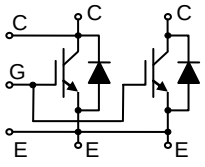
MBN600E45A

Silicon N-channel IGBT

FEATURES

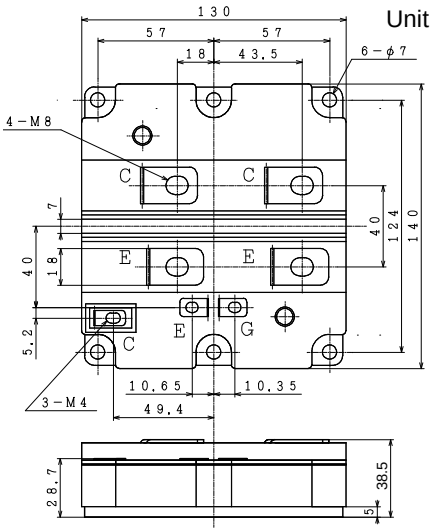
- High speed, low loss IGBT module.
- Low driving power due to low input capacitance MOS gate.
- Low noise due to ultra soft fast recovery diode.
- High reliability, high durability module.
- High thermal fatigue durability. (delta Tc=70°C, N>30,000cycles)
- Isolated heat sink (terminal to base).

CIRCUIT DIAGRAM



TERMINALS

OUTLINE DRAWING



Weight: 900(g)

ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Item		Symbol	Unit	MBN600E45A
Collector Emitter Voltage		V_{CES}	V	4,500
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	600
	1ms	I_{Cp}		1,200
Forward Current	DC	I_F	A	600
	1ms	I_{FM}		1,200
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	-	-	12	V_{CE}=4,500V, V_{GE}=0V, Tj=25°C
				-	34	67	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	4.5	5.5	6.3	I_C=600A, 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=600mA, Tj=25°C
Input Capacitance		C_{ies}	nF	-	87	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Internal Gate Resistance		Rge	Ω	-	2.3	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Switching Times	Rise Time	t_r	μs	1.1	1.6	2.5	V_{CC}=2,600V, Ic=600A
	Turn On Time	t_{on}		1.5	2.2	3.0	L=130nH
	Fall Time	t_f		1.6	1.9	3.0	R_G=3.3Ω (3)
	Turn Off Time	t_{off}		3.1	3.6	5.5	V_{GE}=±15V, Tj=125°C
Peak Forward Voltage Drop		V_{FM}	V	3.7	4.2	5.0	IF=600A, V_{GE}=0V, Tj=125°C
Reverse Recovery Time		t_{rr}	μs	0.3	0.6	1.0	Vcc=2,600V, IF=600A, L=130nH Tj=125°C
Turn On Loss		$E_{on(10\%)}$	J/P		1.5	2.0	V_{CC}=2,600V, Ic=600A, L=130nH
Turn Off Loss		$E_{off(10\%)}$	J/P		1.3	1.7	R_G=3.3Ω (3)
Reverse Recovery Loss		$E_{rr(10\%)}$	J/P		0.7	1.0	V_{GE}=±15V, Tj=125°C
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.013	Junction to case
	FWD	Rth(j-c)		-	-	0.026	
Contact Thermal Impedance		Rth(c-f)	K/W	-	0.008	-	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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DEFINITION OF TEST CIRCUIT

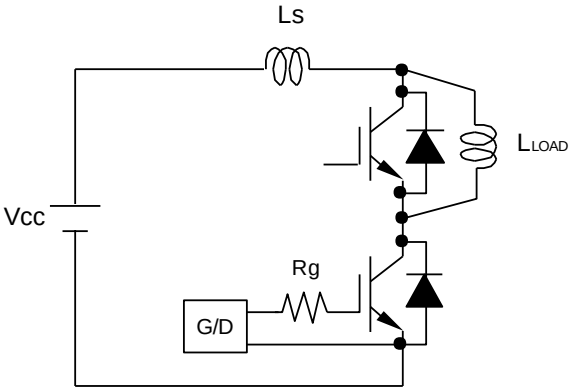

Fig.1 Switching test circuit

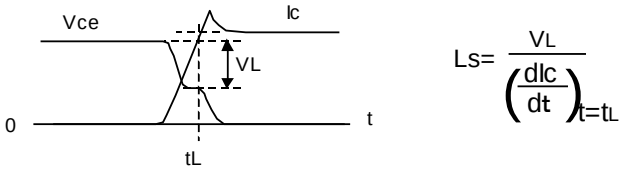

Fig.2 Definition of Ls

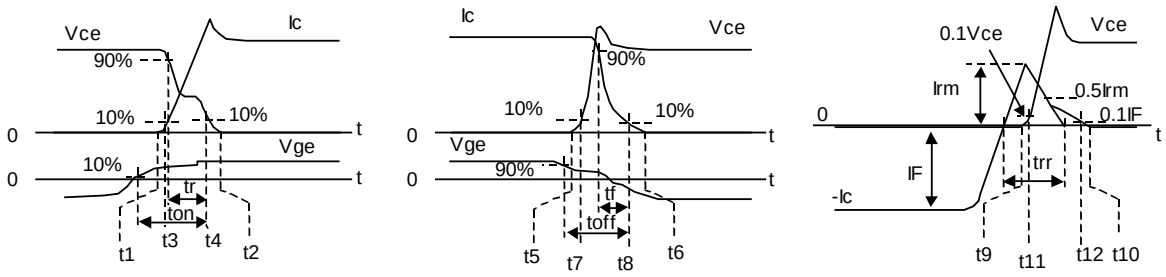

Fig.3 Definition of switching loss

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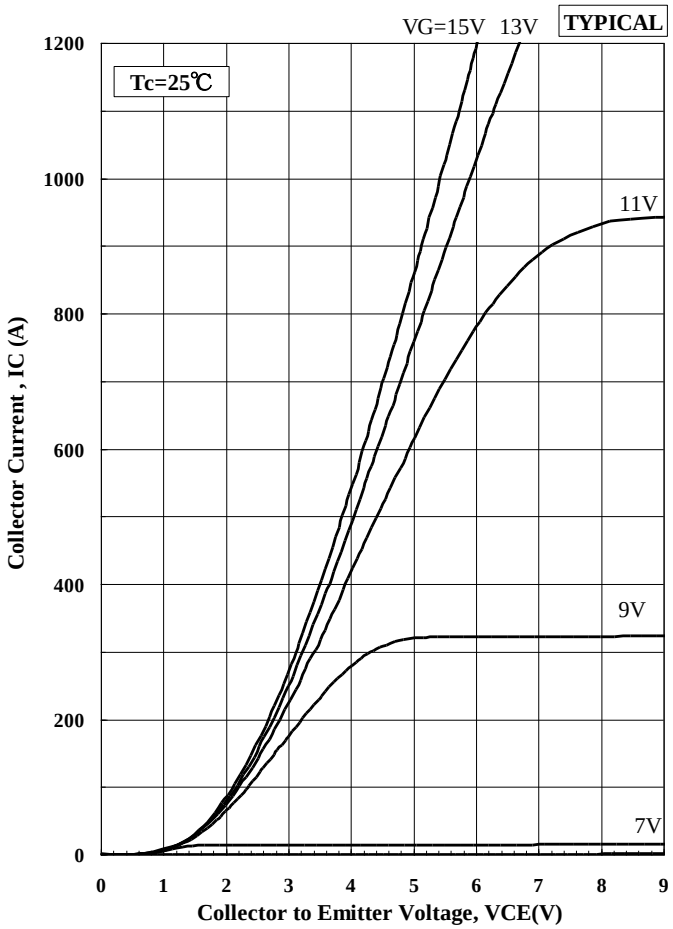
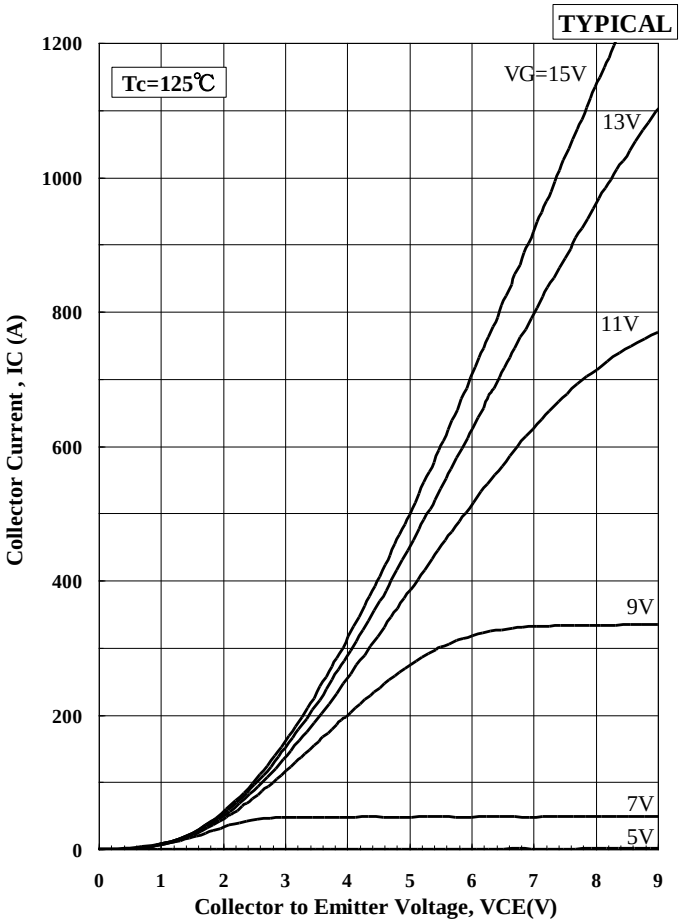
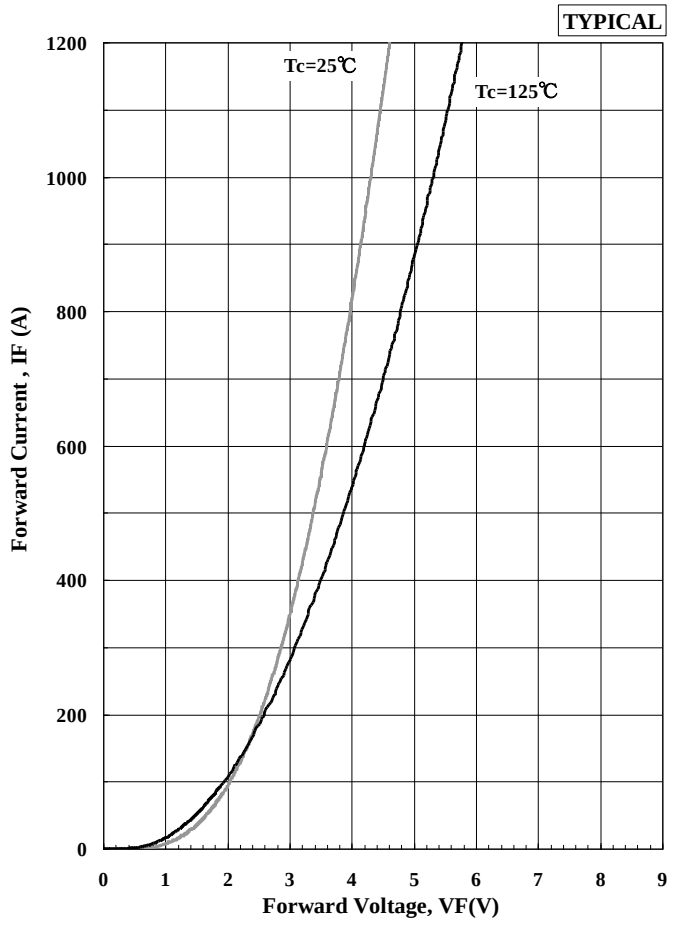
CHARACTERISTICS CURVE



Collector Current vs.Collector to Emitter Voltage



Collector Current vs.Collector to Emitter Voltage



Forward Voltage of free-wheeling diode

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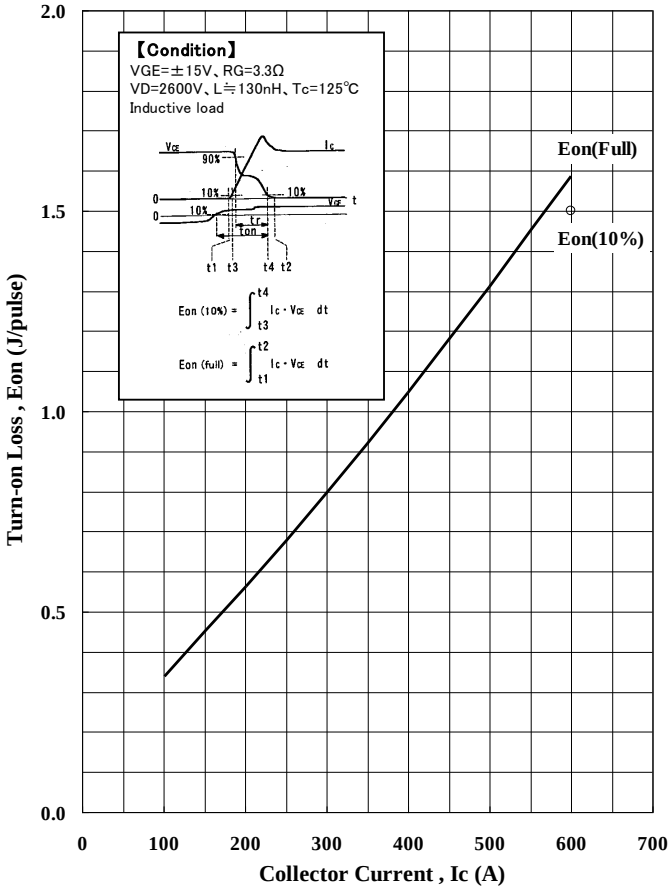
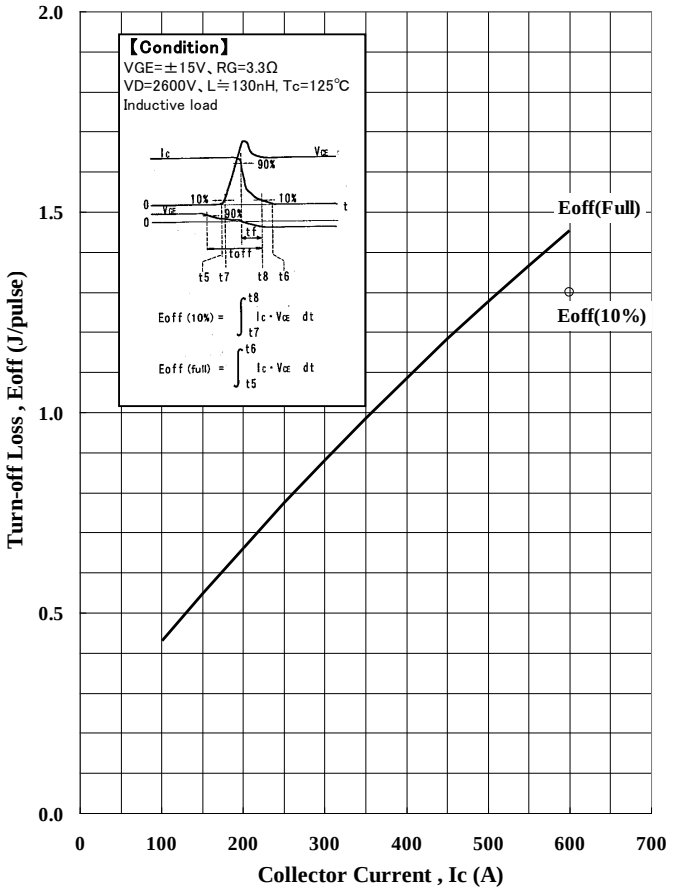
TYPICAL



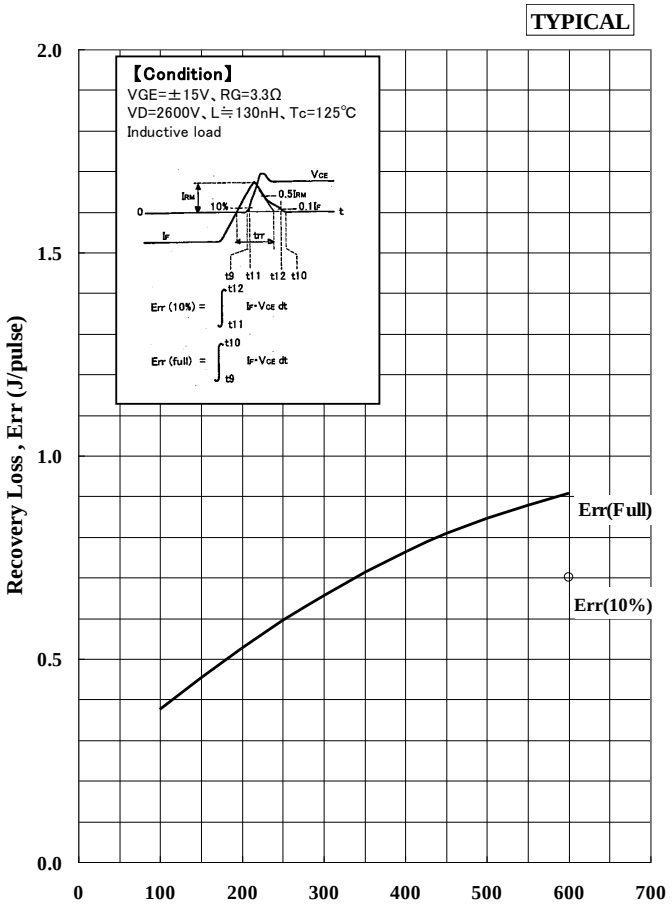
Turn-on Loss vs.Collector Current

TYPICAL



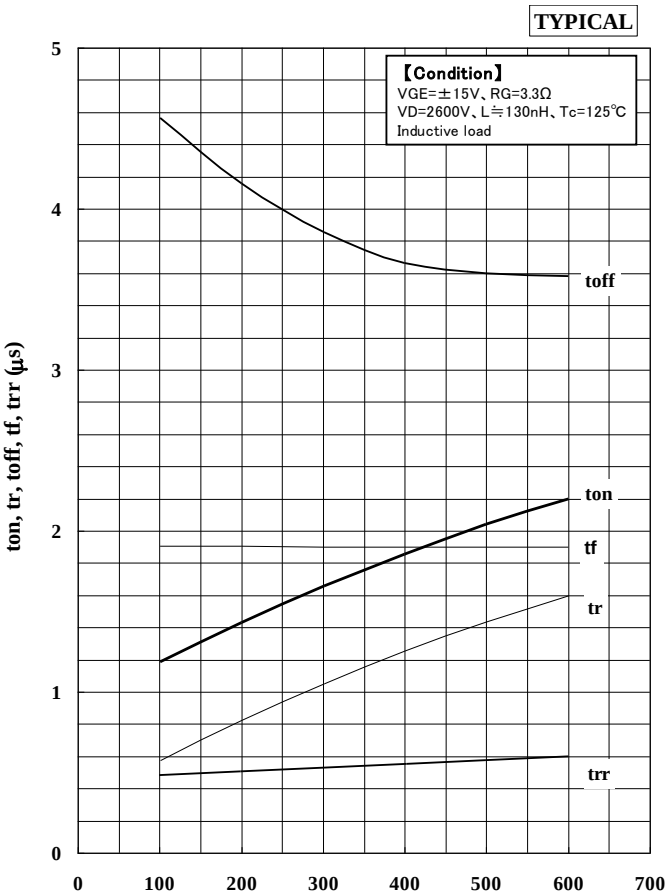
Turn-off Loss vs.Collector Current

TYPICAL



Recovery Loss vs.Collector Current

TYPICAL



Switching time vs. Collector current

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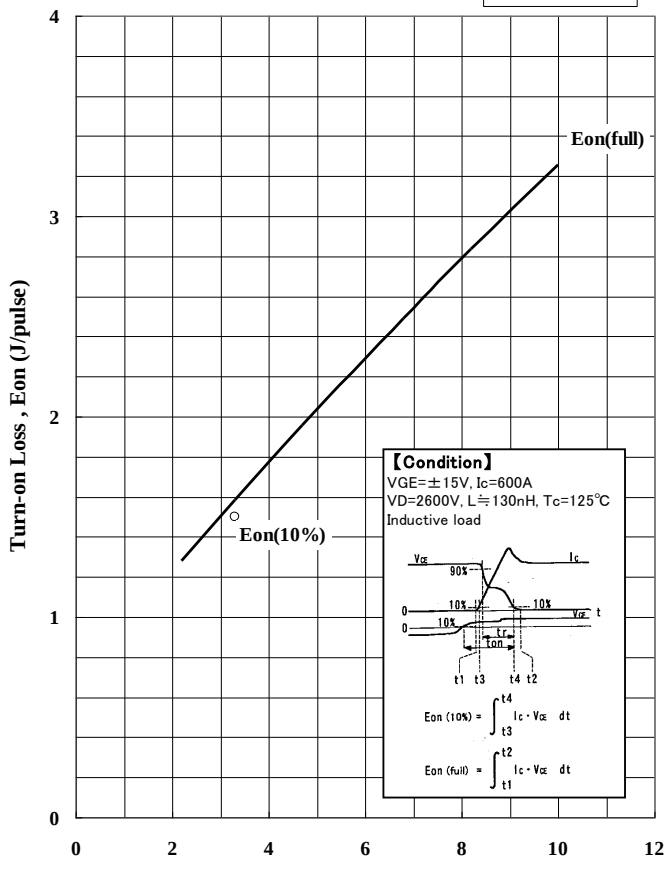
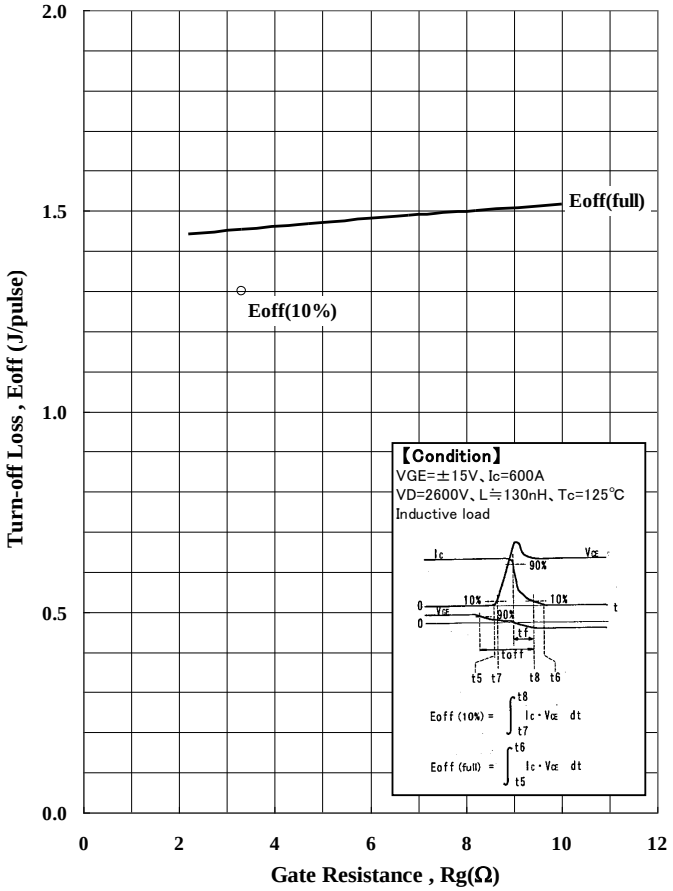
TYPICAL



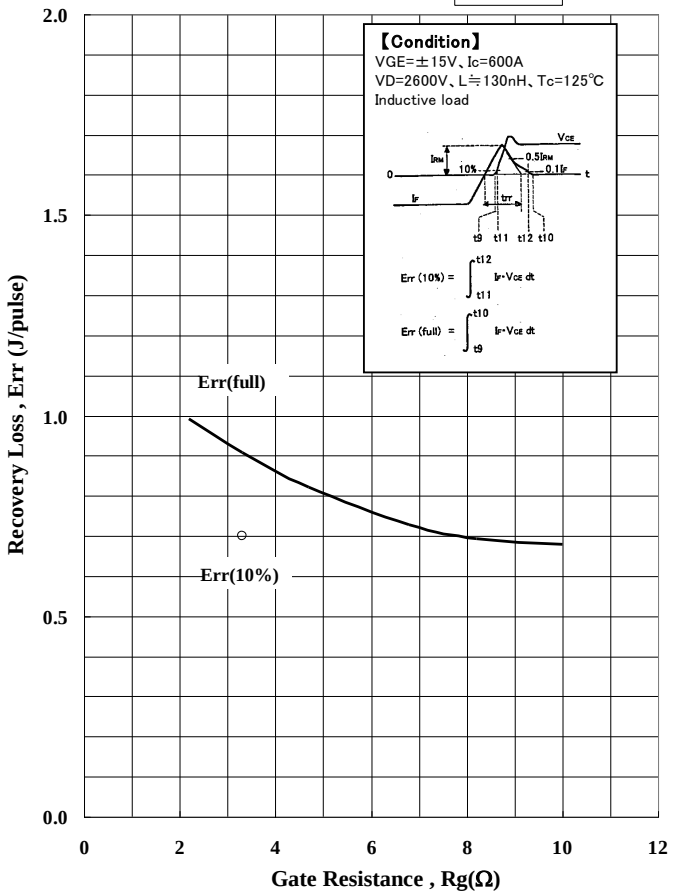
Turn-on Loss vs. Gate Resistance

TYPICAL



Turn-off Loss vs. Gate Resistance

TYPICAL



Recovery Loss vs. Gate Resistance

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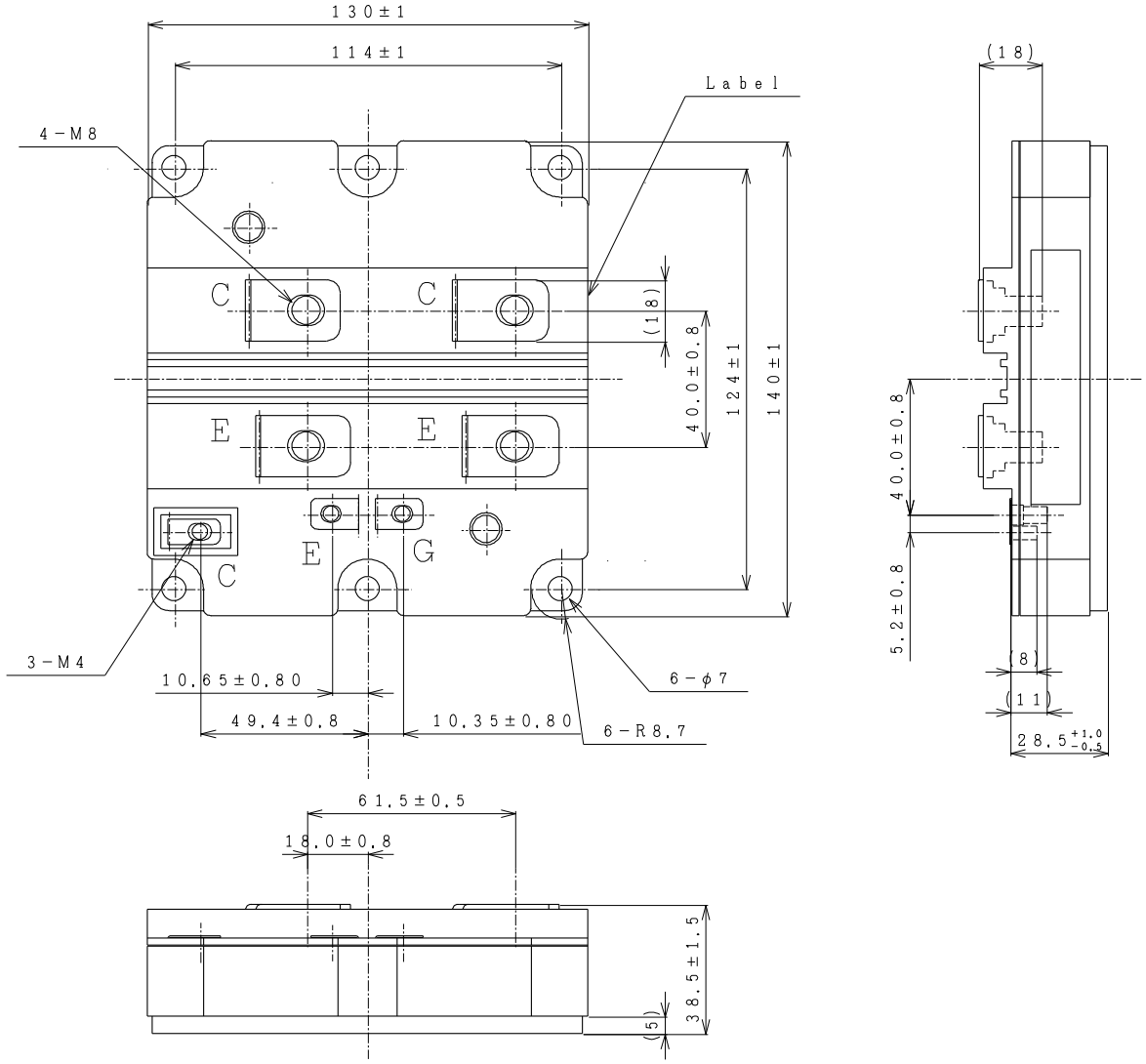
OUTLINE DRAWINGS



Unit in mm

Fig.4 Outline drawings

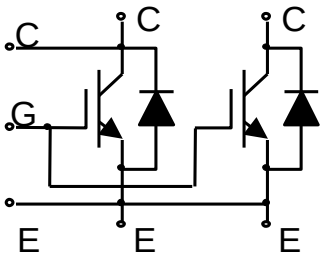


Fig.5 Circuit diagram

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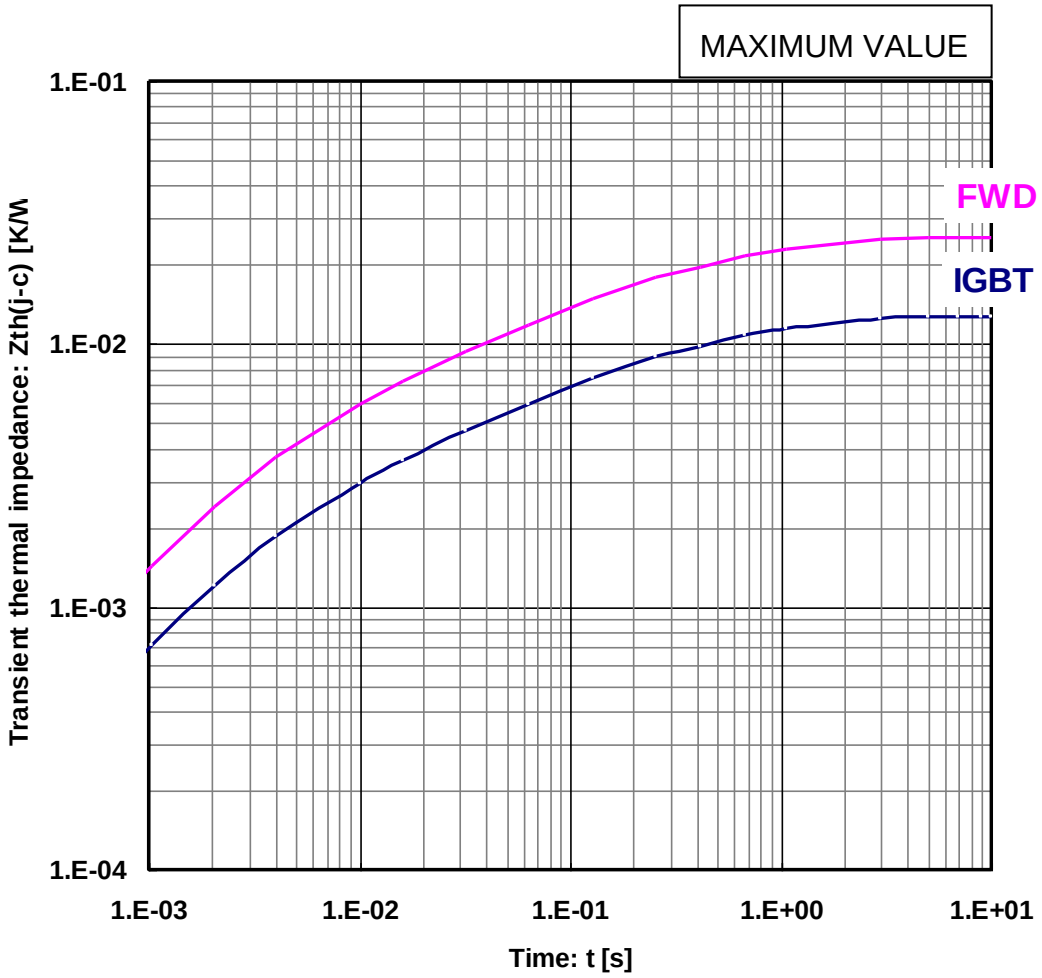
TRANSIENT THERMAL IMPEDANCE



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

MBN600E45A

HITACHI POWER SEMICONDUCTORS

Notices

1. The information given herein, including the specifications and dimensions, is subject to change without prior notice to improve product characteristics. Before ordering, purchasers are advised to contact Hitachi sales department for the latest version of this data sheets.
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