

12MBI100VX-120-50

IGBT Modules

IGBT MODULE (V series)

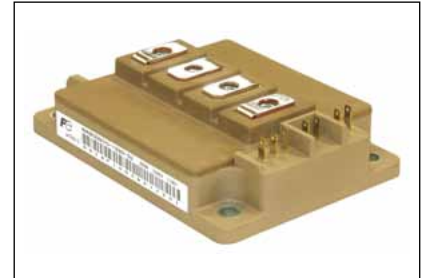
1200V / 100A / IGBT, RB-IGBT 4 in one package

■ Features

- Higher Efficiency
- Optimized A (T-type) -3 level circuit
- Low inductance module structure
- Featuring Reverse Blocking IGBT (RB-IGBT)

■ Applications

- Inverter for Motor Drive
- Uninterruptible Power Supply
- Power conditioner



■ Maximum Ratings and Characteristics

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

Items		Symbols	Conditions		Maximum ratings	Units	
T1, T2	Collector-Emitter voltage	V _{GES}			1200	V	
	Gate-Emitter voltage	V _{GES}			±20	V	
	Collector current	IGBT	I _c	Continuous	T _c =80°C	100	A
			I _{cp}	1ms	T _c =80°C	200	
		FWD	-I _c			100	
			-I _{c pulse}	1ms		200	
Collector power dissipation	P _c	1 device		430	W		
T3, T4	Collector-Emitter voltage	V _{GES}			600	V	
	Repetitive peak reverse voltage	V _{RRM}			600	V	
	Gate-Emitter voltage	V _{GES}			±20	V	
	Collector current	I _c	Continuous	T _c =80°C	100	A	
		I _{cp}	1ms	T _c =80°C	200		
Collector power dissipation	P _c	1 device		400	W		
Junction temperature		T _j			150	°C	
Case temperature		T _c			125		
Storage temperature		T _{stg}			-40 ~ +125		
Isolation voltage	between terminal and copper base (*1) between thermistor and others (*2)	V _{iso}	AC : 1min.		2500	VAC	
	Mounting (*3)	-	M5		3.5	N m	

Note *1: All terminals should be connected together during the test.

Note *2: Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.

Note *3: Recommendable value : 2.5-3.5 Nm (M5)

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

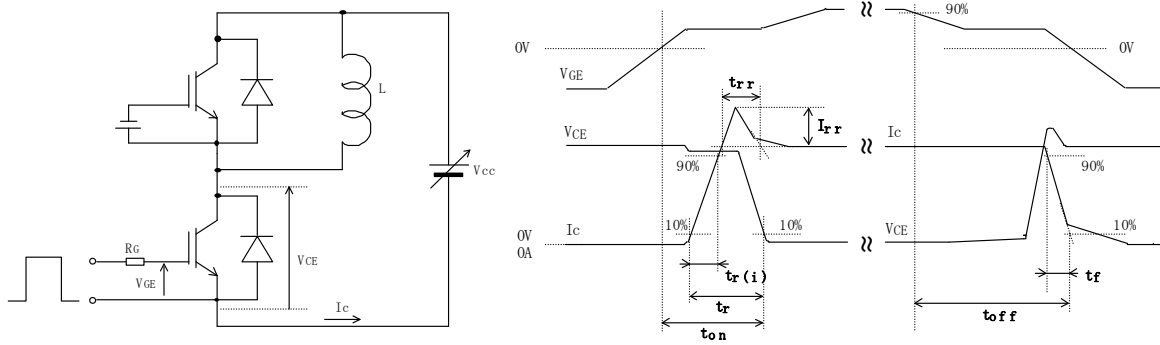
Items	Symbols	Conditions	Characteristics			Units		
			min.	typ.	max.			
T1, T2	Zero gate voltage collector current	I_{CES}	$V_{GE} = 0V, V_{CE} = 1200V$	-	-	1.0	mA	
	Gate-Emitter leakage current	I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$	-	-	200	nA	
	Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 20V, I_C = 100mA$	6.0	6.5	7.0	V	
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (chip)	$V_{GE} = 15V$ $I_C = 100A$	$T_j = 25^\circ C$	-	1.75	2.20	V
				$T_j = 125^\circ C$	-	2.05	-	
		$V_{CE(sat)}$ (P-U, V, W / U, V, W-N terminal)	$V_{GE} = 15V$ $I_C = 100A$	$T_j = 25^\circ C$	-	2.60	3.05	
				$T_j = 125^\circ C$	-	2.90	-	
	Internal gate resistance	$R_{g(int)}$	-	-	7.5	-	Ω	
	Input capacitance	C_{ies}	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	-	9.1	-	nF	
	Turn-on time	t_{on}	SW mode : A $V_{CC} = 300V$ $I_C = 100A$	-	0.44	1.20	μs	
		t_r		-	0.11	0.60		
		$t_{r(f)}$		-	0.05	-		
	Turn-off time	t_{off}	$V_{GE} = \pm 15V$	-	0.44	1.00	μs	
		t_f	$R_G = 1.6\Omega$	-	0.06	0.30		
Forward on voltage	V_F (chip)	$I_F = 100A$	$T_j = 25^\circ C$	-	1.70	2.15	V	
			$T_j = 125^\circ C$	-	1.85	-		
	V_F (P-U, V, W / U, V, W-N terminal)	$I_F = 100A$	$T_j = 25^\circ C$	-	2.55	3.00		
			$T_j = 125^\circ C$	-	2.70	-		
Reverse recovery time	t_{rr}	SW mode : A $V_{CC} = 600V$ $I_F = 100A$ $V_{GE} = \pm 15V$ $R_G = 1.6\Omega$	-	-	0.35	μs		
		SW mode : B $V_{CC} = 300V$ $I_F = 100A$ $V_{GE} = \pm 15V$ $R_G = 3.3\Omega$ (T3, T4)	-	-	0.35			
T3, T4	Zero gate voltage collector current	I_{CES}	$V_{GE} = 0V, V_{CE} = 600V$	-	-	1.0	mA	
	Gate-Emitter leakage current	I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$	-	-	200	nA	
	Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 20V, I_C = 100mA$	5.5	6.5	7.5	V	
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (chip)	$V_{GE} = 15V$ $I_C = 100A$	$T_j = 25^\circ C$	-	2.45	2.80	V
				$T_j = 125^\circ C$	-	2.60	-	
		$V_{CE(sat)}$ (M-U, V, W terminal)	$V_{GE} = 15V$ $I_C = 100A$	$T_j = 25^\circ C$	-	3.30	3.65	
				$T_j = 125^\circ C$	-	3.45	-	
	Internal gate resistance	$R_{g(int)}$	-	-	8.8	-	Ω	
	Input capacitance	C_{ies}	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	-	6.5	-	nF	
	Turn-on time	t_{on}	SW mode : B $V_{CC} = 300V$ $I_C = 100A$	-	0.24	1.20	μs	
		t_r		-	0.10	0.60		
		$t_{r(f)}$		-	0.04	-		
	Turn-off time	t_{off}	$V_{GE} = \pm 15V$	-	0.20	1.00	μs	
		t_f	$R_G = 3.3\Omega$	-	0.03	0.30		
Reverse recovery time	t_{rr}	SW mode : A $V_{CC} = 300V$ $I_C = 100A$ $V_{GE} = \pm 15V$ $R_G = 1.6\Omega$ (T1, T2)	-	-	0.35	μs		
Thermistor	Resistance	R	$T = 25^\circ C$	-	5000	-	Ω	
			$T = 100^\circ C$	465	495	520		
	B value	B	$T = 25/50^\circ C$	3305	3375	3450	K	

● Thermal resistance characteristics

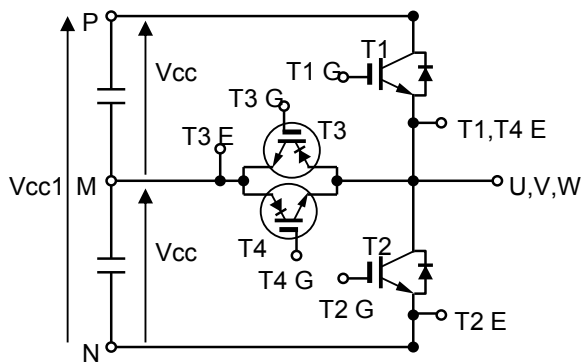
Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	max.		
Thermal resistance (1device)	$R_{th(j-c)}$	T1, T2 IGBT	-	-	0.29	$^\circ C/W$	
		T1, T2 FWD	-	-	0.44		
		T3, T4 RB-IGBT	-	-	0.31		
Contact thermal resistance (1device) (*4)	$R_{th(c-f)}$	T1, T2 T3, T4	with Thermal Compound		-	0.05	-

Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound (thermal conductivity = 1W/m · k).

■ Definitions of switching time



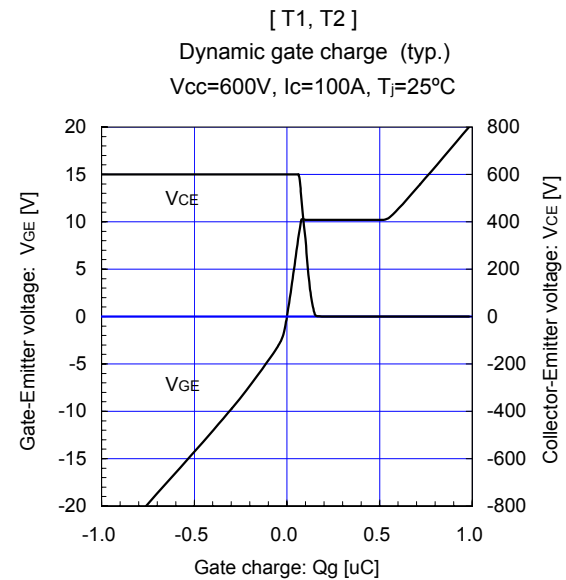
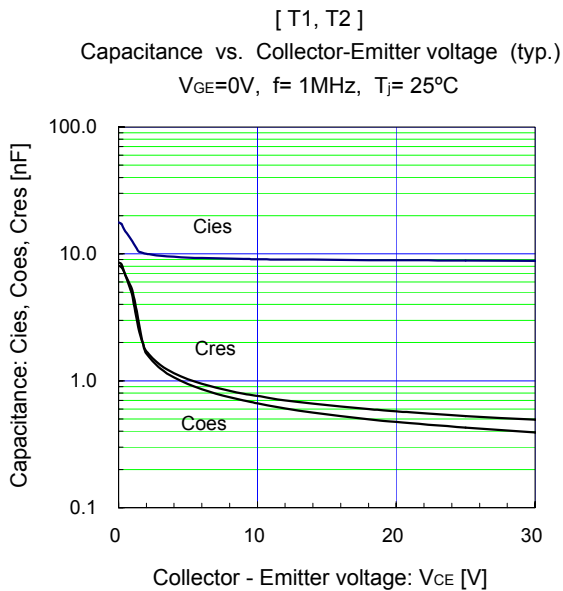
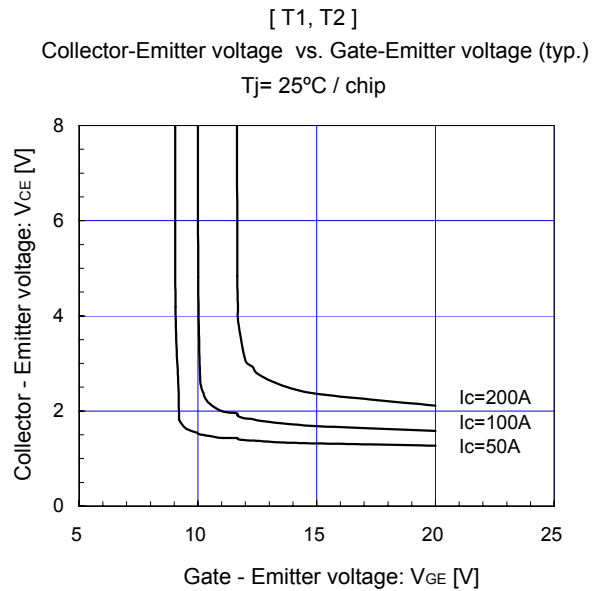
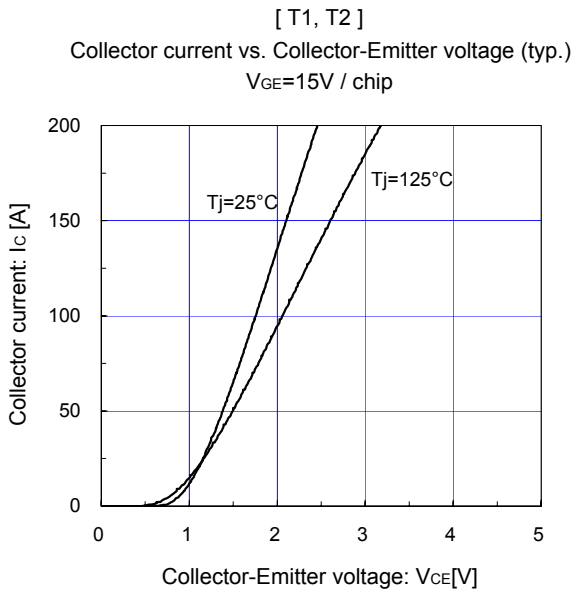
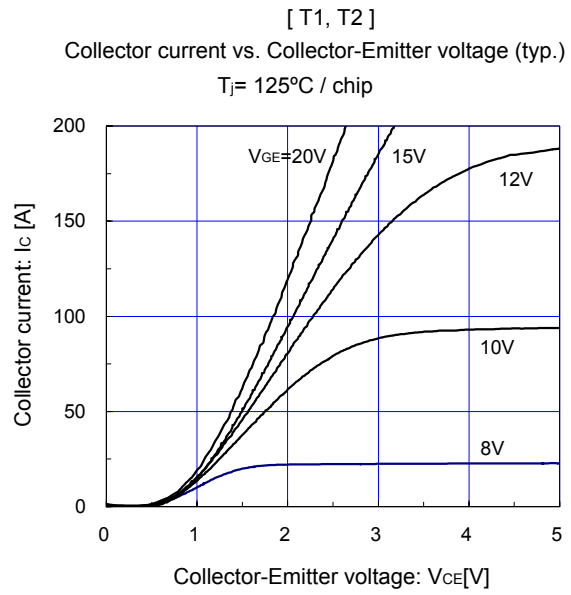
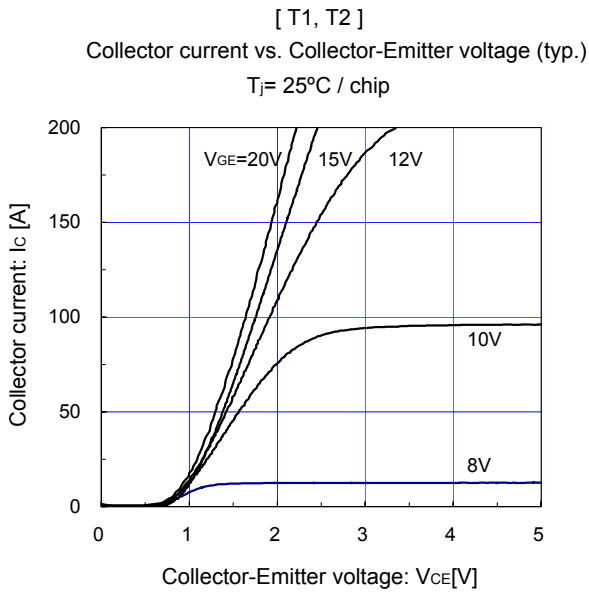
Definitions of switching mode

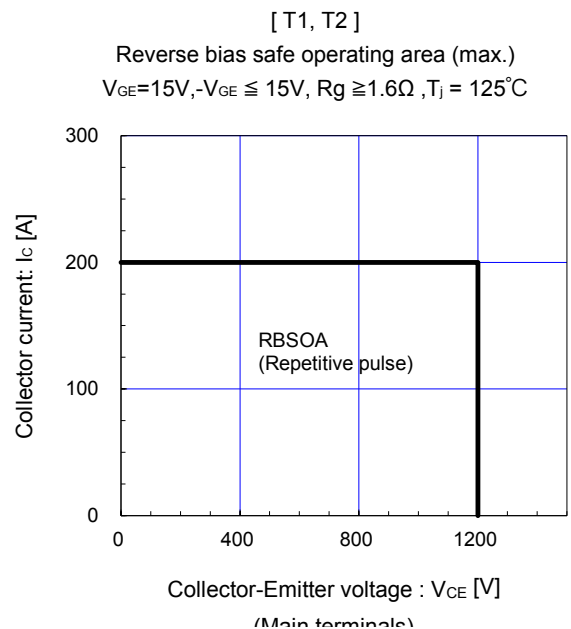
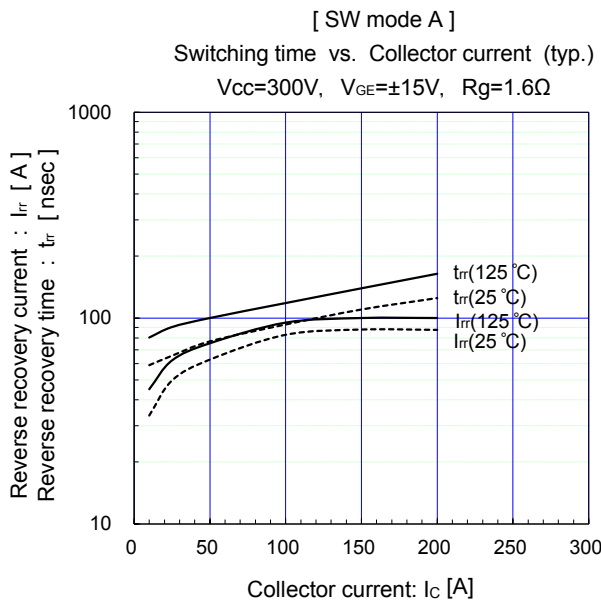
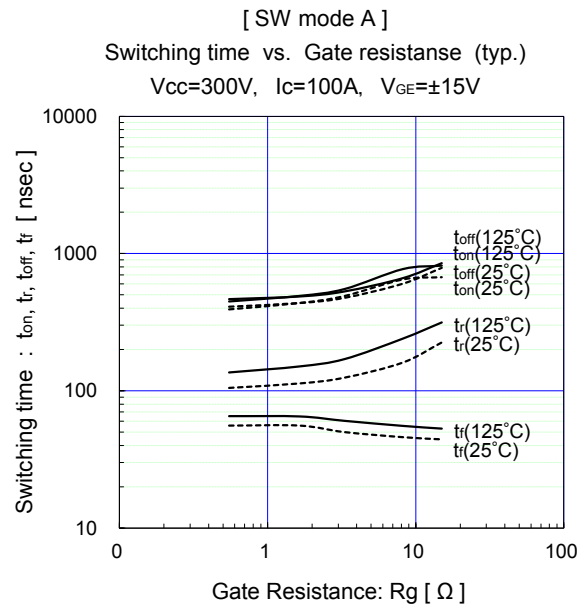
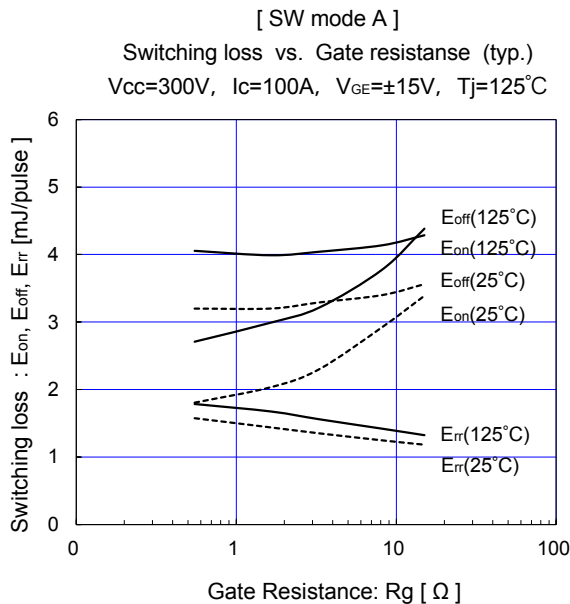
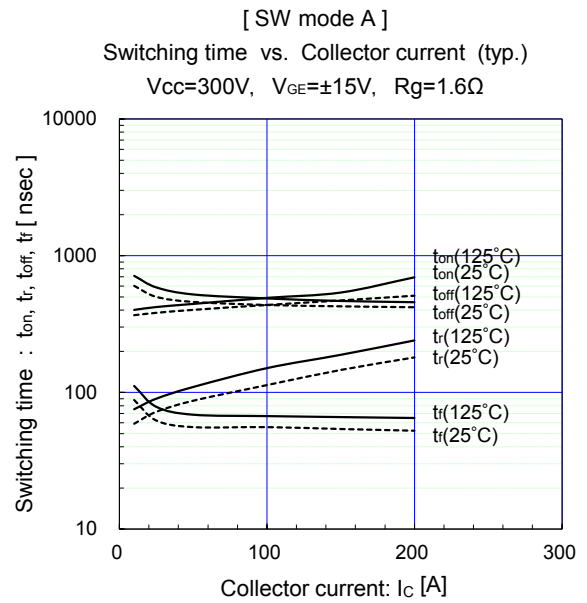
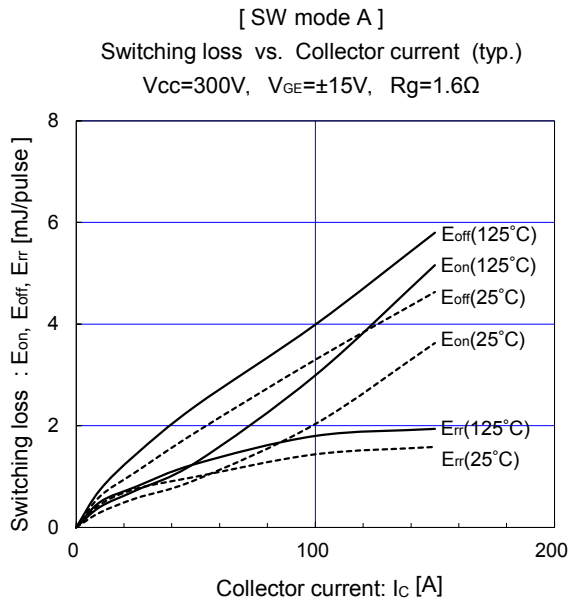


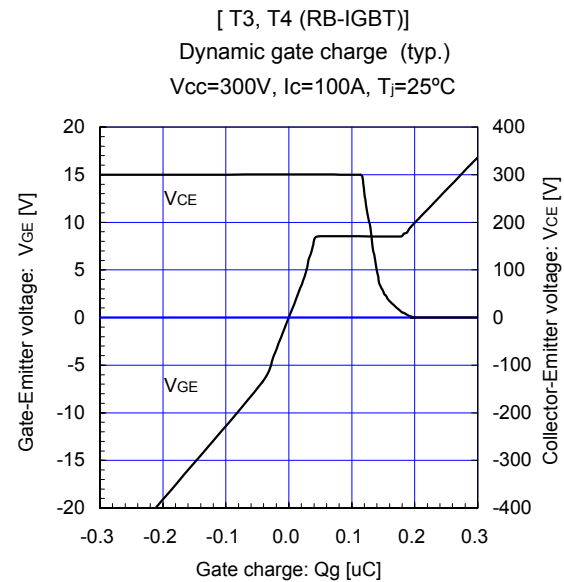
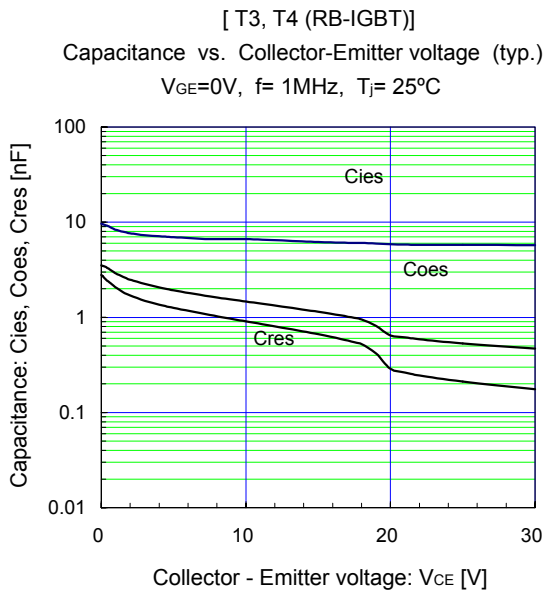
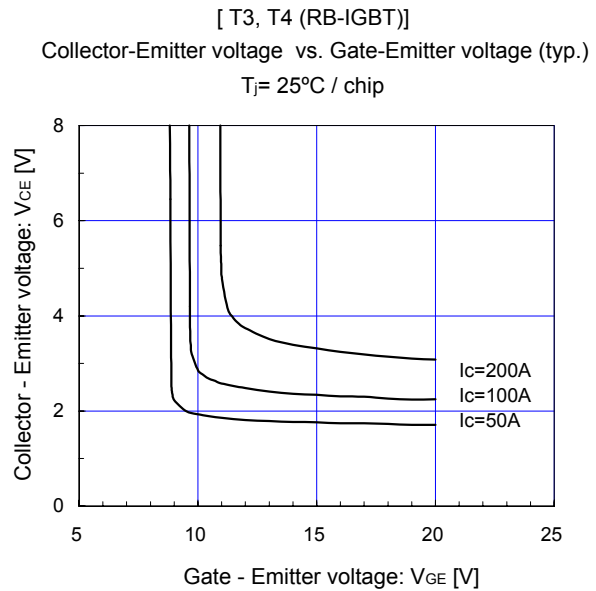
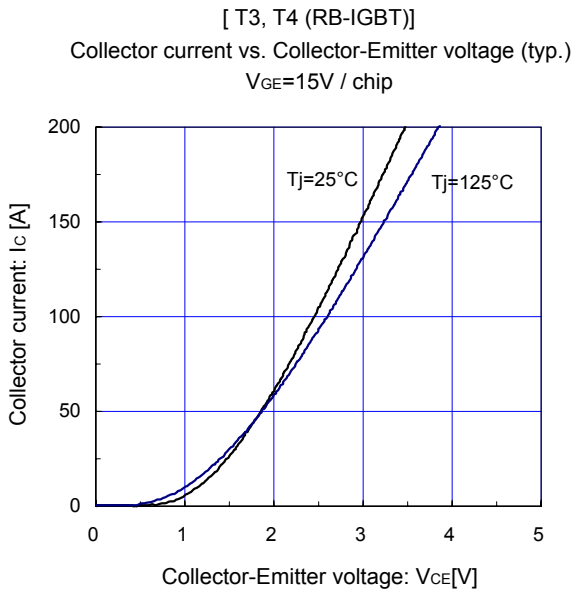
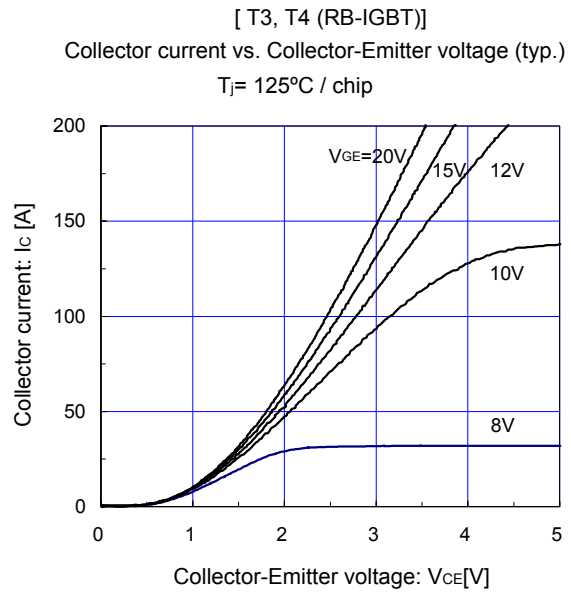
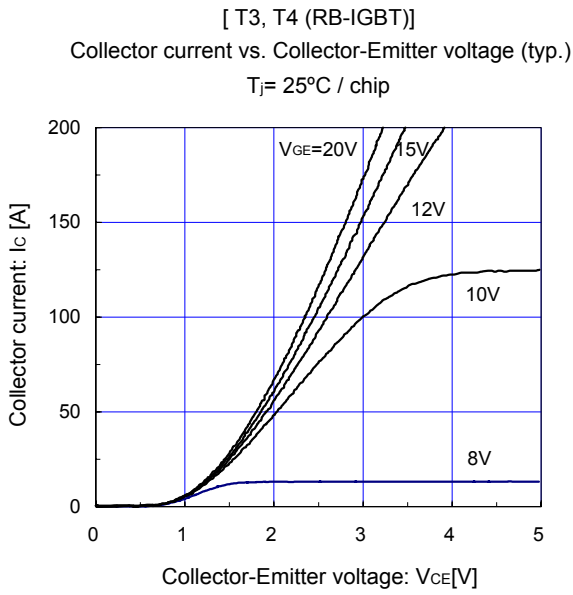
SW mode	Load L	State of switching device			
		T1	T2	T3	T4
A	M-U	SW	OFF	OFF	ON
	M-U	OFF	SW	ON	OFF
B	P-U	OFF	OFF	SW	ON
	U-N	OFF	OFF	ON	SW

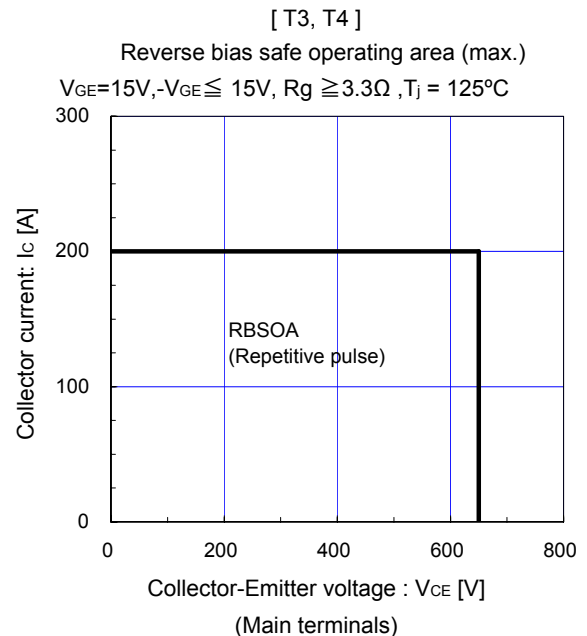
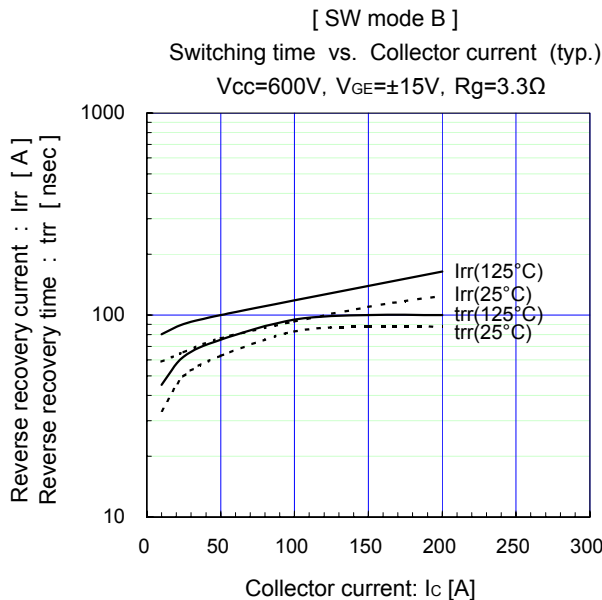
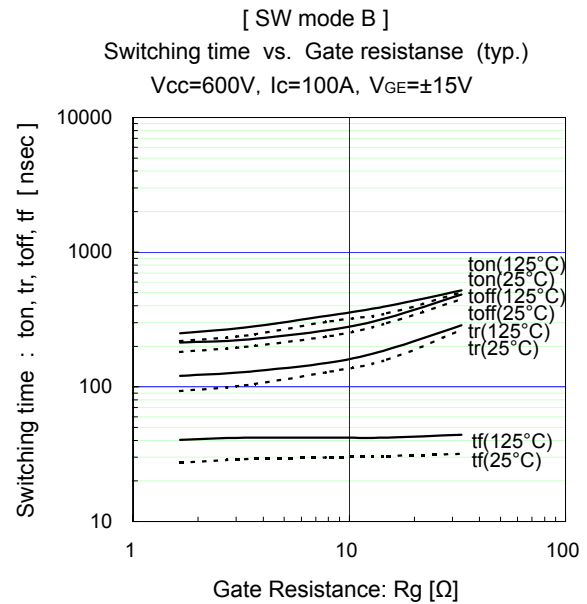
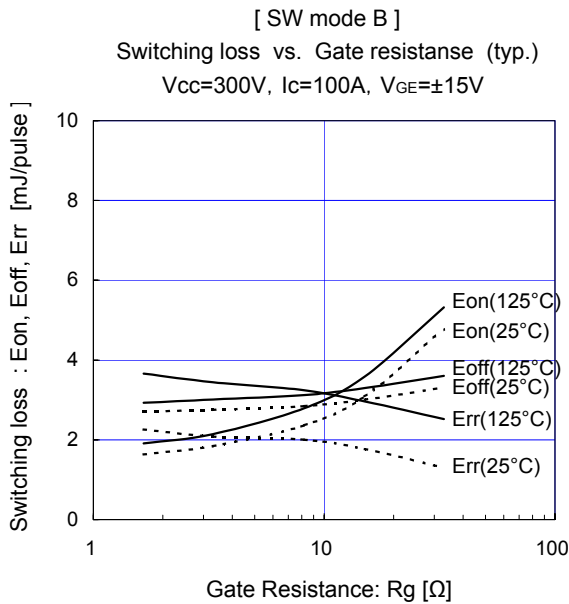
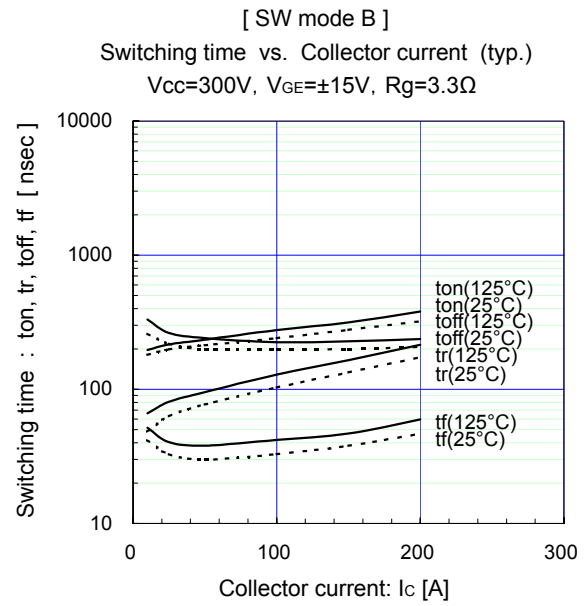
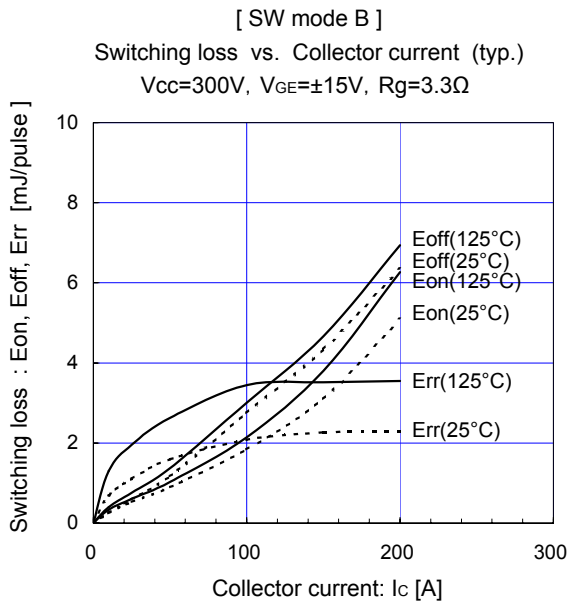
SW: Connect to drive circuit and input gate signal.
 ON: Bias voltage of gate +15V.
 OFF: Reverse bias voltage of gate -15V.
 $V_{cc} = V_{cc1}/2$

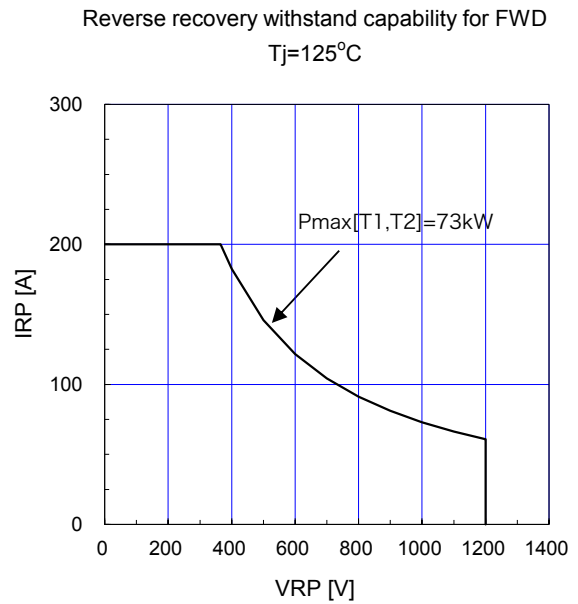
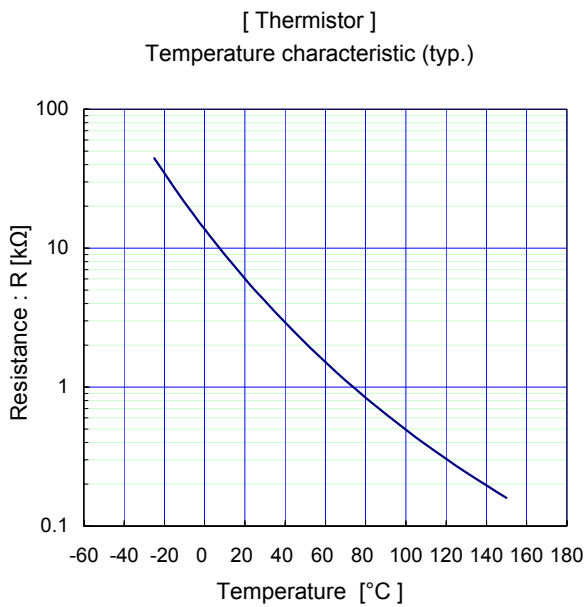
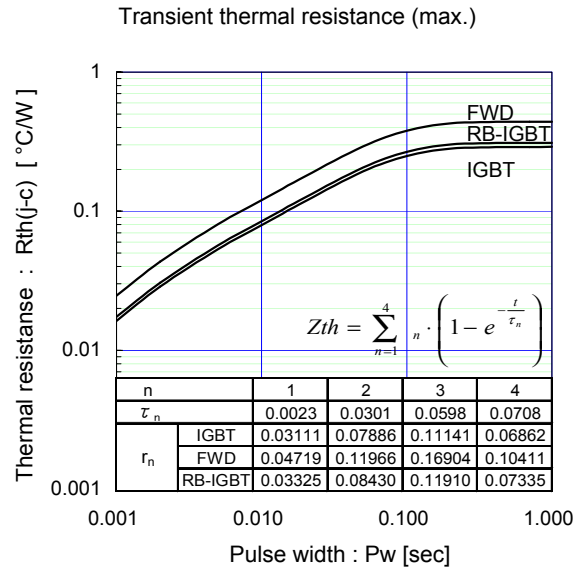
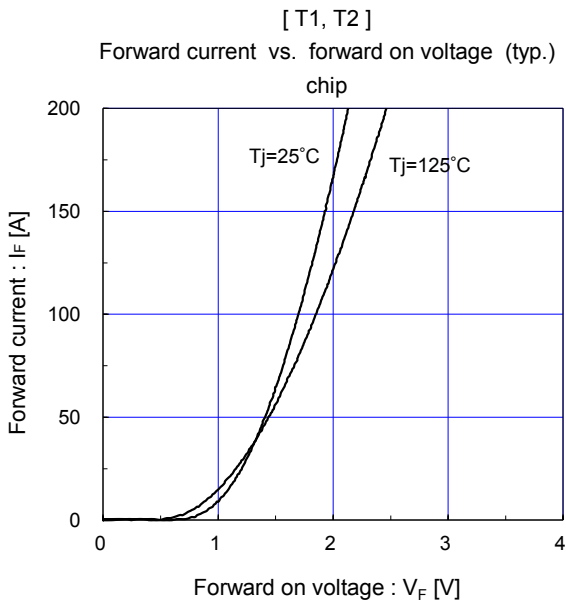
■ Characteristics (Representative)





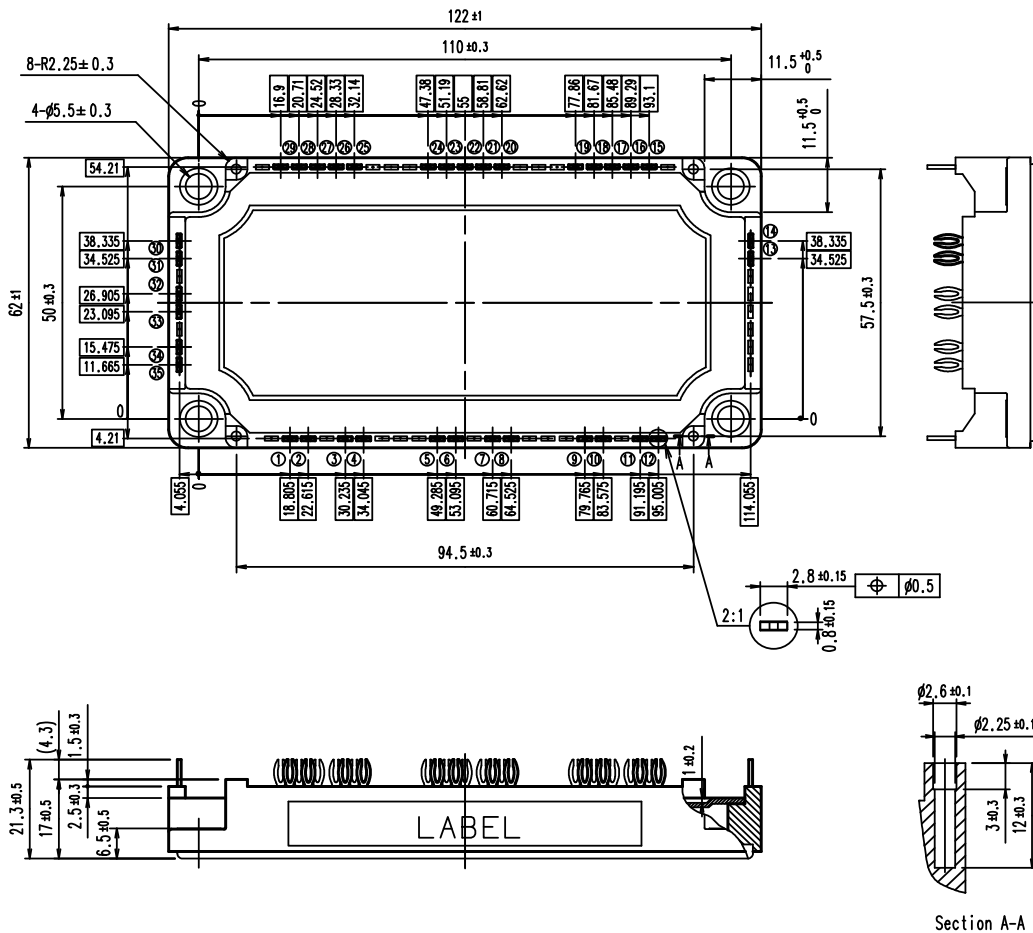






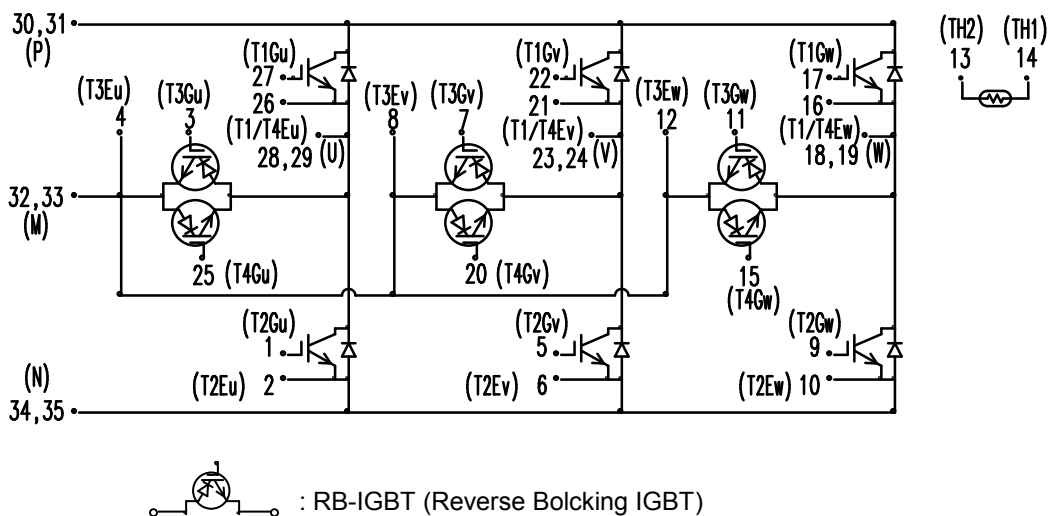
Outline Drawings, mm

□ shows theoretical dimension.
 () shows reference dimension.



Equivalent Circuit Schematic

Weight: 304g (typ.)



WARNING

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