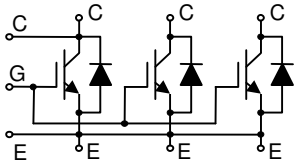
MBN900D45A

Silicon N-channel IGBT

FEATURES

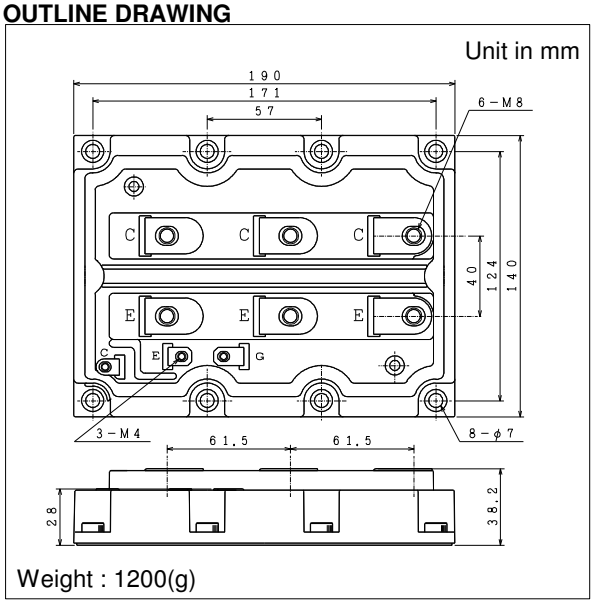
* High speed, low loss IGBT module.
* Low driving power due to low input capacitance MOS gate.
* Low noise due to ultra soft fast recovery diode.
* High reliability, high durability module.
* High thermal fatigue durability. (delta Tc=70°C, N>30,000cycles)
* Isolated head sink (terminal to base).

CIRCUIT DIAGRAM



TERMINALS

OUTLINE DRAWING



ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Item		Symbol	Unit	MBN900D45A
Collector Emitter Voltage		V_{CES}	V	4,500
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	900
	1ms	I_{Cp}		1,800
Forward Current	DC	I_F	A	900
	1ms	I_{FM}		1,800
Junction Temperature		T_j	°C	-40 ~ +125
Storage Temperature		T_{stg}	°C	-40 ~ +125
Isolation Voltage		V_{ISO}	V_{RMS}	6,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	N·m	2/10 (1)
	Mounting (M6)	-		6 (2)

Notes: (1) Recommended Value 1.8±0.2/9±1N·m (2) Recommended Value 5.5±0.5N·m

ELECTRICAL CHARACTERISTICS

Item		Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current		I_{CES}	mA	-	-	18	V_{CE}=4,500V, V_{GE}=0V, Tj=25°C
				-	50	100	V_{CE}=4,500V, V_{GE}=0V, Tj=125°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	-	5.5	tbd	I_C=900A, V_{GE}=15V, Tj=125°C
Gate Emitter Threshold Voltage		$V_{GE(TO)}$	V	4.5	6.0	7.5	V_{CE}=10V, I_C=900mA, Tj=25°C
Input Capacitance		C_{ies}	nF	-	130	-	V_{CE}=10V,V_{GE}=0V, f=100kHz, Tj=25°C
Internal Gate Resistance		Rge	Ω	-	1.5	-	V_{CE}=10V,V_{GE}=0V, f=100kHz, Tj=25°C
Switching Times	Rise Time	t_r	µs	-	1.6	2.5	V_{CC}=2,600V, Ic=900A
	Turn On Time	t_{on}		-	2.2	3.0	L=100nH
	Fall Time	t_f		-	1.9	3.0	R_G=2.2Ω (3)
	Turn Off Time	t_{off}		-	3.6	5.5	V_{GE}=±15V, Tj=125°C
Peak Forward Voltage Drop		V_{FM}	V	-	4.2	5.0	Ic=900A, V_{GE}=0V, Tj=125°C
Reverse Recovery Time		t_{rr}	µs	-	0.6	1.0	Vcc=2600V, Ic=900 A, L=100nH Tj=125°C
Turn On Loss		$E_{on(10\%)}$	J/P		2.2	3.0	V_{CC}=2600, Ic=900, L=100nH
Turn Off Loss		$E_{off(10\%)}$	J/P		2.0	2.5	R_G=2.2Ω (3)
Reverse Recovery Loss		$E_{rr(10\%)}$	J/P		1.1	1.5	V_{GE}=±15V, Tj=125°C
Stray inductance module		L_{SCE}	nH	-	13	-	
Thermal Impedance	IGBT	Rth(j-c)	°C/W	-	-	0.008	Junction to case
	FWD	Rth(j-c)		-	-	0.016	
Contact Thermal Impedance		Rth(c-f)	°C/W	-	0.006	-	Case to fin

Notes:(3) R_G value is the test condition's value 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.

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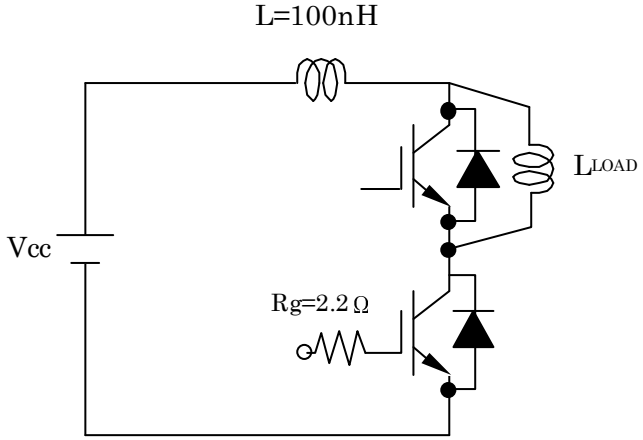
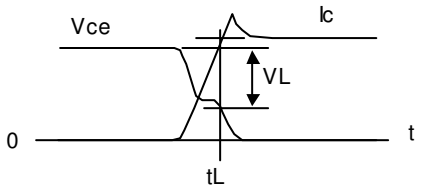
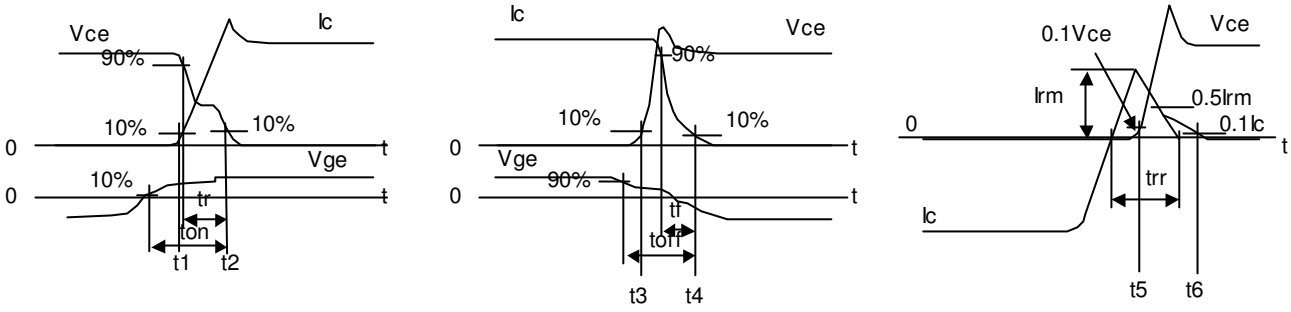


Fig 1 Switching Test circuit



$$L = \frac{V_L}{\left(\frac{dIc}{dt}\right)_{t=tL}}$$

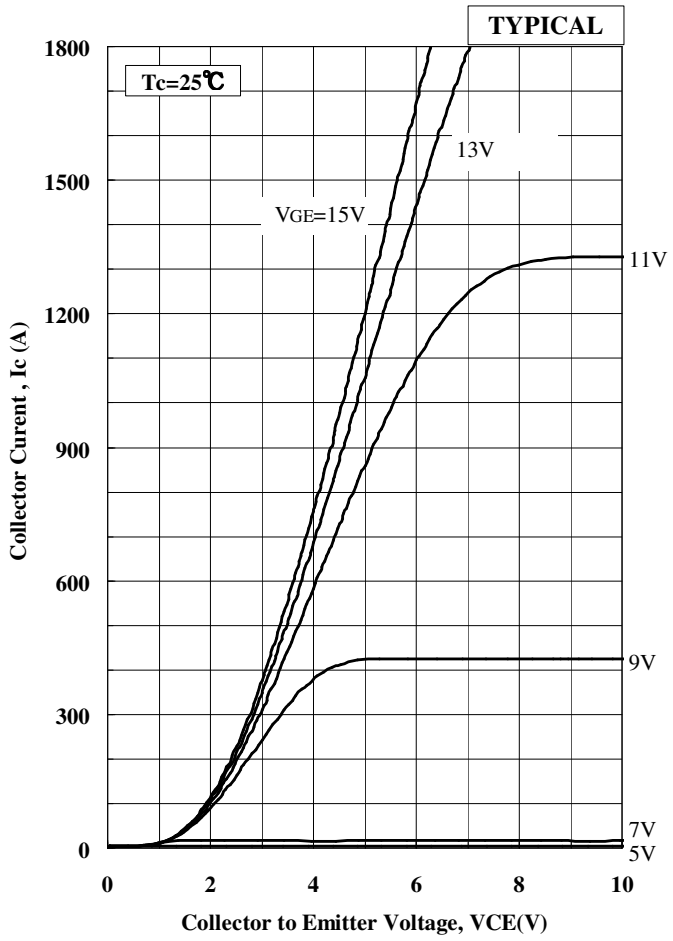
Fig 2 Difinition of stray inductance



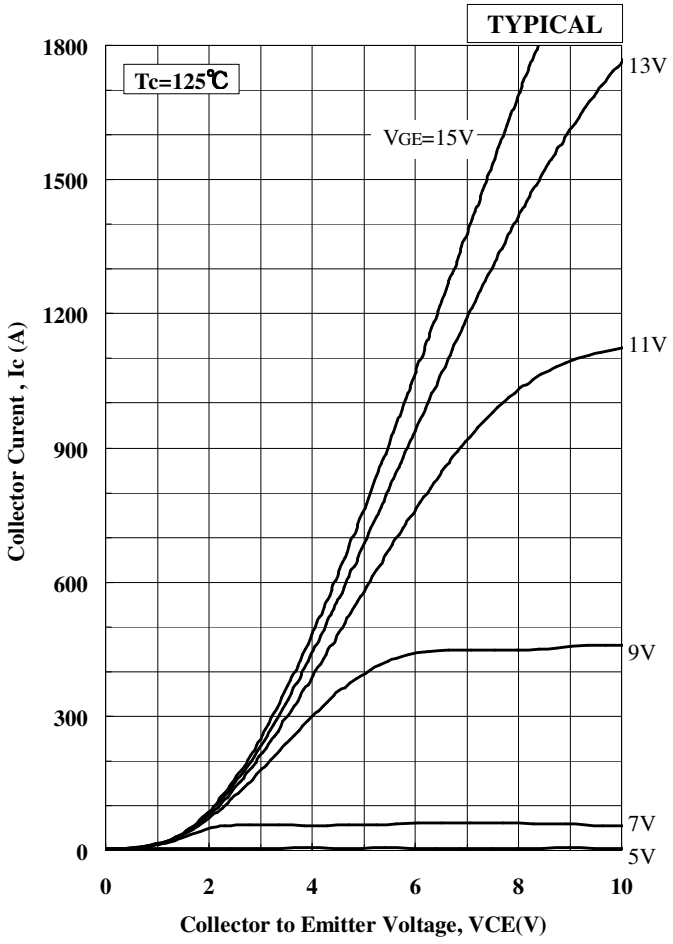
$$Eon(10\%) = \int_{t1}^{t2} Ic \cdot Vce\, dt \qquad Eoff(10\%) = \int_{t3}^{t4} Ic \cdot Vce\, dt \qquad Err(10\%) = \int_{t5}^{t6} IF \cdot Vce\, dt$$

$$Eon(Full) = \int_{t7}^{t8} Ic \cdot Vce\, dt \qquad Eoff(Full) = \int_{t9}^{t10} Ic \cdot Vce\, dt \qquad Err(Full) = \int_{t11}^{t12} IF \cdot Vce\, dt$$

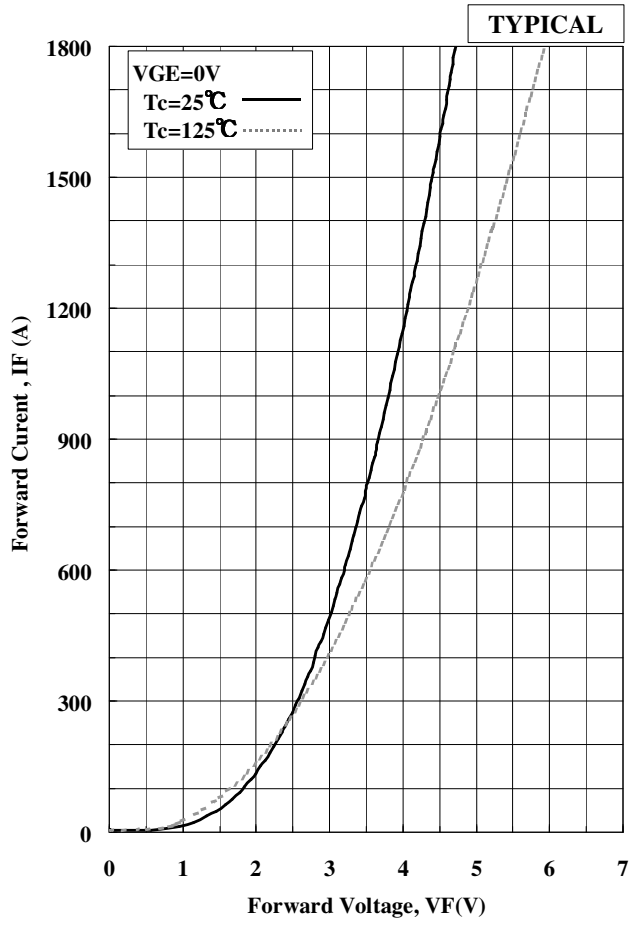
Fig.3 Definition of switching loss



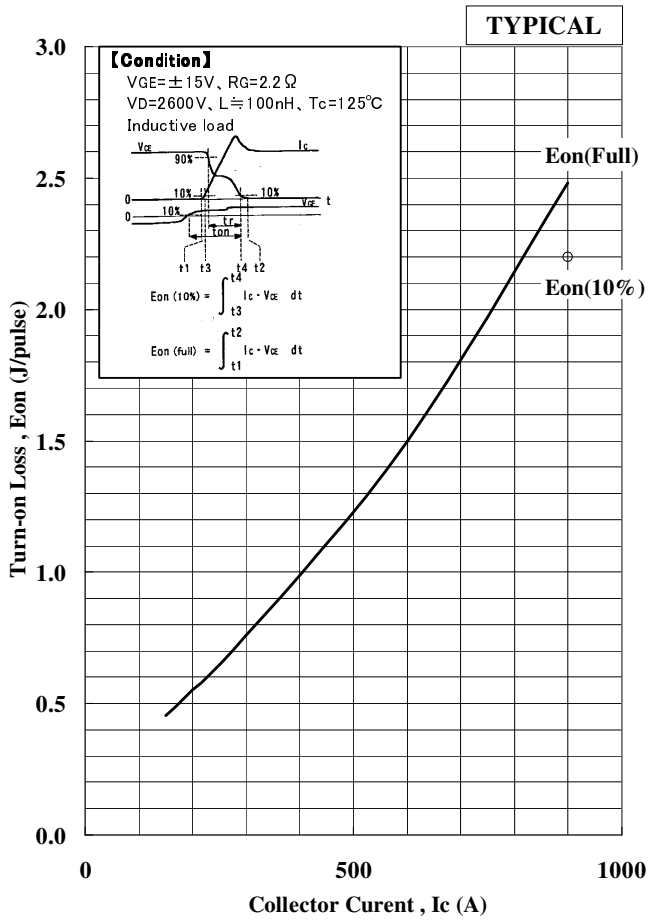
Collector Current vs.Collector to Emitter Voltage



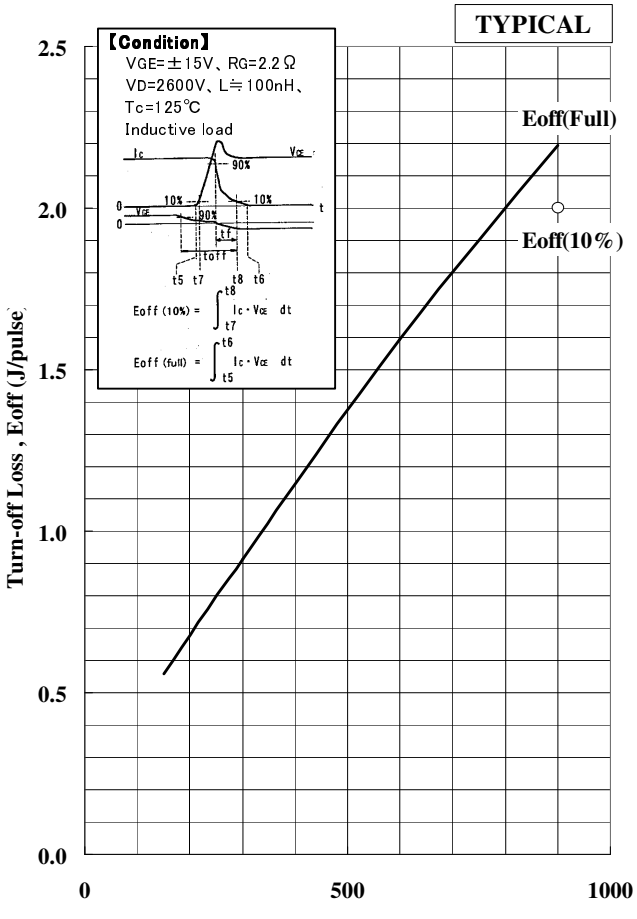
Collector Current vs.Collector to Emitter Voltage



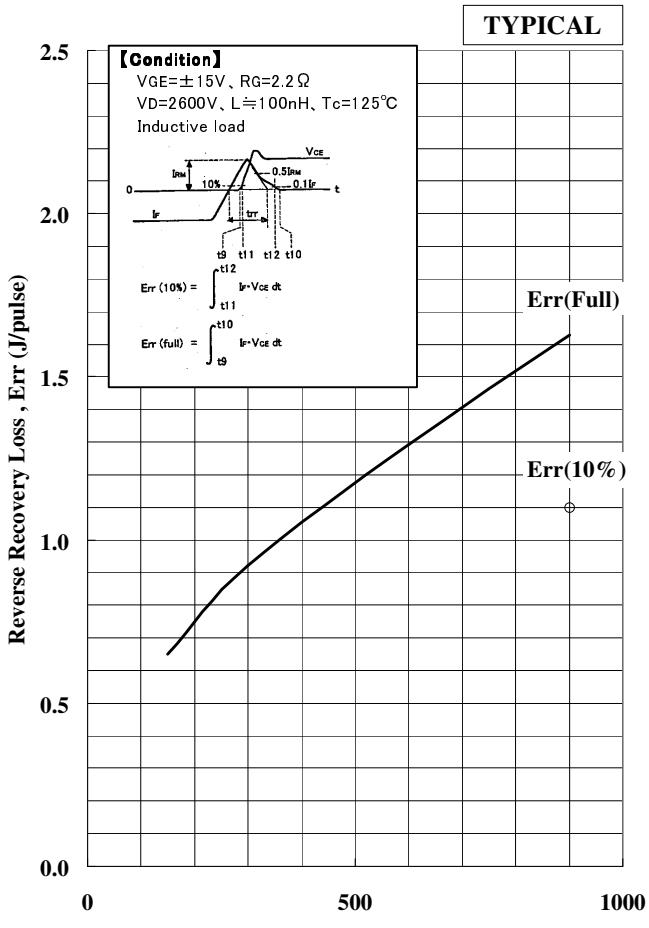
Forward Voltage of free-wheeling diode



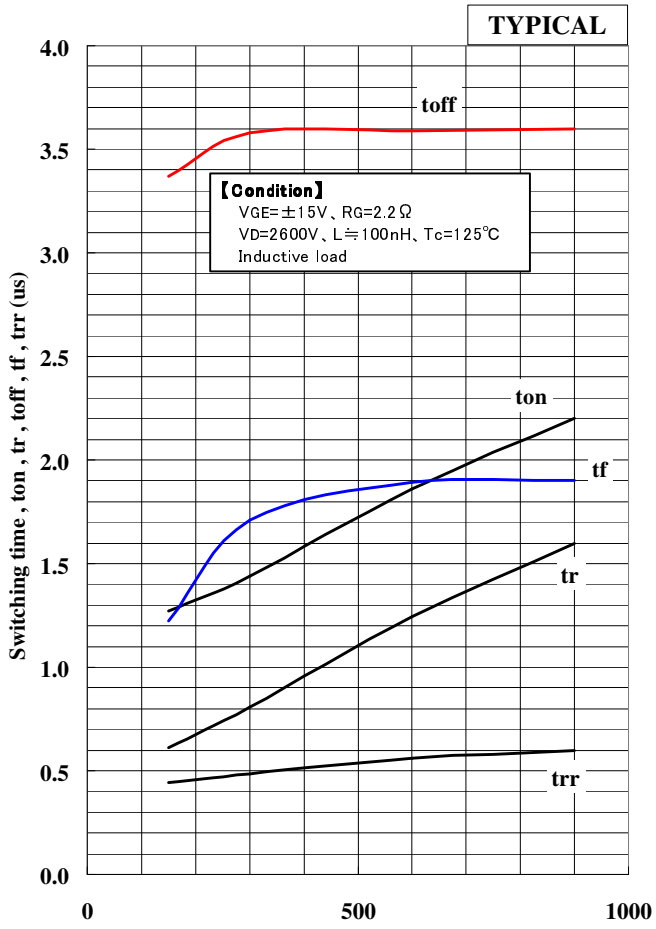
Turn-on Loss vs.Collector Current



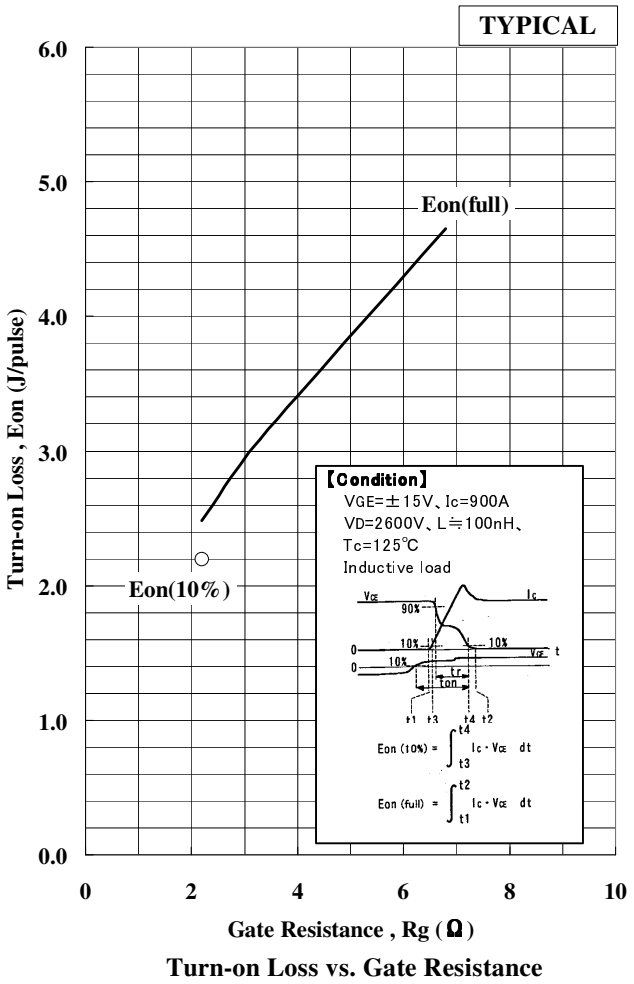
Turn-off Loss vs.Collector Current



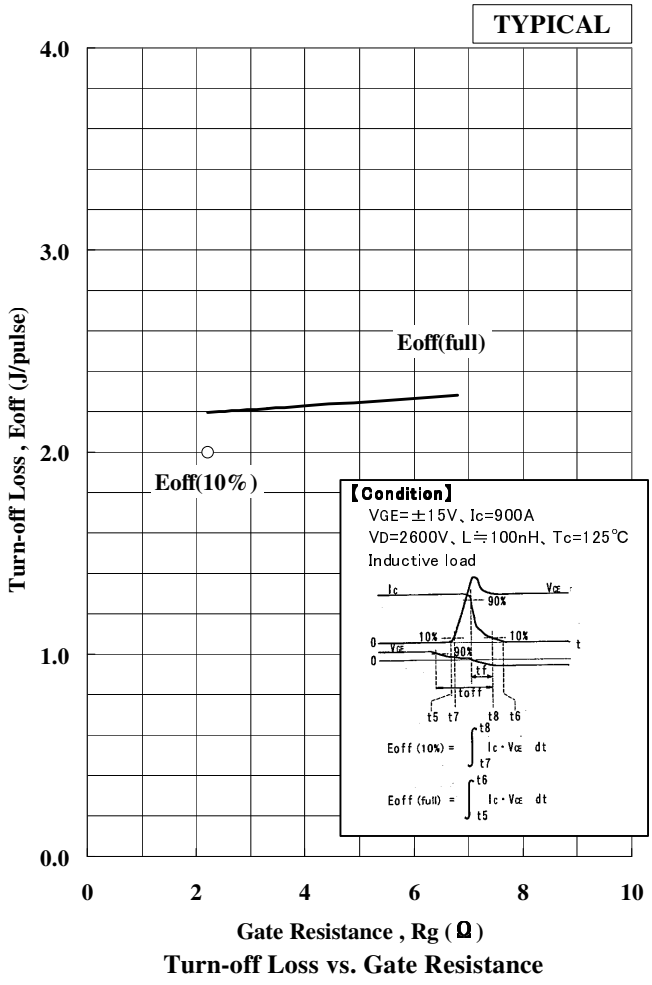
Recovery Loss vs.Collector Current



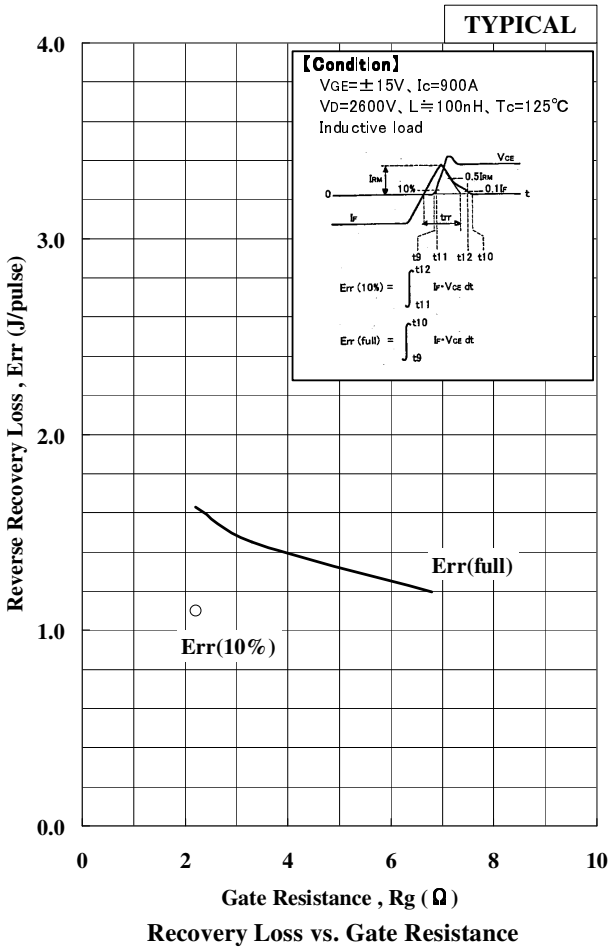
Switching time vs. Collector current



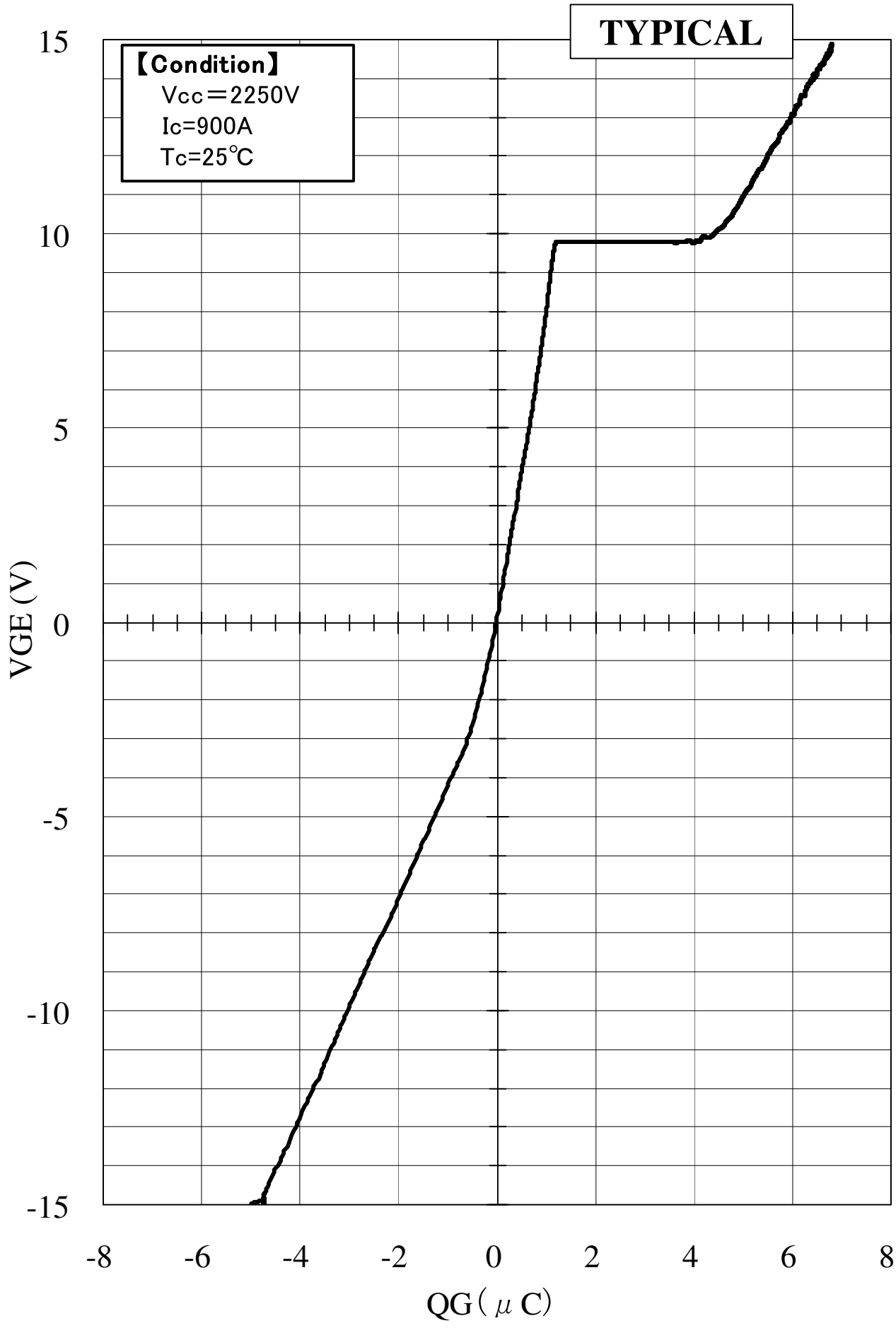
Turn-on Loss vs. Gate Resistance



Turn-off Loss vs. Gate Resistance

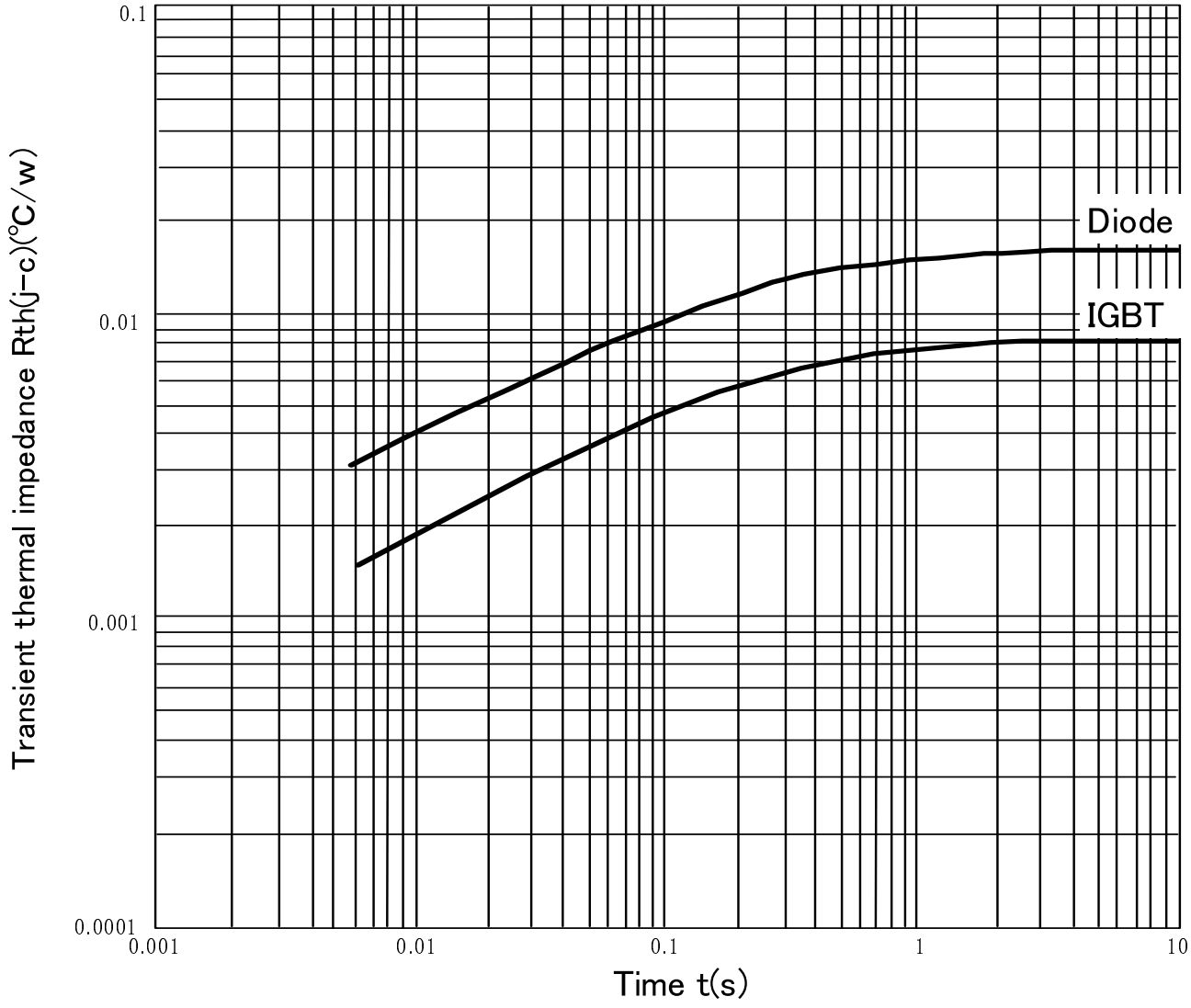


Recovery Loss vs. Gate Resistance


TYPICAL
【Condition】
Vcc＝2250V
Ic=900A
Tc=25℃
15
10
5
0
-5
-10
-15
VGE (V)
-8
-6
-4
-2
0
2
4
6
8
QG（μC）

Qg-VGE curve

TYPICAL



Trannsient thermal impedance

HITACHI POWER SEMICONDUCTORS

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