

MBN900D45A

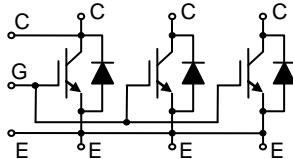
Silicon N-channel IGBT

OUTLINE DRAWING

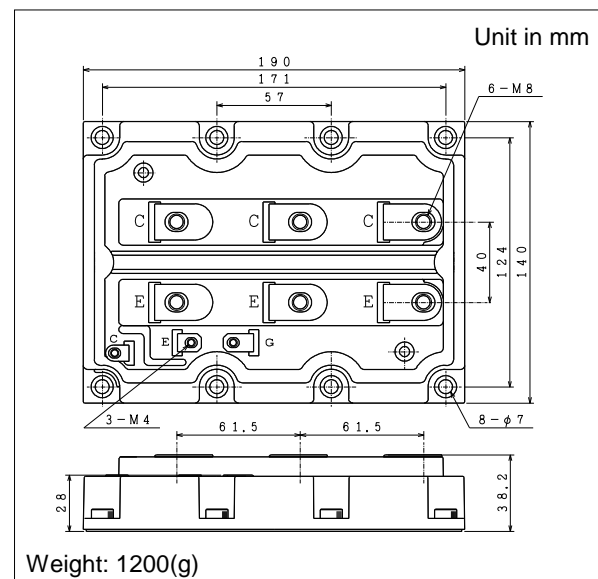
FEATURES

- * 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.
($\Delta T_c=70^\circ\text{C}$, $N>30,000$ cycles)
- * Isolated head sink (terminal to base).

CIRCUIT DIAGRAM



TERMINALS



ABSOLUTE MAXIMUM RATINGS ($T_c=25^\circ\text{C}$)

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

Notes: (1) Recommended Value $1.8\pm 0.2/9\pm 1\text{N}\cdot\text{m}$ (2) Recommended Value $5.5\pm 0.5\text{N}\cdot\text{m}$

ELECTRICAL CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions	
Collector Emitter Cut-Off Current	I_{CES}	mA	-	-	18	$V_{CE}=4,500\text{V}$, $V_{GE}=0\text{V}$, $T_j=25^\circ\text{C}$	
			-	50	100	$V_{CE}=4,500\text{V}$, $V_{GE}=0\text{V}$, $T_j=125^\circ\text{C}$	
Gate Emitter Leakage Current	I_{GES}	nA	-500	-	+500	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_j=25^\circ\text{C}$	
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	V	-	5.5	tbd	$I_C=900\text{A}$, $V_{GE}=15\text{V}$, $T_j=125^\circ\text{C}$	
Gate Emitter Threshold Voltage	$V_{GE(TO)}$	V	4.5	6.0	7.5	$V_{CE}=10\text{V}$, $I_C=900\text{mA}$, $T_j=25^\circ\text{C}$	
Input Capacitance	C_{ies}	nF	-	130	-	$V_{CE}=10\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$, $T_j=25^\circ\text{C}$	
Internal Gate Resistance	R_{ge}	Ω	-	1.5	-	$V_{CE}=10\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$, $T_j=25^\circ\text{C}$	
Switching Times	Rise Time	t_r	-	1.6	2.5	$V_{CC}=2,600\text{V}$, $I_C=900\text{A}$	
	Turn On Time	t_{on}	-	2.2	3.0	$L=100\text{nH}$	
	Fall Time	t_f	-	1.9	3.0	$R_G=2.2\Omega$ (3)	
	Turn Off Time	t_{off}	-	3.6	5.5	$V_{GE}=\pm 15\text{V}$, $T_j=125^\circ\text{C}$	
Peak Forward Voltage Drop	V_{FM}	V	-	4.2	5.0	$I_F=900\text{A}$, $V_{GE}=0\text{V}$, $T_j=125^\circ\text{C}$	
Reverse Recovery Time	t_{rr}	μs	-	0.6	1.0	$V_{CC}=2,600\text{V}$, $I_F=900\text{A}$, $L=100\text{nH}$, $T_j=125^\circ\text{C}$	
Turn On Loss	$E_{on(10\%)}$	J/P	-	2.2	3.0	$V_{CC}=2,600\text{V}$, $I_C=900\text{A}$, $L=100\text{nH}$	
Turn Off Loss	$E_{off(10\%)}$	J/P	-	2.0	2.5	$R_G=2.2\Omega$ (3)	
Reverse Recovery Loss	$E_{rr(10\%)}$	J/P	-	1.1	1.5	$V_{GE}=\pm 15\text{V}$, $T_j=125^\circ\text{C}$	
Stray inductance module	L_{SCE}	nH	-	13	-		
Thermal Impedance	IGBT	$R_{th(j-c)}$	K/W	-	-	0.008	Junction to case
	FWD	$R_{th(j-c)}$	K/W	-	-	0.016	
Contact Thermal Impedance	$R_{th(c-f)}$	K/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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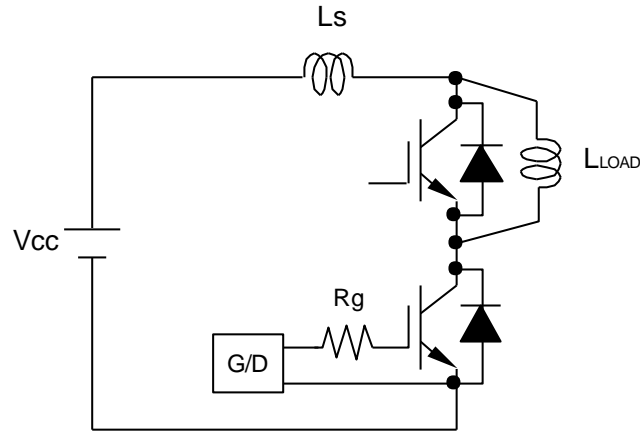


Fig.1 Switching test circuit

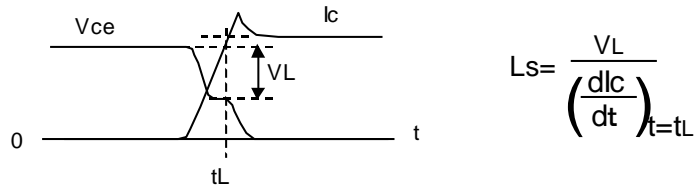


Fig.2 Definition of Ls

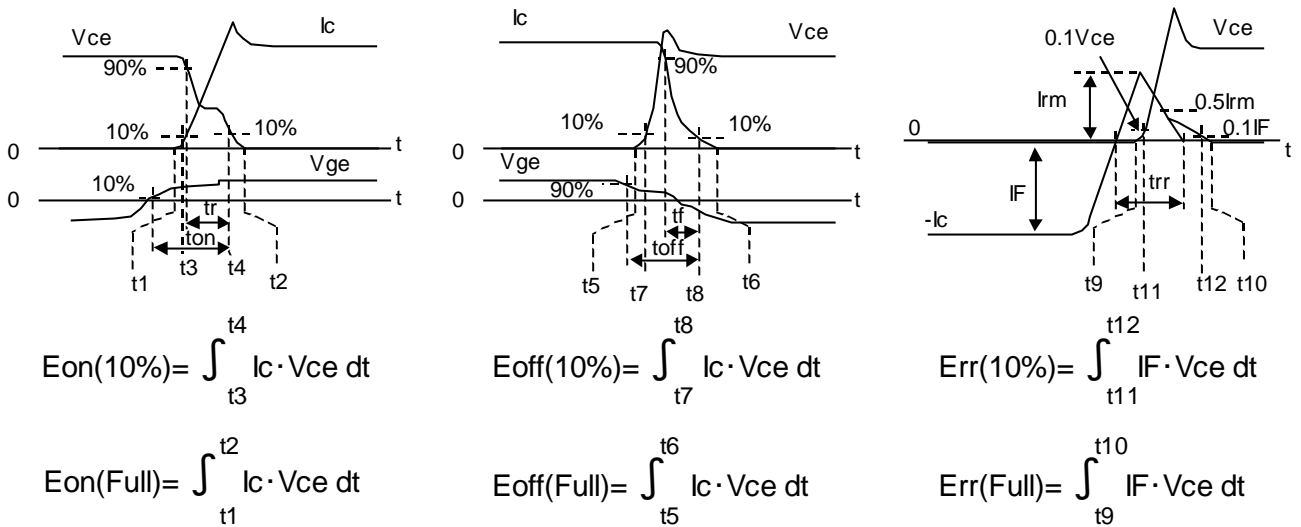
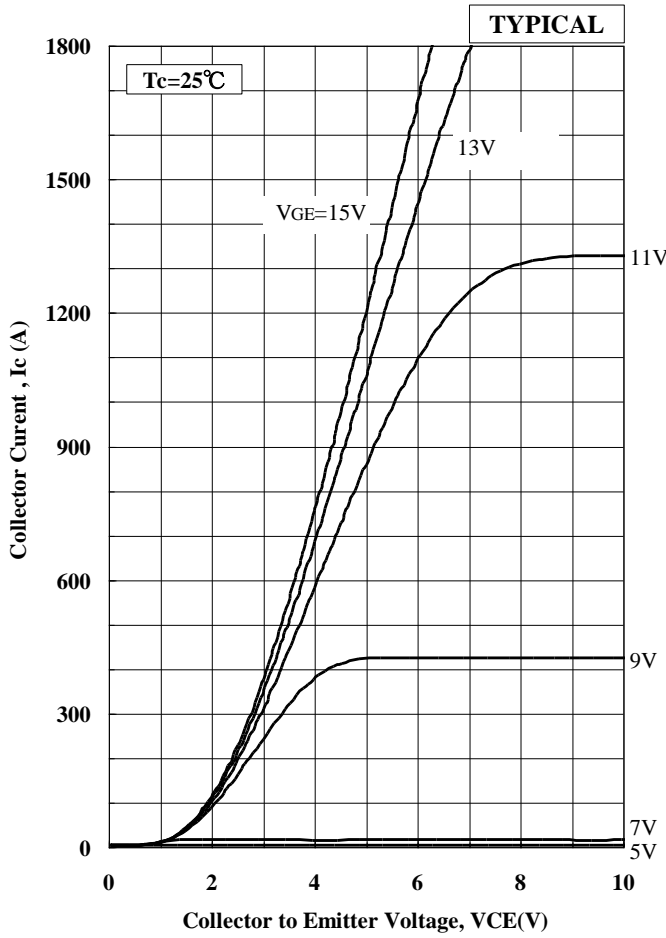
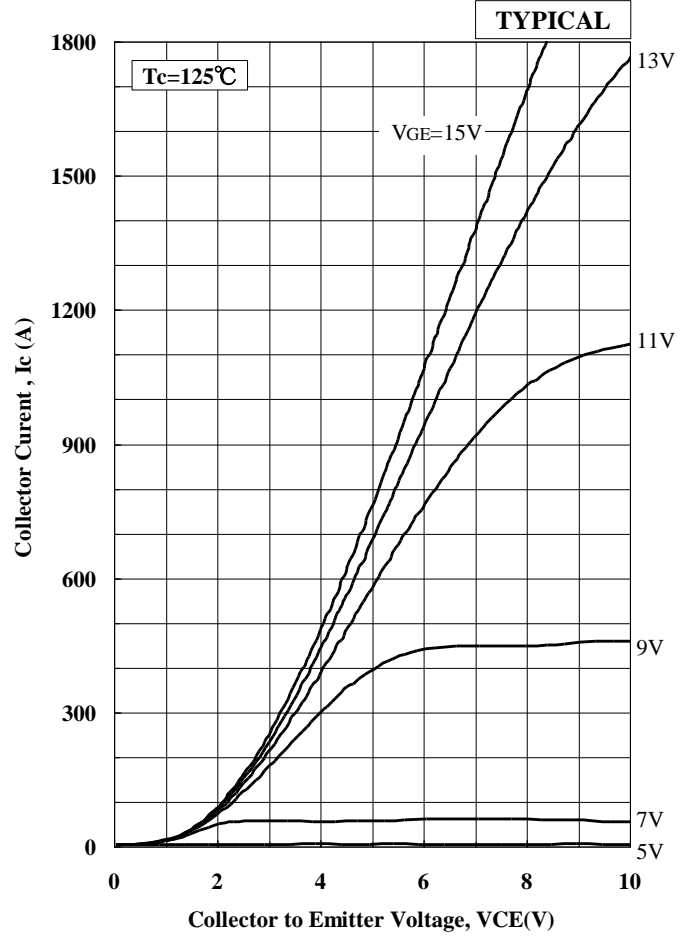


Fig.3 Definition of switching loss

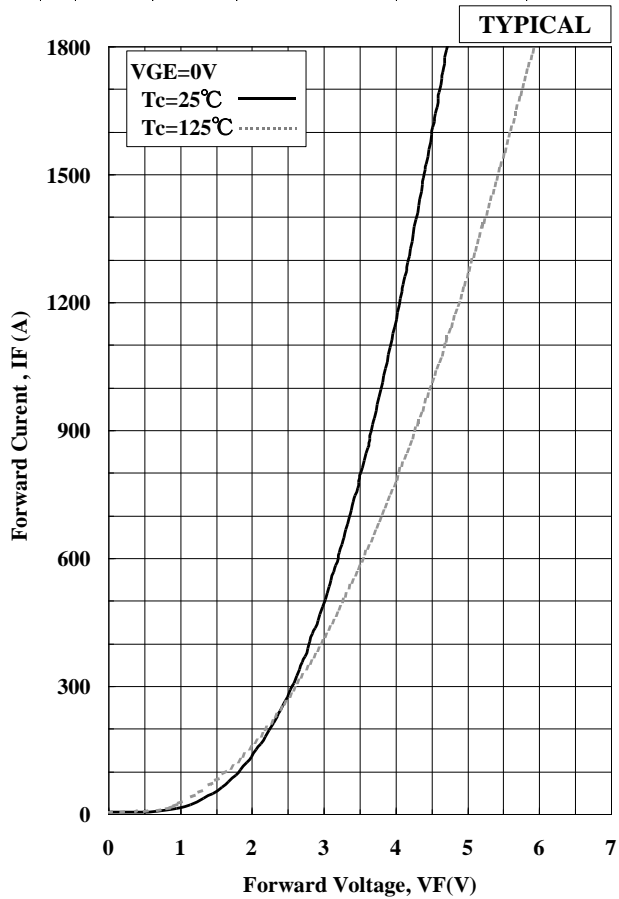
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Collector Current vs. Collector to Emitter Voltage

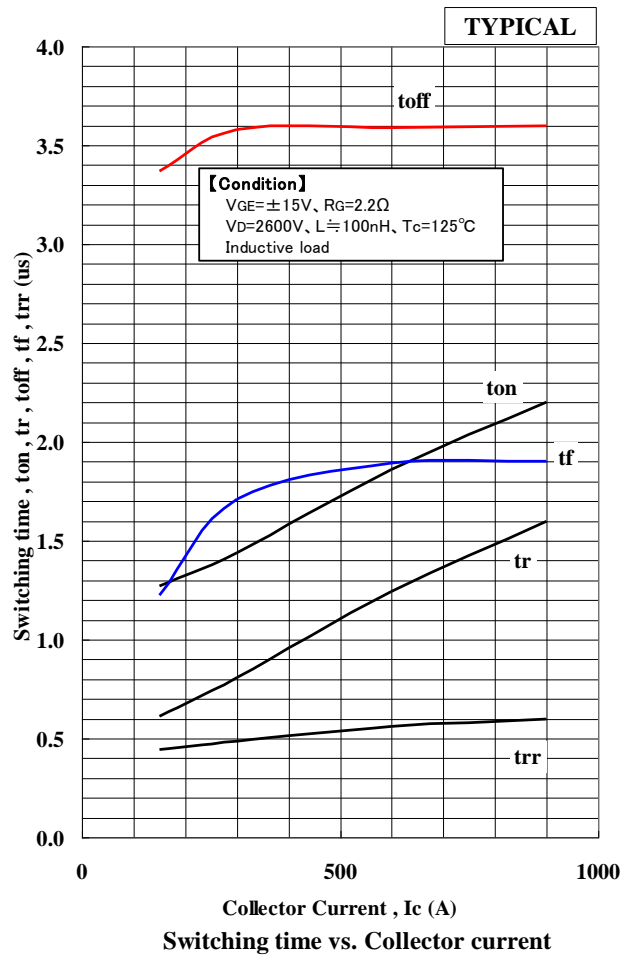
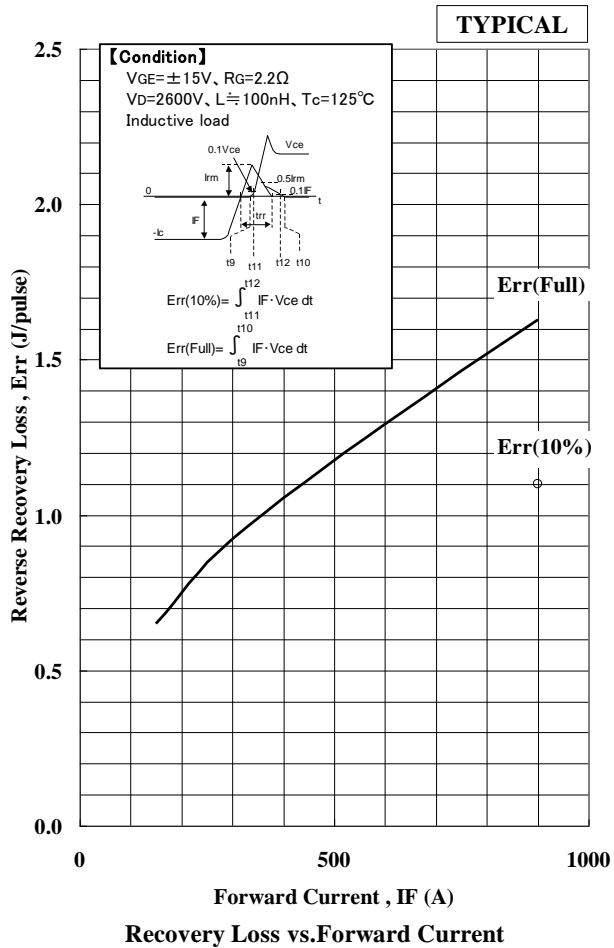
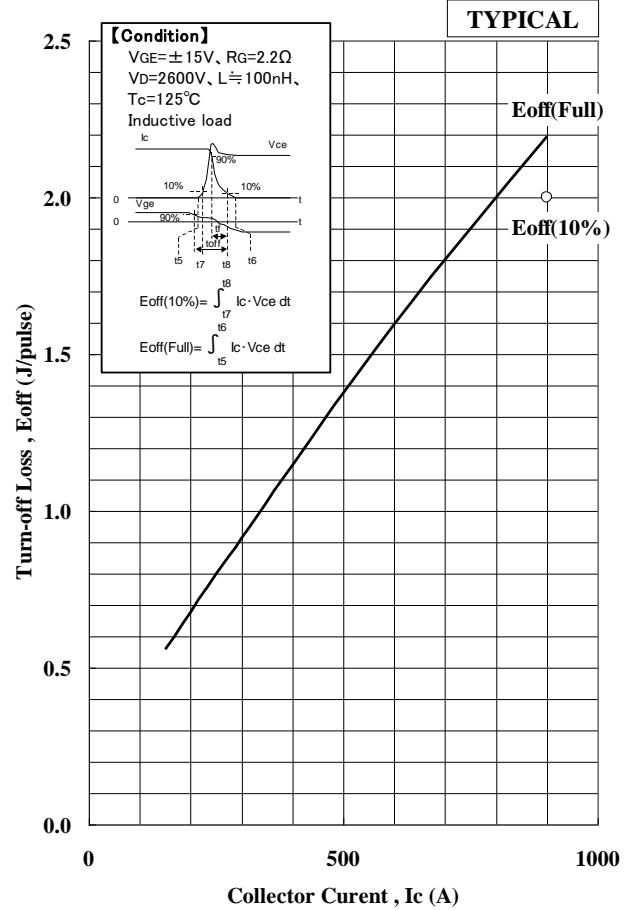
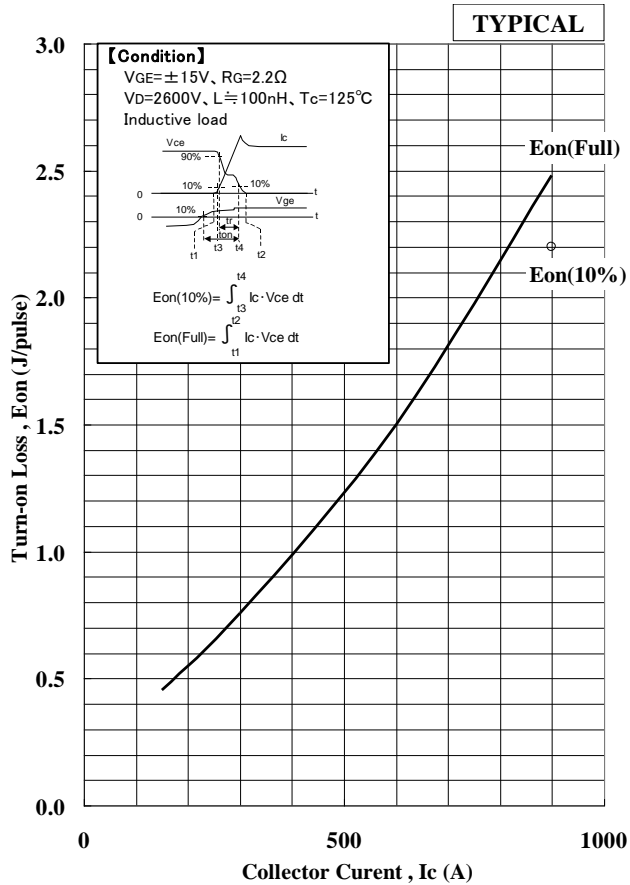


Collector Current vs. Collector to Emitter Voltage

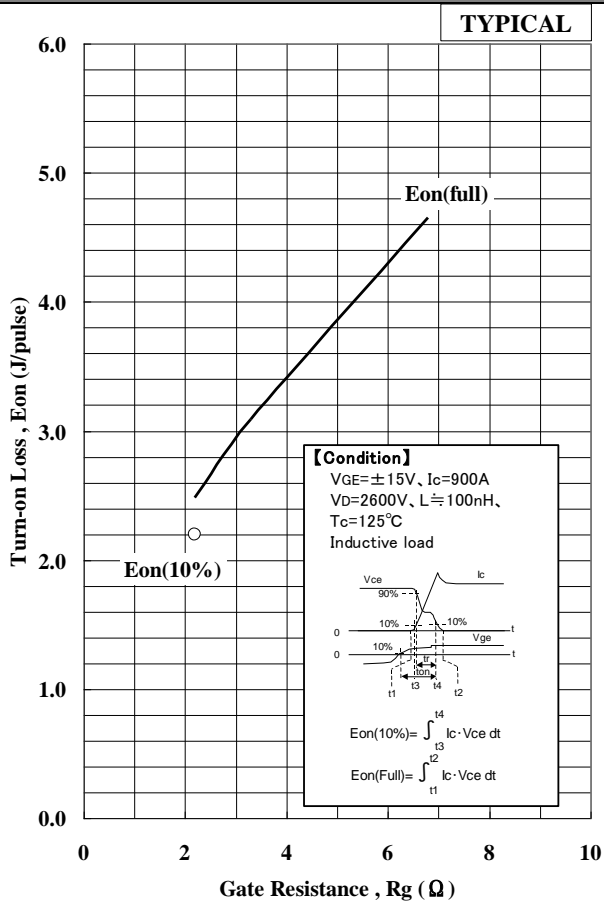


Forward Voltage of free-wheeling diode

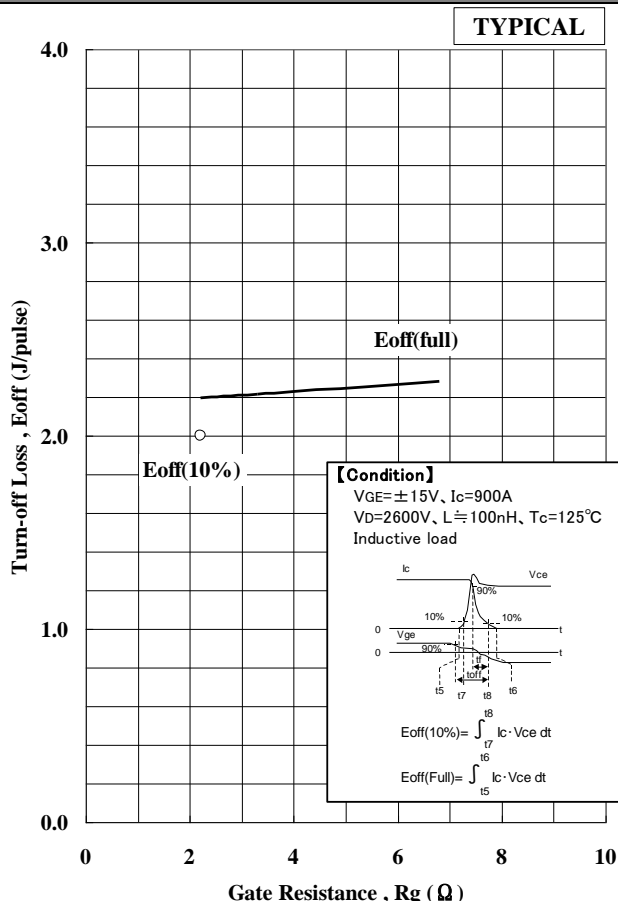
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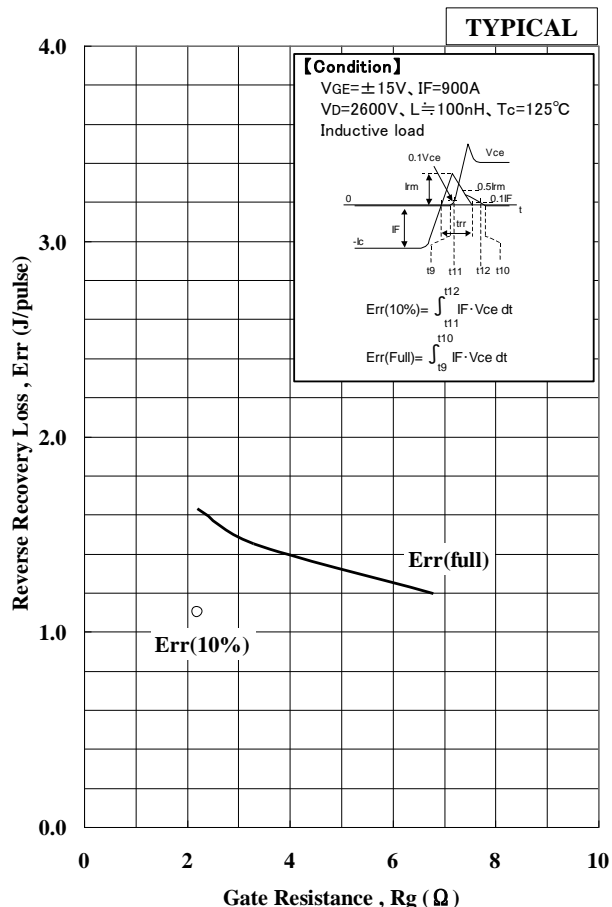
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Turn-on Loss vs. Gate Resistance

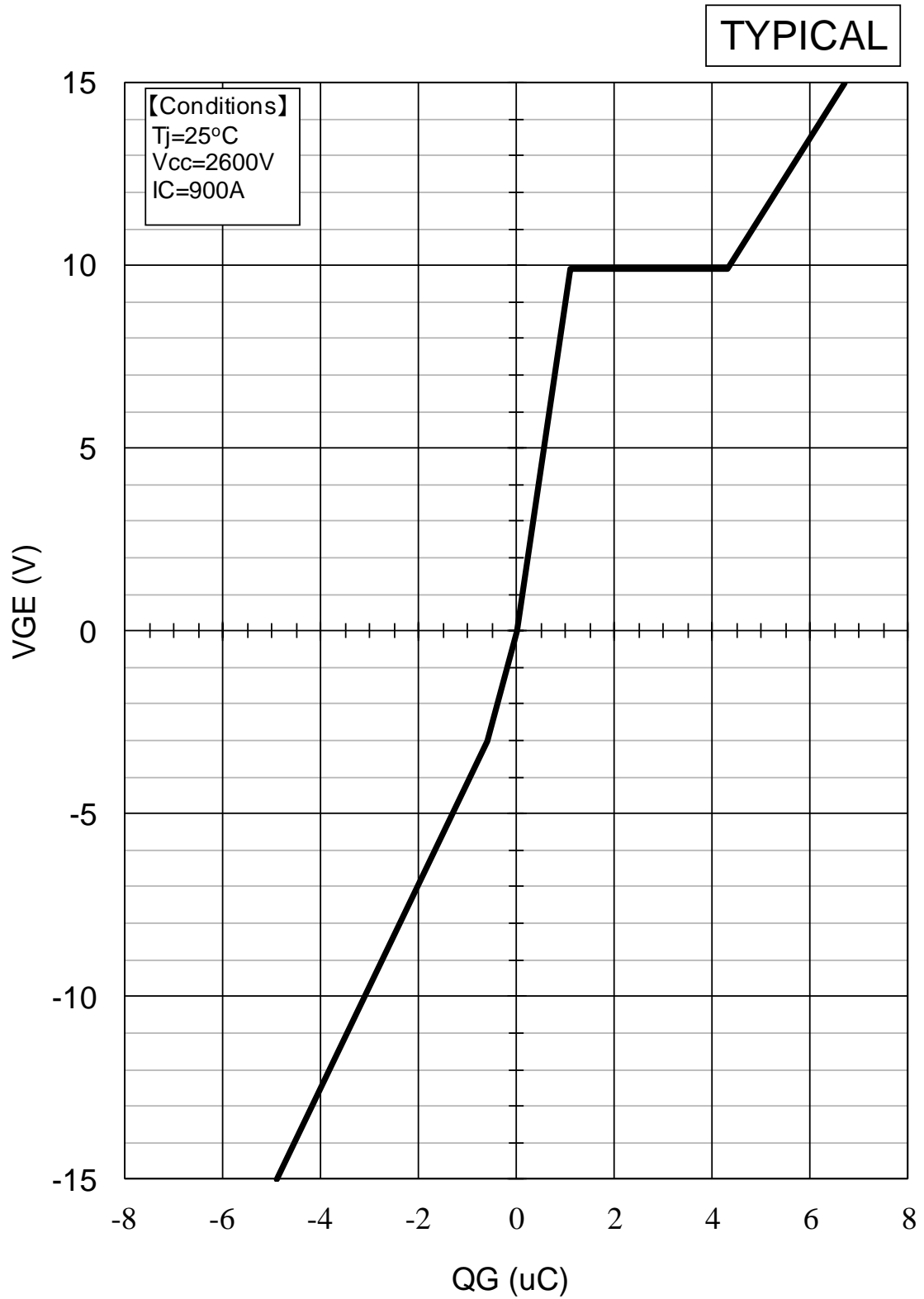


Turn-off Loss vs. Gate Resistance



Recovery Loss vs. Gate Resistance

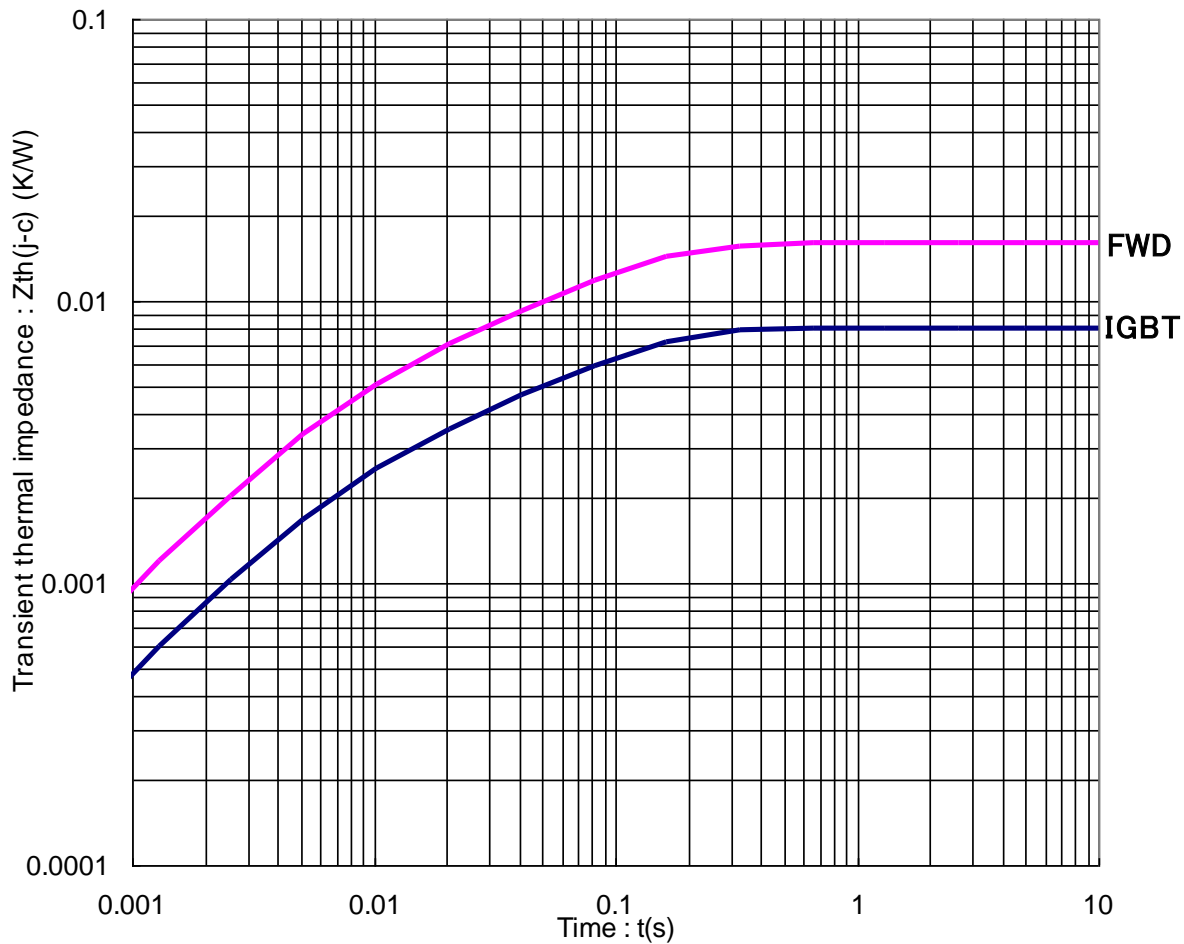
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QG-VGE curve

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Maximum



Transient Thermal Impedance Curve

Material Declaration

Please note that following materials are contained in the product In order to keep characteristics and reliability level.

Material	Contained part
Lead (Pb) and its compounds	Solder

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HITACHI POWER SEMICONDUCTORS

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