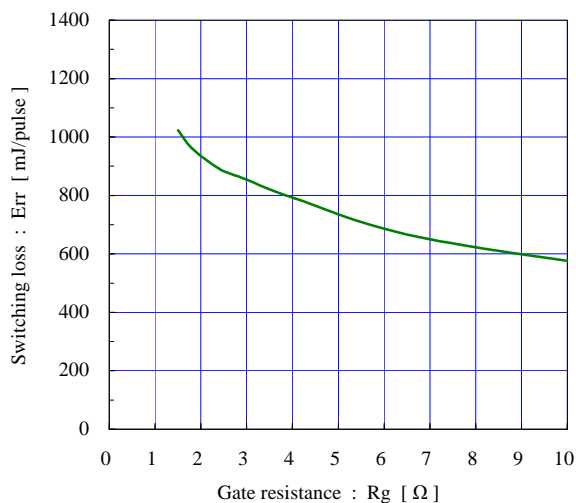


Switching loss vs. Collector current (typ.)
 $V_{cc}=1800V, V_{GE}=\pm 15V$



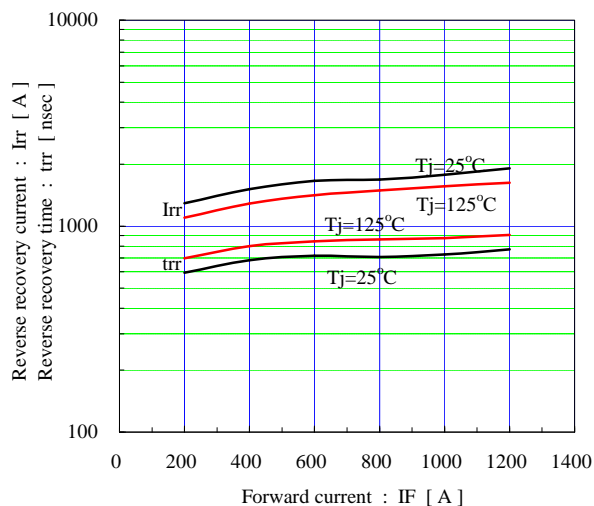
Switching loss vs. Gate resistance (typ.)

$V_{cc}=1800V, I_F=800A, V_{GE}=\pm 15V, T_j=125^\circ C$

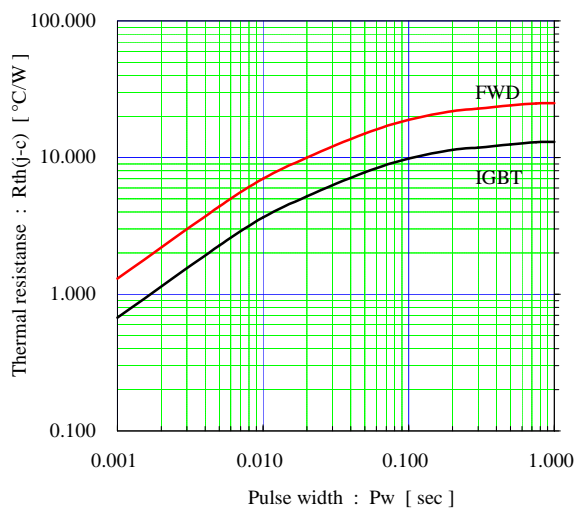


Reverse recovery characteristics (typ.)

$V_{cc}=1800V, V_{GE}=\pm 15V$



Transient thermal resistance (max.)



REVISIONS			
