MBM1200E17E

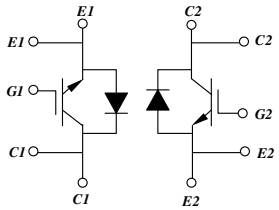
Preliminary SPEC.

Silicon N-channel IGBT 1700V E version

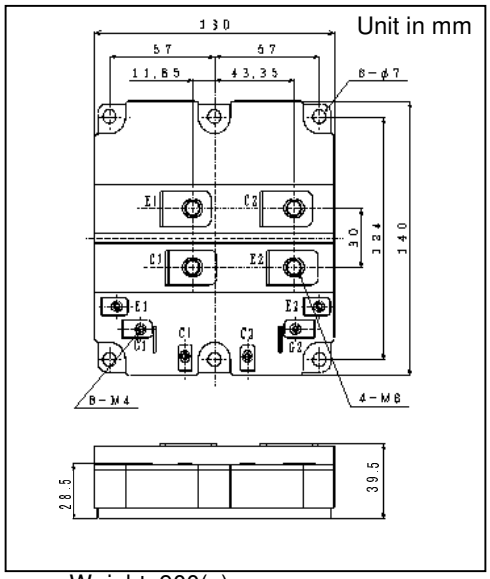
FEATURES

* 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.
* High thermal fatigue durability
  :(delta Tc=70K, N＞30,000cycles).
* AlSiC base-plate/AlN substrate.

CIRCUIT DIAGRAM



OUTLINE DRAWING



Weight: 900(g)

ABSOLUTE MAXIMUM RATINGS (Tc=25℃)

Item		Symbol	Unit	MBM1200E17E
Collector Emitter Voltage		V_{CES}	V	1,700
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	1200
	1ms	I_{Cp}		2,400
Forward Current	DC	I_F	A	1200
	1ms	I_{FM}		2,400
Junction Temperature		T_j	℃	-40 ～ +125
Storage Temperature		T_{stg}	℃	-40 ～ +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±0.2/15$^{+0}_{-3}$ N·m (2) Recommended Value 5.5±0.5N·m

ELECTRICAL CHARECTERISTICS

Item		Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current		I_{CES}	mA	-	-	5.0	V_{CE}=1,700V, V_{GE}=0V, Tj=25℃
				-	5	17	V_{CE}=1,700V, V_{GE}=0V, Tj=25℃
Gate Emitter Leakage Current		I_{GES}	nA	-	-	±500	V_{GE}=±20V, V_{CE}=0V, Tj=25℃
Collector Emitter Saturation Voltage		$V_{CE(sat)}$	V	-	2.2	2.7	I_C=1200A, V_{GE}=15V, Tj=125℃
Gate Emitter Threshold Voltage		$V_{GE(TO)}$	V	5.0	6.5	8.0	V_{CE}=10V, I_C=120mA, Tj=25℃
Input Capacitance		Cies	nF	-	100	-	V_{CE}=10V, V_{GE}=0V,f=100kHz, Tj=25℃
Internal Gate Resistance		Rg(int)	Ω	-	1.3	-	
Switching Times	Rise Time	t_r	μs	-	1.2	2.4	V_{CC}=900V, Ic=1200A, L=100nH, Rg(on/off)=6.8/1.5Ω (3) V_{GE}=±15V, Tj=125°C
	Turn On Time	t_{on}		-	1.9	3.8	
	Fall Time	t_f		-	1.0	2.0	
	Turn Off Time	t_{off}		-	2.0	4.0	
Peak Forward Voltage Drop		V_{FM}	V	-	1.9	2.5	IF=1200A, V_{GE}=0V, Tj=125℃
Reverse Recovery Time		t_{rr}	μs	-	0.6	1.2	V_{CC}=900V, Ic,IF=1200A, L=100nH, Rg(on/off)=6.8/1.5Ω (3) V_{GE}=±15V, Tj=125°C
Turn On Loss		$E_{on(10\%)}$	J/P	-	0.35	0.55	
Turn Off Loss		$E_{off(10\%)}$	J/P	-	0.75	1.1	
Reverse Recovery Loss		$E_{rr(10\%)}$	J/P	-	0.35	0.55	
Thermal Resistance	IGBT	Rth(j-c)	K/W			0.022	Junction to case
	FWD	Rth(j-c)		-	-	0.033	
Contact Thermal Resistance		Rth(c-f)	K/W	-	0.016	-	Case to fin(per 1 arm)

Notes: (3) Rg value is the test condition's value for decision of the switching times, not recommended value.
Please, determine the suitable Rg 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.

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Inspire the Next

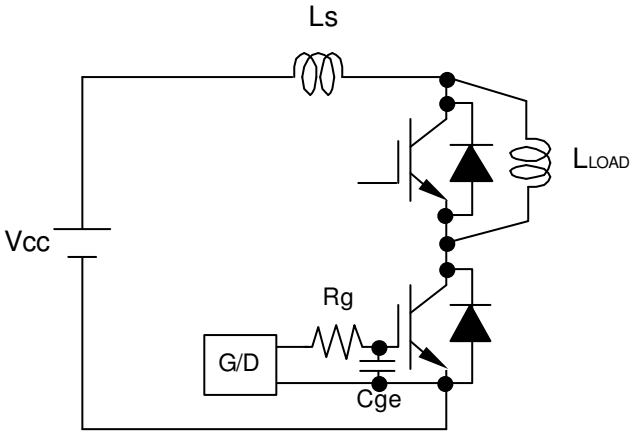
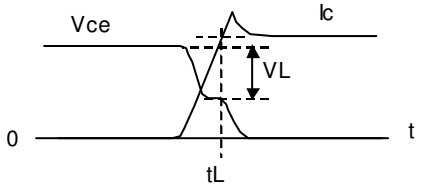
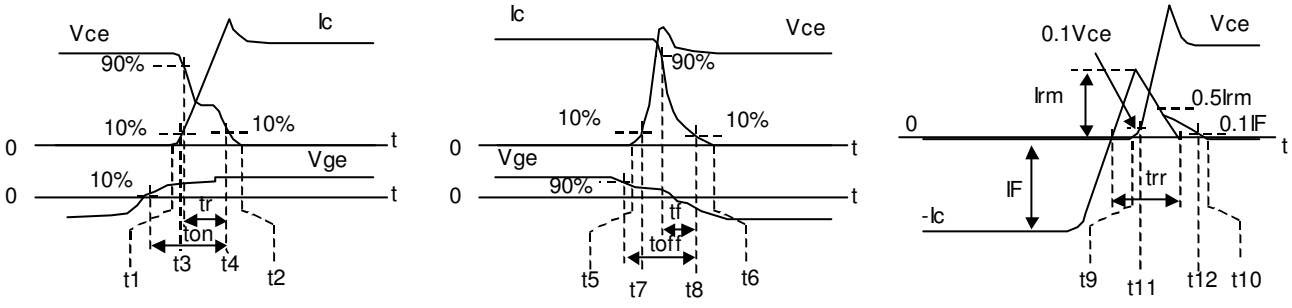


Fig.1 Switching test circuit



$$Ls = \frac{VL}{\left(\frac{dIc}{dt}\right)_{t=tL}}$$

Fig.2 Definition of Ls



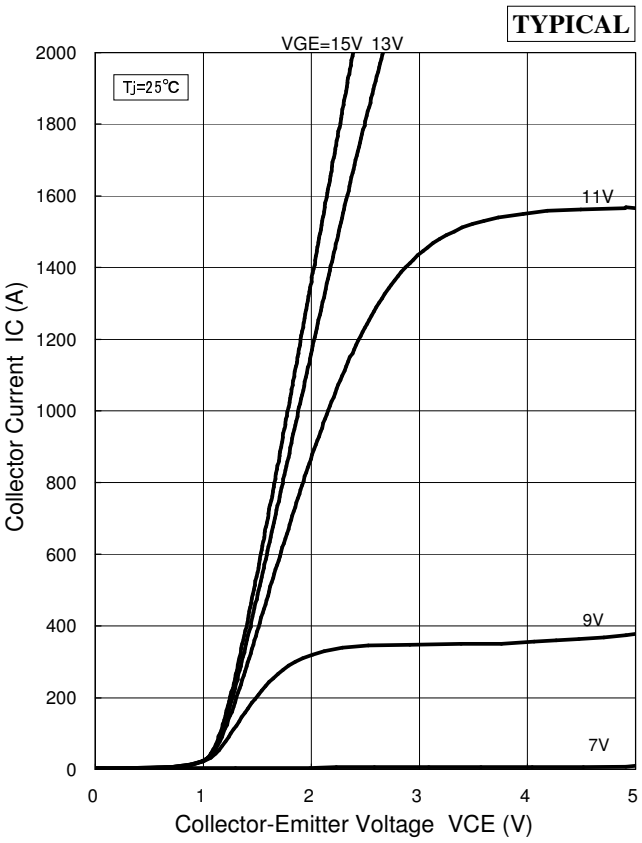
$$Eon(10\%) = \int_{t3}^{t4} Ic \cdot Vce\, dt \qquad Eoff(10\%) = \int_{t7}^{t8} Ic \cdot Vce\, dt \qquad Err(10\%) = \int_{t11}^{t12} IF \cdot Vce\, dt$$

$$Eon(Full) = \int_{t1}^{t2} Ic \cdot Vce\, dt \qquad Eoff(Full) = \int_{t5}^{t6} Ic \cdot Vce\, dt \qquad Err(Full) = \int_{t9}^{t10} IF \cdot Vce\, dt$$

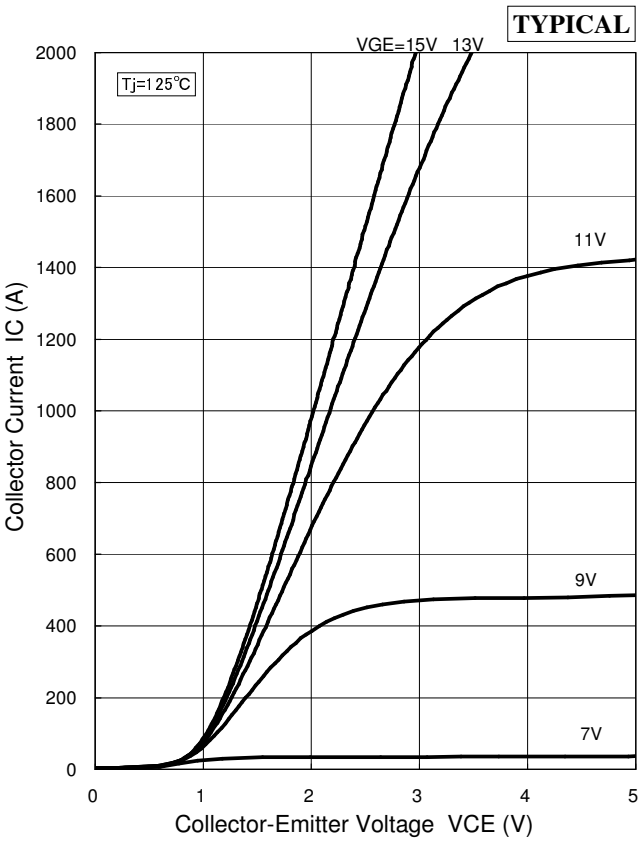
Fig.3 Definition of switching loss

CHARACTERISTICS CURVE

STATIC CHARACTERISTICS



Collector Current vs.Collector to Emitter Voltage



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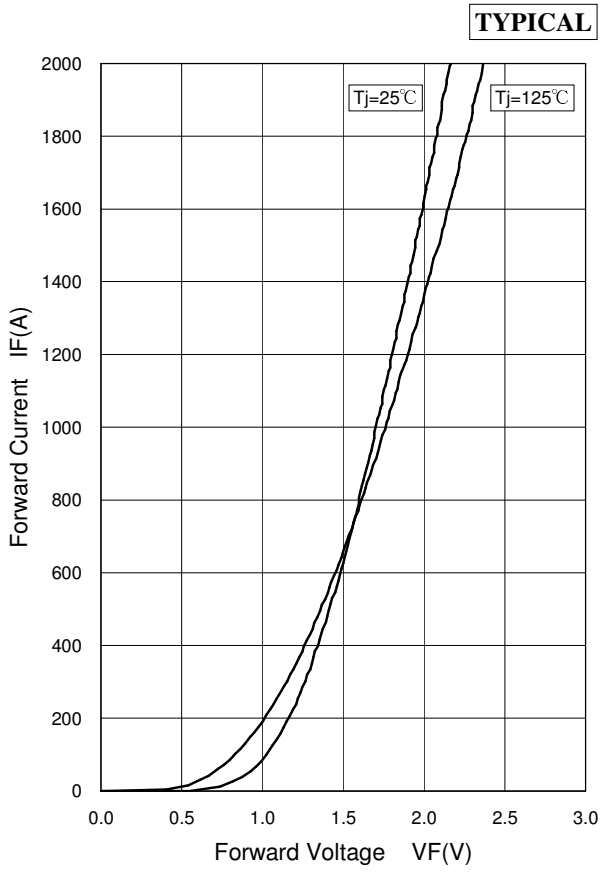
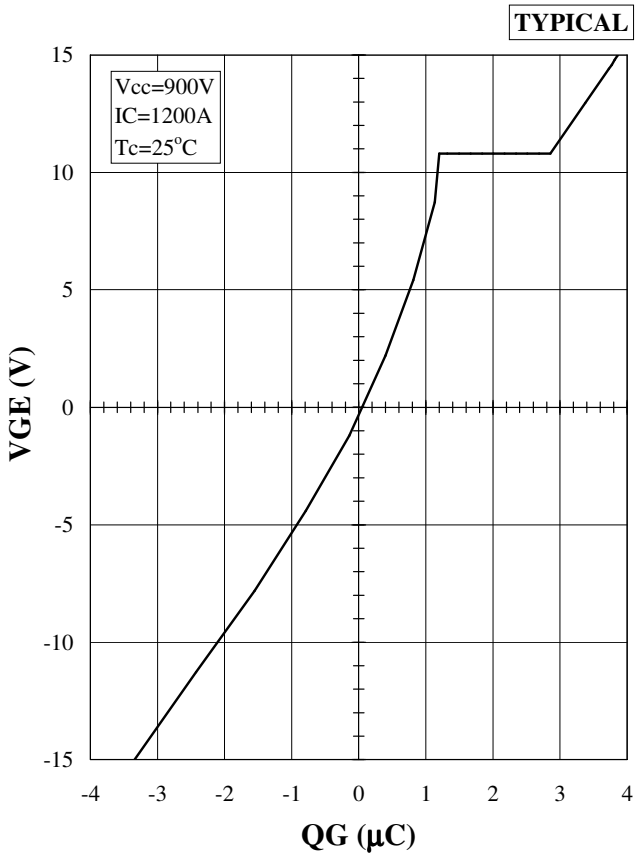


Forward Voltage of free-wheeling diode



QG-VGE curve

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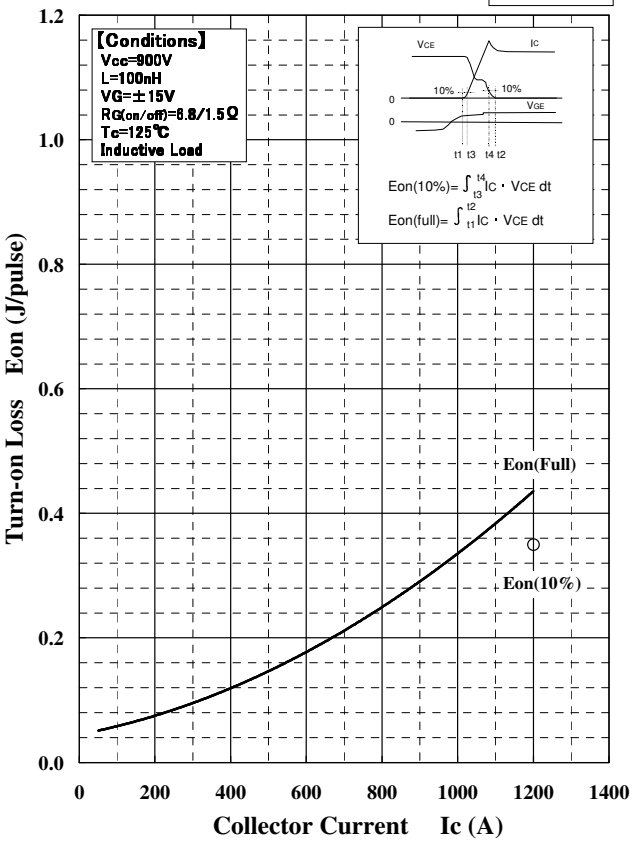
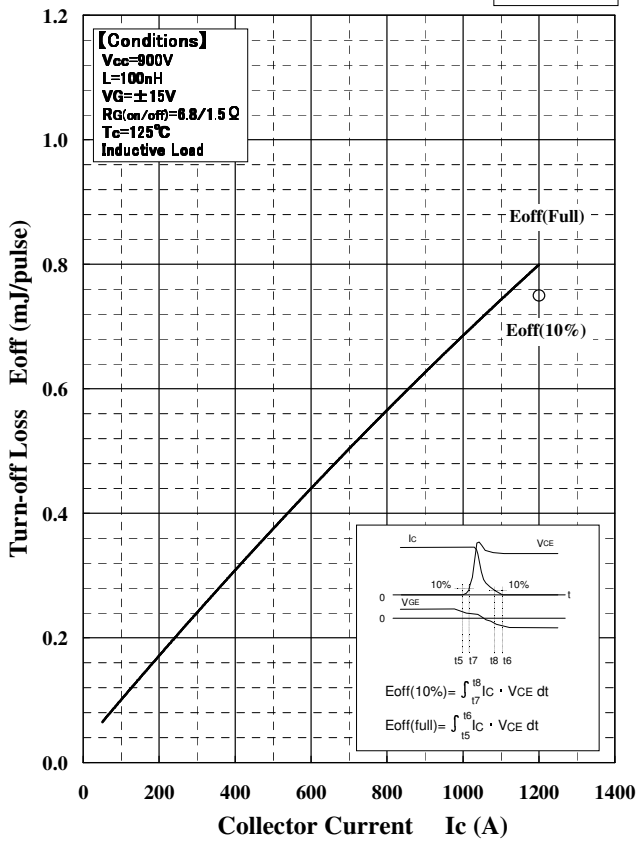
DEPENDENCE OF CURRENT

TYPICAL



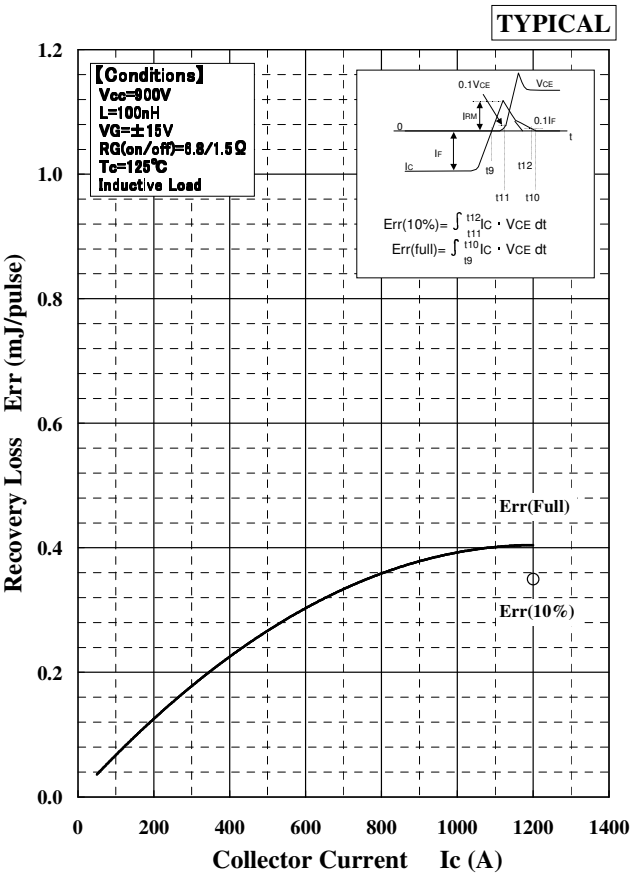
Turn-on Loss vs. Collector Current

TYPICAL



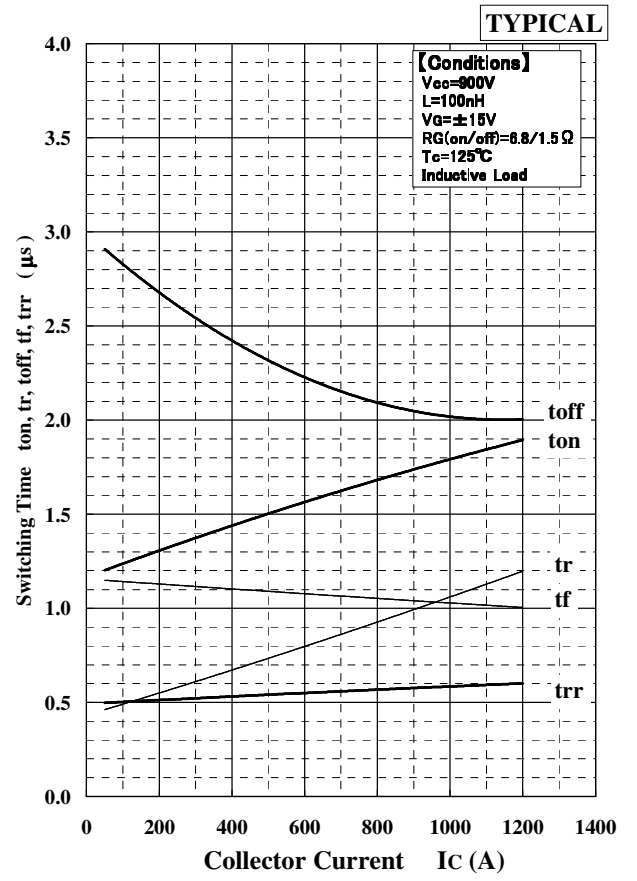
Turn-off Loss vs. Collector Current

TYPICAL



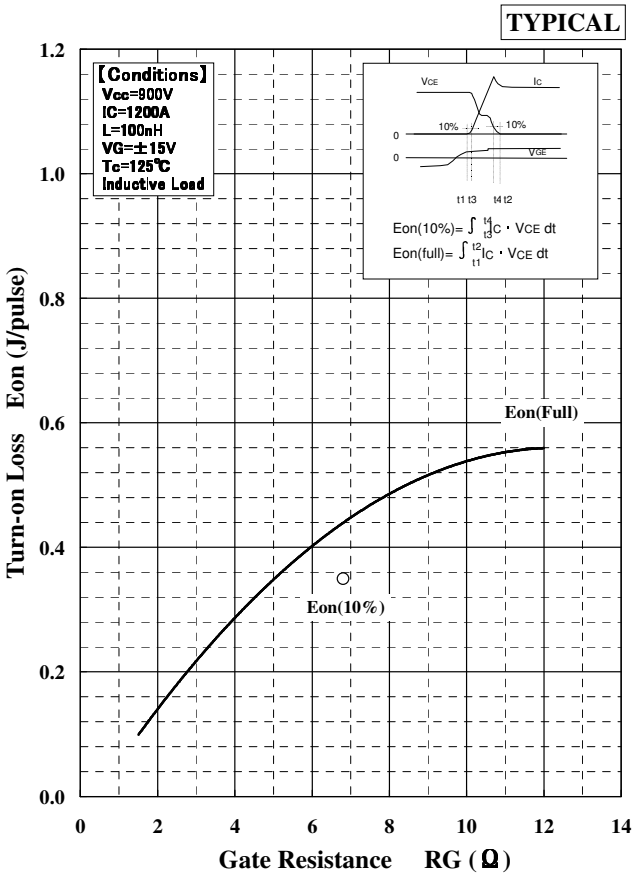
Recovery Loss vs. Collector Current

TYPICAL

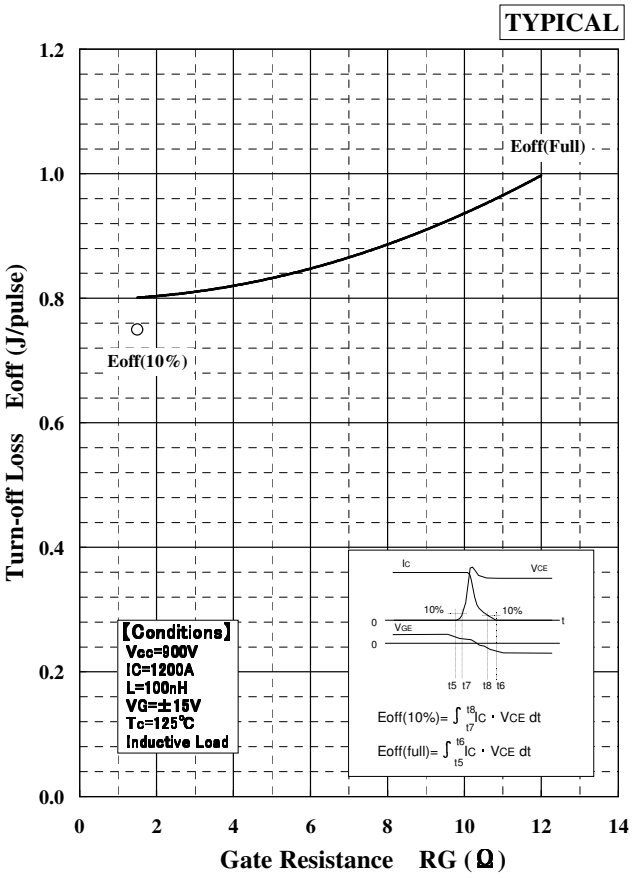


Switching Time vs. Collector Current

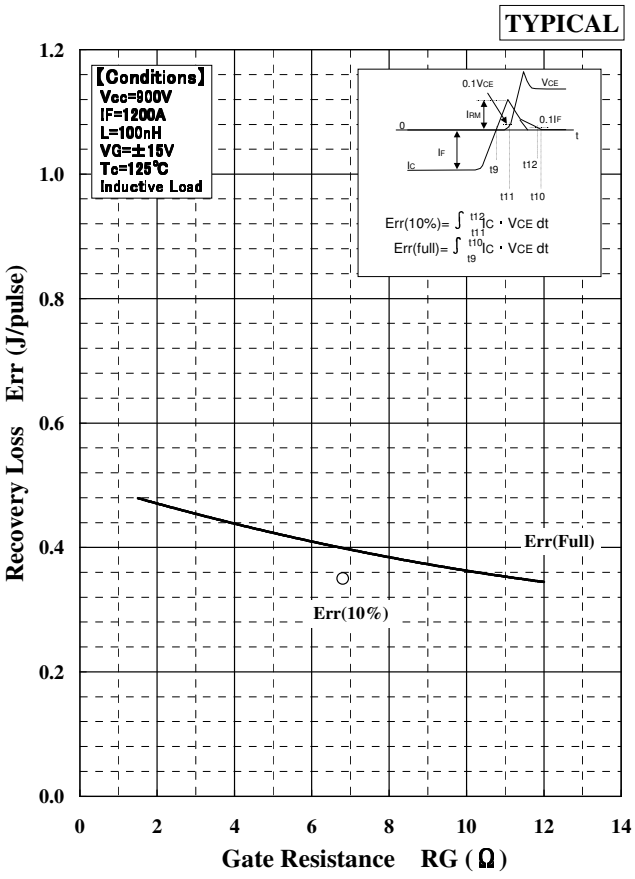
DEPENDENCE OF RG



Turn-on Loss vs. Gate Resistance



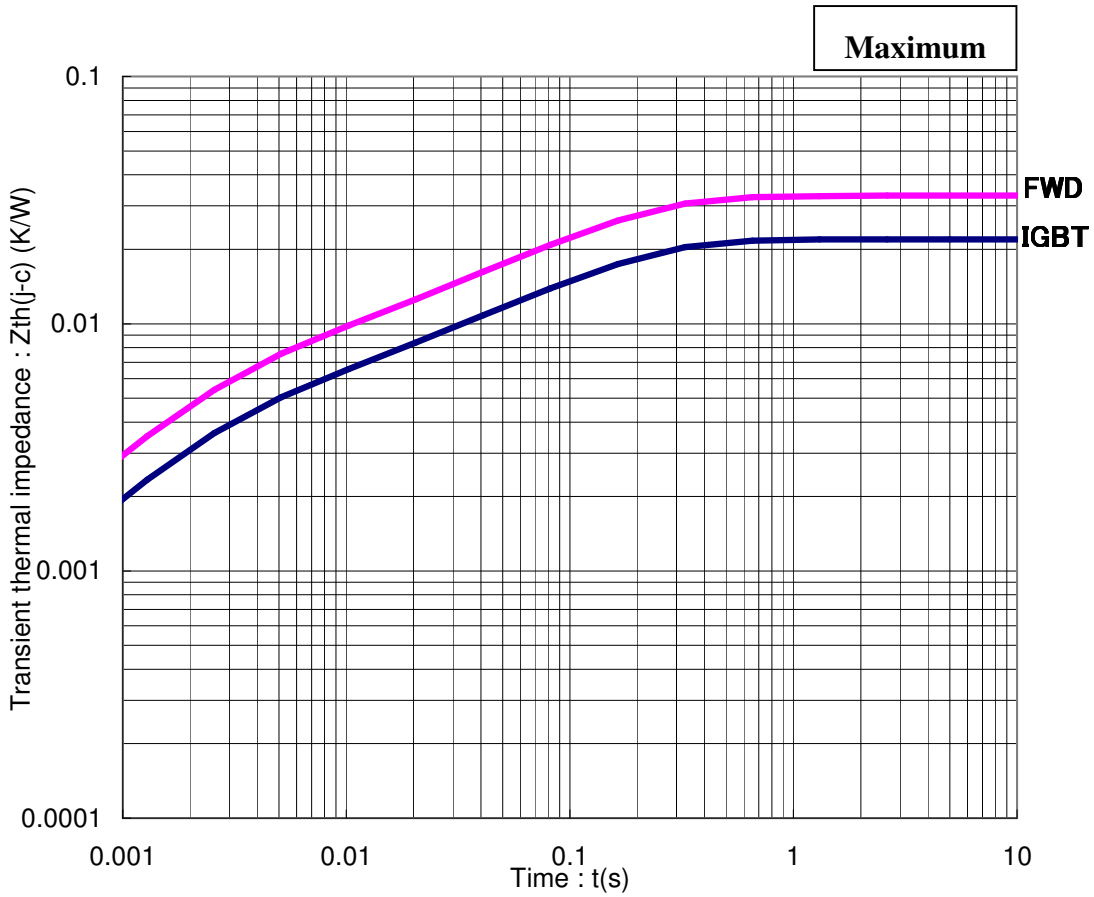
Turn-off Loss vs. Gate Resistance



Recovery Loss vs. Gate Resistance

Thermal Impedance

TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve

Negative environmental impact material

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

Material	Contained part
Lead (Pb) and its compounds	Solder
Arsenic and its compounds	Si chip

HITACHI POWER SEMICONDUCTORS

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