MBM1200E17F

Silicon N-channel IGBT 1700V F version

1. FEATURES

* Soft switching behavior & low conduction loss:
  Soft low-injection punch-through with
  trench gate IGBT.
* Low driving power:
  Low input capacitance advanced trench gate.
* Low noise recovery: Ultra soft fast recovery diode.

2.ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Item		Symbol	Unit	MBM1200E17F
Collector Emitter Voltage		V_{CES}	V	1,700
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	1,200
	1ms	I_{Cp}		2,400
Forward Current	DC	I_F	A	1,200
	1ms	I_{FM}		2,400
Junction Temperature		$T_{j\,op}$	°C	-50 ~ +150
Storage Temperature		T_{stg}	°C	-55 ~ +125
Isolation Voltage		V_{ISO}	V_{RMS}	4,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	N·m	2/15 (1)
	Mounting (M6)	-		6 (2)

Notes: (1) Recommended Value $1.8\pm0.2/15^{+0}_{-3}$N·m (2) Recommended Value 5.5±0.5N·m

3.ELECTRICAL CHARACTERISTICS

Item		Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current		I_{CES}	mA	-	-	10	V_{CE}=1,700V, V_{GE}=0V, Tj=25°C
				-	23	-	V_{CE}=1,700V, V_{GE}=0V, Tj=150°C
Gate Emitter Leakage Current		I_{GES}	nA	-500	-	+500	V_{GE}=±20V, V_{CE}=0V, Tj=25°C
Collector Emitter Saturation Voltage		$V_{CE(sat)}$	V	-	2.0	-	I_C=1,200A, V_{GE}=15V, Tj=25°C
				-	2.4	-	I_C=1,200A, V_{GE}=15V, Tj=150°C
Gate Emitter Threshold Voltage		$V_{GE(TO)}$	V	4.1	5.5	7.1	V_{CE}=10V, I_C=120mA, Tj=25°C
Input Capacitance		C_{ies}	nF	-	63	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Internal Gate Resistance		Rge	Ω	-	4	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Turn On Delay Time		$t_{d(on)}$	μs	-	0.74	1.7	V_{CC}=900V, Ic=1,200A
Rise Time		t_r		-	0.26	0.8	Ls=100nH (3)
Turn Off Delay Time		$t_{d(off)}$		-	1.9	3.0	R_G(on/off)=2.7/4.7Ω (3)
Fall Time		t_f		-	1.6	3.0	V_{GE}=±15V, Tj=150°C
Peak Forward Voltage Drop		V_{FM}	V	-	2.0	-	IF=1,200A, V_{GE}=0V, Tj=25°C
				-	2.3	-	IF=1,200A, V_{GE}=0V, Tj=150°C
Reverse Recovery Time		t_{rr}	μs	-	0.65	1.5	V_{CC}=900V, Ic=1,200A
Turn On Loss		E_{on}	J/P	-	0.31	-	Ls=100nH (3)
Turn Off Loss		E_{off}	J/P	-	0.93	-	R_G(on/off)= 2.7/4.7Ω (3)
Reverse Recovery Loss		E_{rr}	J/P	-	0.44	-	V_{GE}=±15V, Tj=150°C
Stray inductance in module		L_{SCE}	nH	-	21	-	Per 1 arm
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.022	Junction to case
	FWD	Rth(j-c)		-	-	0.033	
Contact Thermal Impedance		Rth(c-f)	K/W	-	0.016	-	Case to fin (λgrease=1W/(m·K), heat-sink flatness ≤50um), per 1 arm

Notes:(3) Ls and R_G are the test condition's values for evaluation of the switching times, not recommended value.
Please, determine the suitable R_G value after the measurement of switching waveforms
(overshoot voltage, etc.) with appliance mounted.

* Please contact our representatives at order.
* For improvement, specifications are subject to change without notice.
* For actual application, please confirm this spec sheet is the newest revision.
* ELECTRICAL CHARACTERISTIC items shown in above table are according to IEC 60747–2 and IEC 60747–9.

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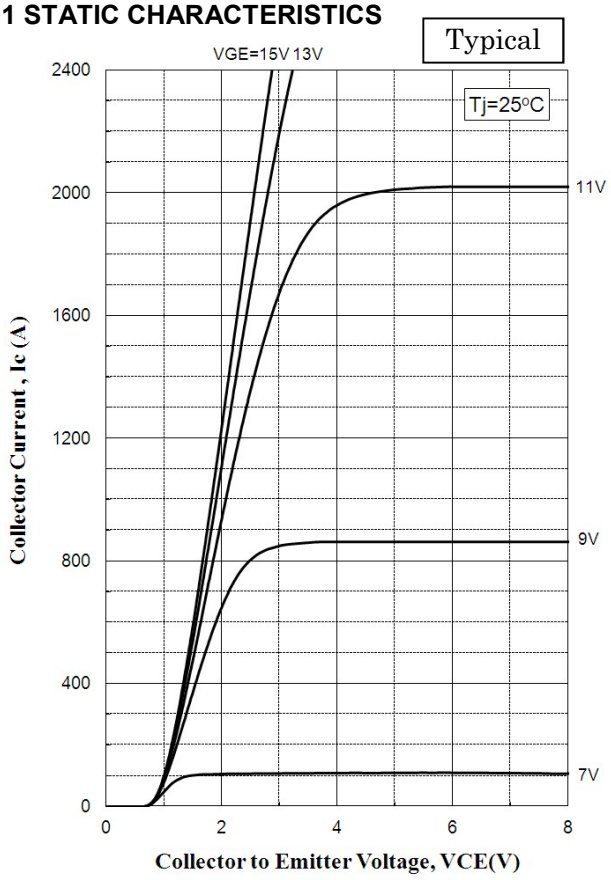
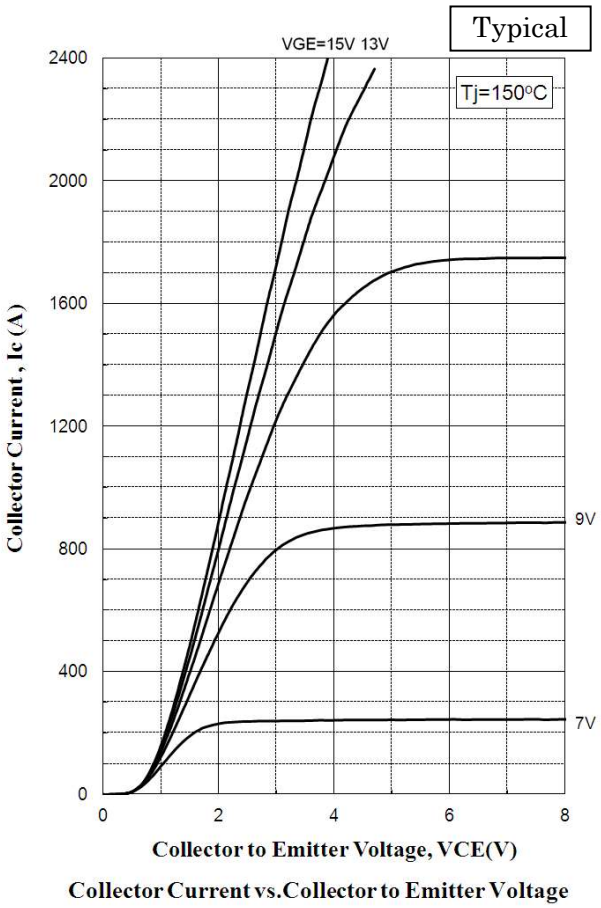
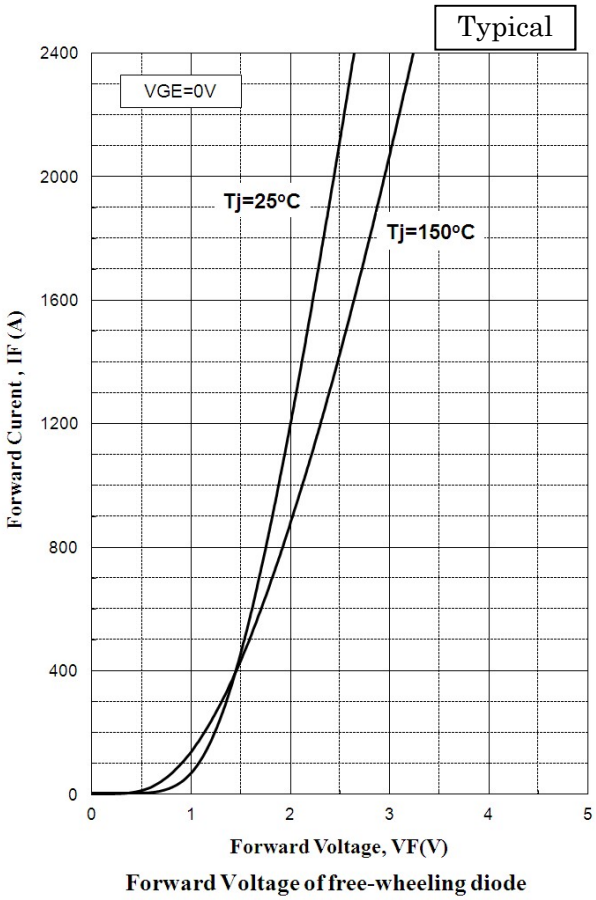
4.CHARACTERISTICS CURVE

4.1 STATIC CHARACTERISTICS





Collector Current vs.Collector to Emitter Voltage



Forward Voltage of free-wheeling diode

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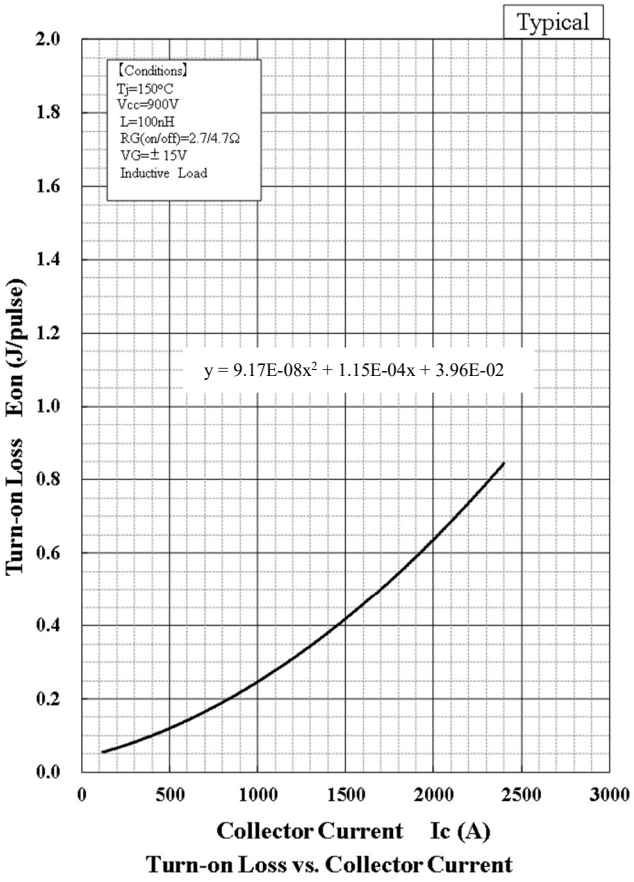
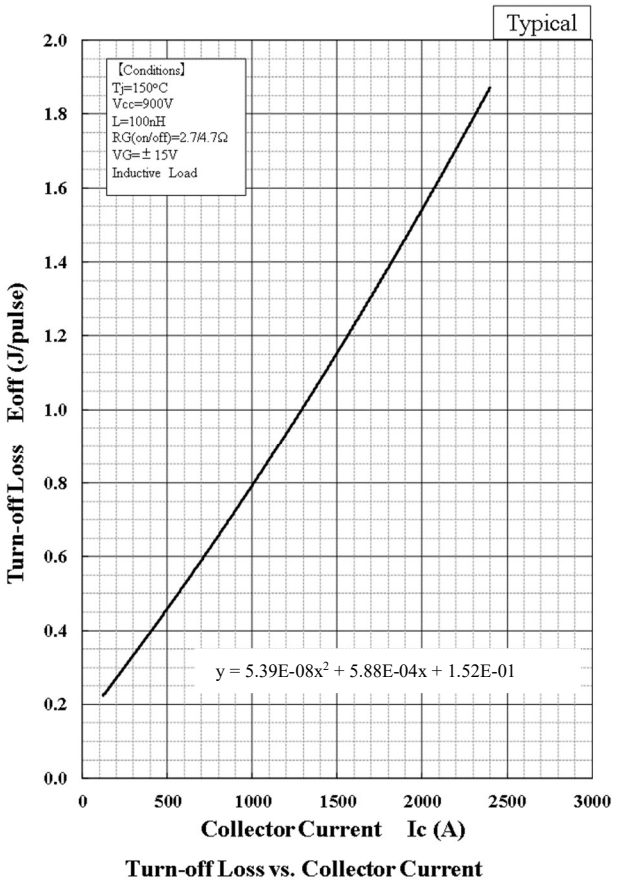
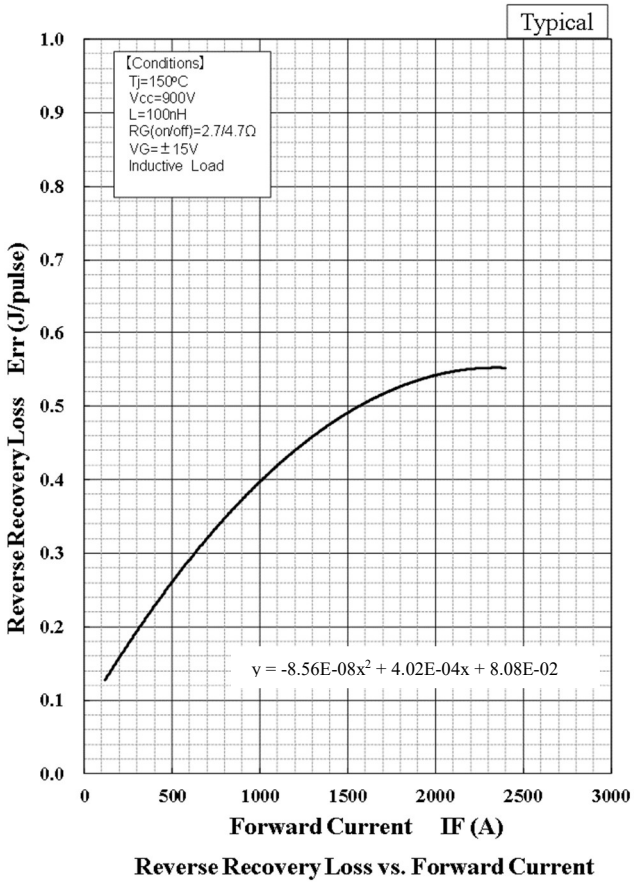
4.2 DYNAMIC CHARACTERISTICS



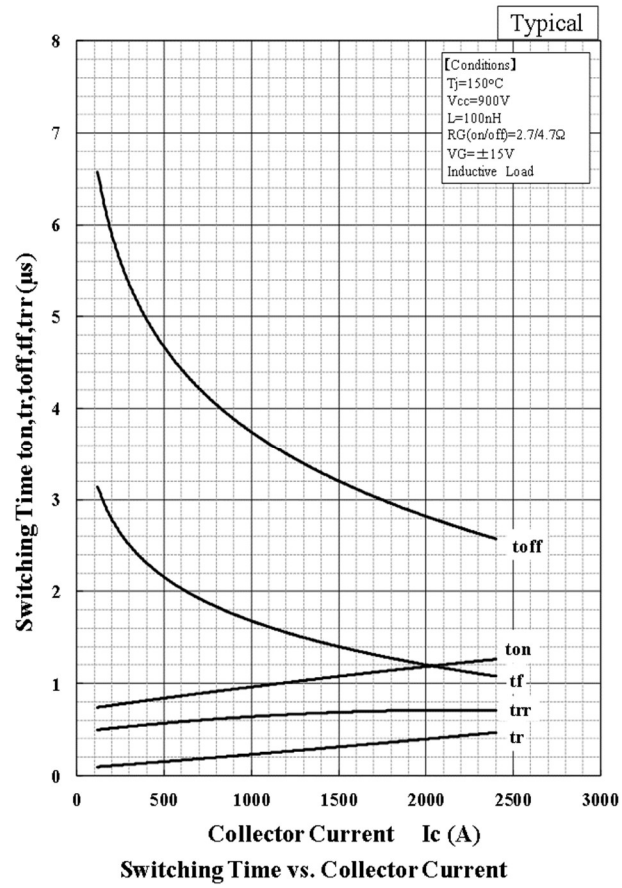
Turn-on Loss vs. Collector Current



Turn-off Loss vs. Collector Current



Reverse Recovery Loss vs. Forward Current



Switching Time vs. Collector Current

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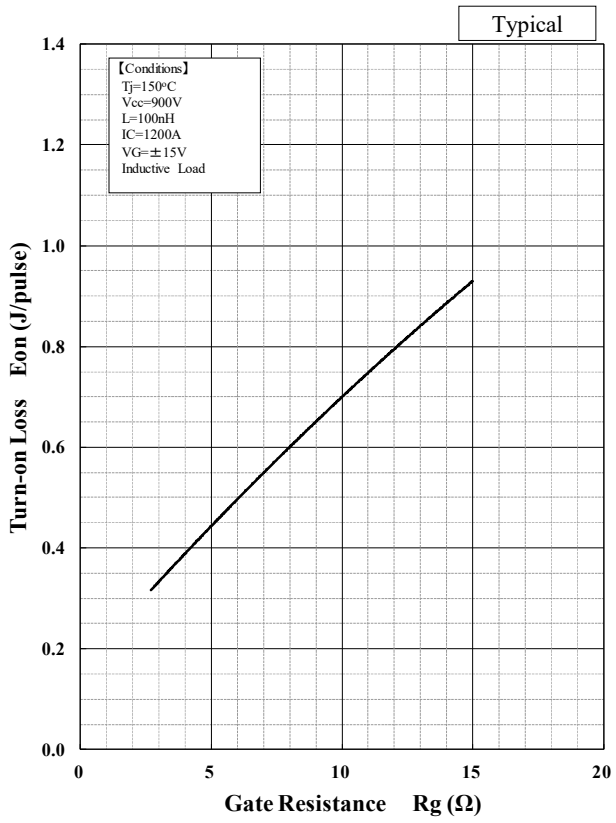
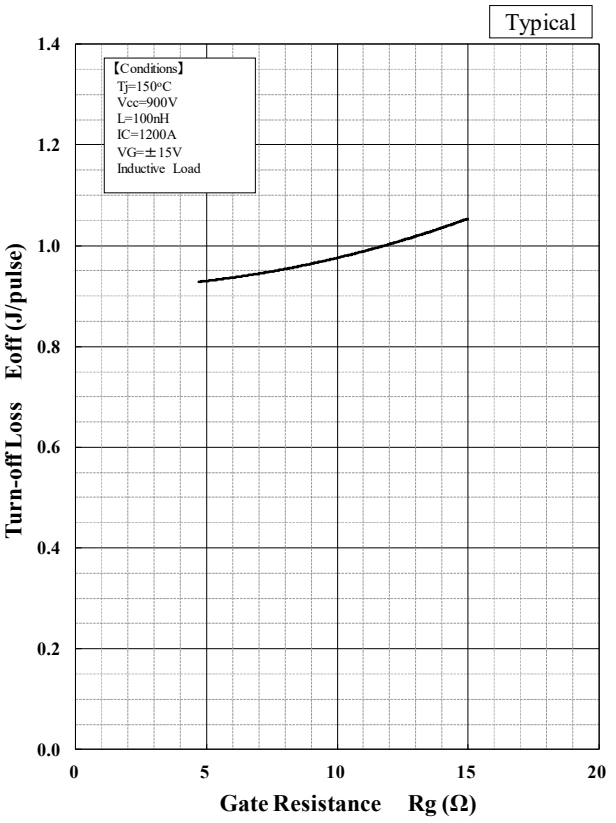
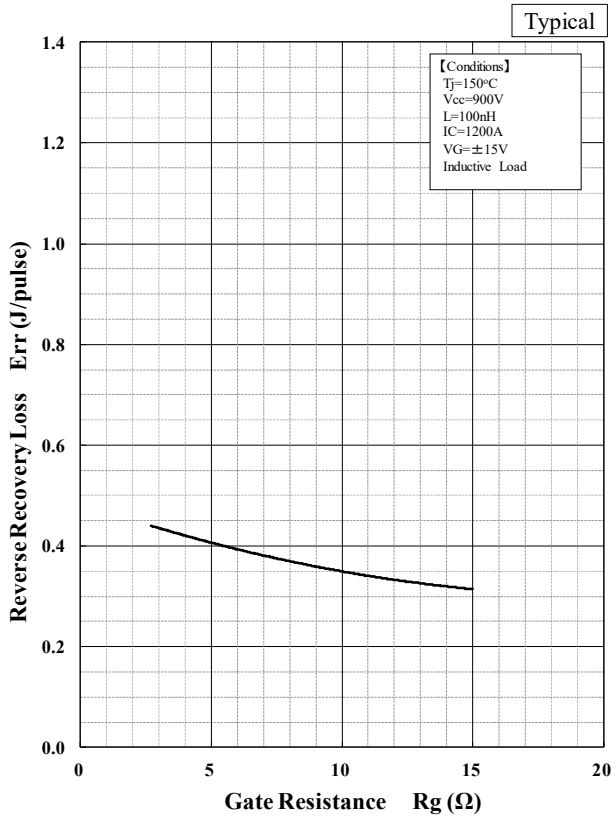


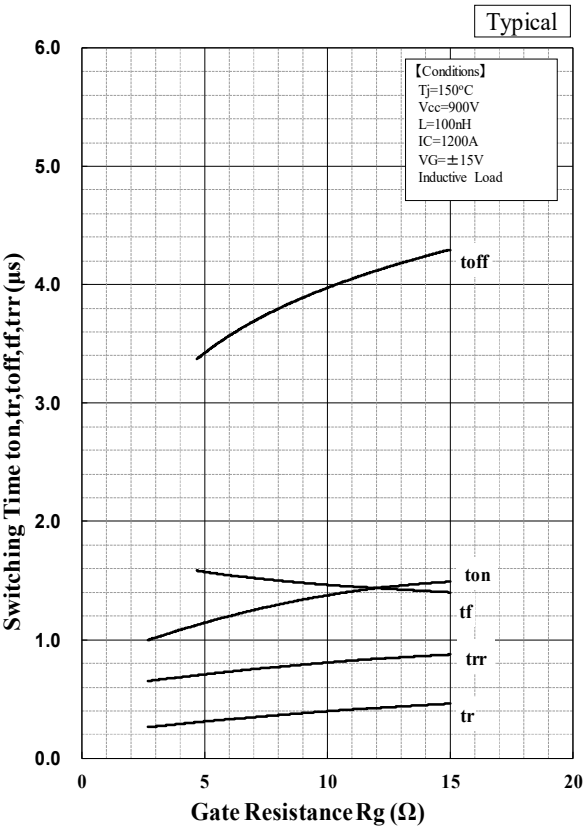
Turn-on Loss vs. Gate Resistance



Turn-off Loss vs. Gate Resistance



Reverse Recovery Loss vs. Gate Resistance



Switching Time vs. Gate Resistance

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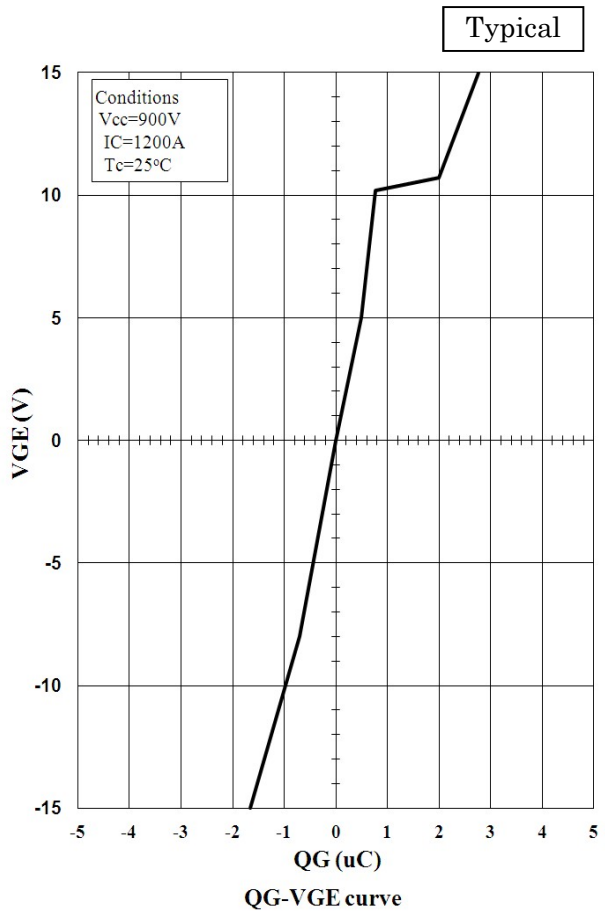
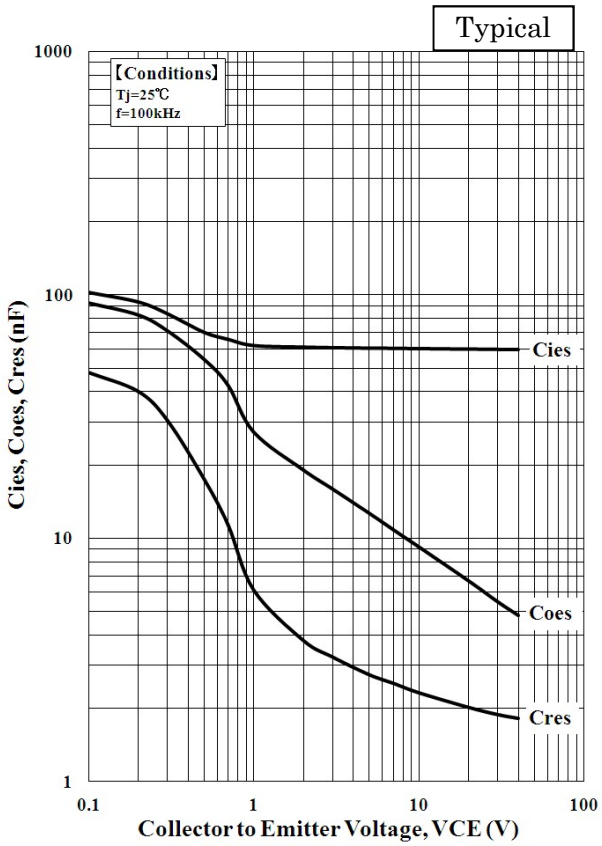
4.3 QG-VG CURVE



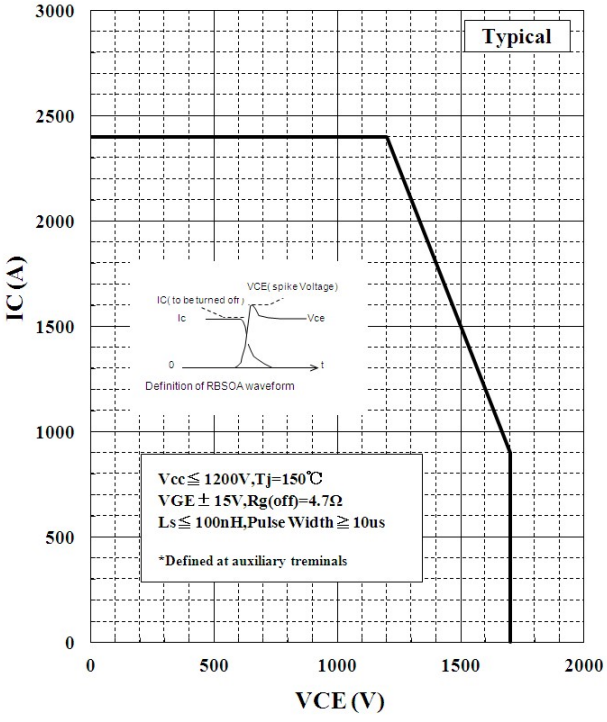
QG-VGE curve

4.4 Cies,Coes,Cres CURVE



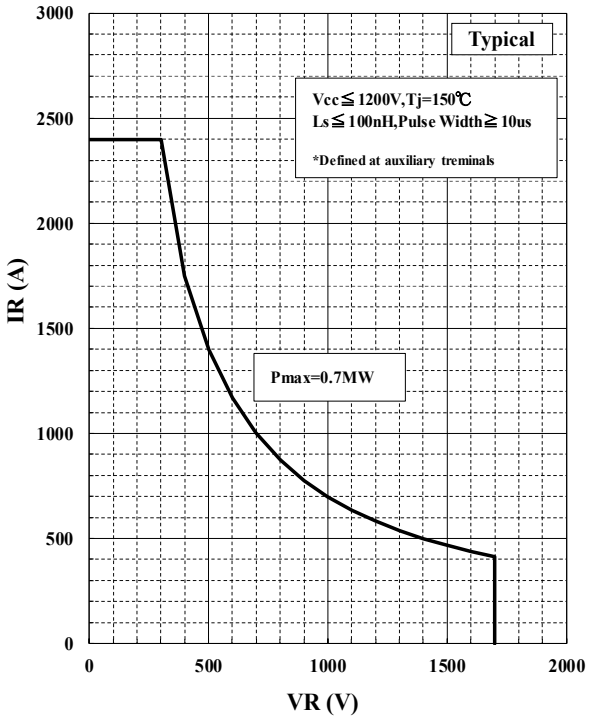
Capacitance vs. Collector to Emitter Voltage

4.5 RBSOA



RBSOA

4.6 RecSOA



RecSOA

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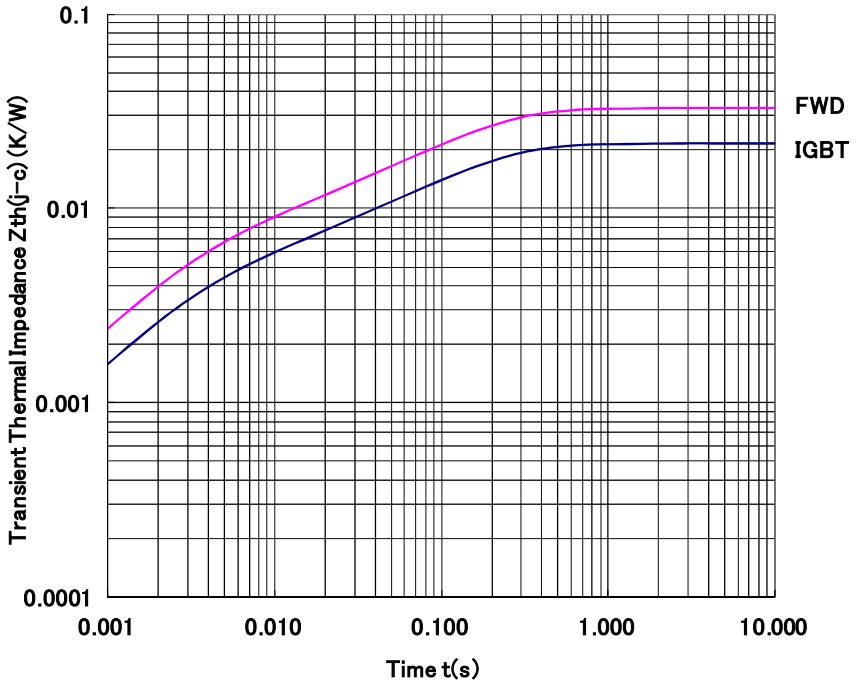
5.TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve

Curve approximation model

(ΣZth[n]*(1-exp(-t/τth[n])))

n	1	2	3	4	Unit
τ th[n]	1.62E-01	2.45E-02	3.11E-03	5.44E-04	sec
rth[n,IGBT]	1.39E-02	3.60E-03	3.61E-03	4.97E-04	K/W
rth[n,Diode]	2.11E-02	5.79E-03	5.34E-03	7.82E-04	K/W

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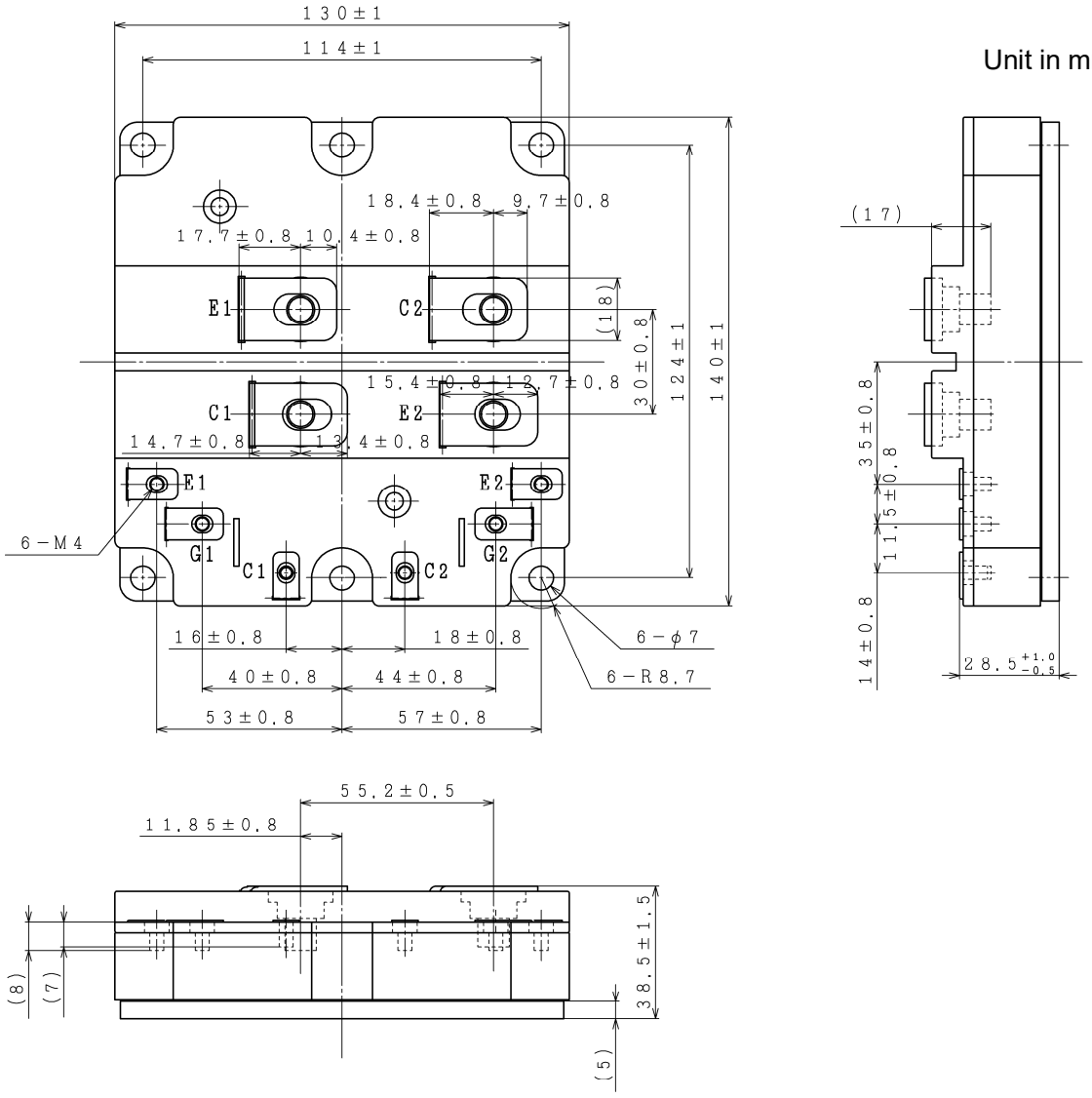
6. Material declaration

Please note the following materials are contained in the product, in order to keep characteristic and reliability level.

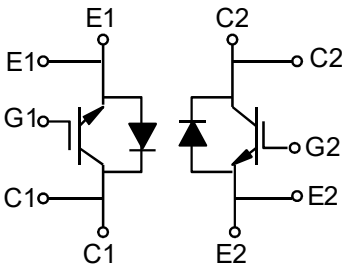
Material	Contained part
Lead (Pb) and its compounds	Solder

7. Outline Drawing

Unit in mm



Weight: 900g



Circuit Diagram

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HITACHI POWER SEMICONDUCTORS

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