

MBL1000E33E2-B

Silicon N-channel IGBT 3300V E2 version

FEATURES

- * Soft switching behavior & low conduction loss:
Soft low-injection punch-through High conductivity IGBT.
- * Low driving power due to low input capacitance MOS gate.
- * Low noise recovery: Ultra soft fast recovery diode.

ABSOLUTE MAXIMUM RATINGS (T_c=25 °C)

Item	Symbol	Unit	MBL1000E33E2-B
Collector Emitter Voltage	V _{CES}	V	3,300
Gate Emitter Voltage	V _{GES}	V	±20
Collector Current	DC	I _c	1,000
	1ms	I _{Cp}	2,000
Forward Current	DC	I _F	800
	1ms	I _{FM}	1,600
Junction Temperature	T _j	°C	-40 ~ +125
Storage Temperature	T _{stg}	°C	-50 ~ +125
Isolation Voltage	V _{ISO}	V _{RMS}	6,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	2/15 (1)
	Mounting (M6)	-	6 (2)

Notes: (1) Recommended Value $1.8 \pm 0.2/15^{+0}_{-3}$ N·m (2) Recommended Value 5.5 ± 0.5 N·m

ELECTRICAL CHARACTERISTICS

1) IGBT + FWD

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current	I _{CES}	mA	-	-	12.0	V _{CE} =3,300V, V _{GE} =0V, T _j =25 °C
Gate Emitter Leakage Current	I _{GES}	nA	-	-	±500	V _{GE} =±20V, V _{CE} =0V, T _j =25 °C
Collector Emitter Saturation Voltage	V _{CE(sat)}	V	2.5	2.95	3.5	I _c =1,000A, V _{GE} =15V, T _j =125 °C
Gate Emitter Threshold Voltage	V _{GE(TO)}	V	5.5	6.3	7.7	V _{CE} =10V, I _c =1,000mA, T _j =25 °C
Input Capacitance	C _{ies}	nF	-	130	-	V _{CE} =10V, V _{GE} =0V, f=100kHz, T _j =25 °C
Internal Gate Resistance	R _{ge}	Ω	-	1.3	-	
Switching Times	Rise Time	t _r	1.0	1.6	2.2	V _{CC} =1,650V, I _c =1,000A L _s =200nH R _G =3.9Ω/3.9Ω, C _{GE} =100nF (3) V _{GE} =±15V, T _j =125 °C
	Turn On Time	t _{on}	1.3	2.3	3.3	
	Fall Time	t _f	1.0	1.8	2.7	
	Turn Off Time	t _{off}	2.8	3.9	5.0	
Peak Forward Voltage Drop	V _{FM}	V	-	2.5	-	I _c =1,000A, V _{GE} =0V, T _j =125 °C
Reverse Recovery Time	t _{rr}	μs	-	0.8	-	V _{CC} =1,650V, I _F =1,000A (4) L _s =200nH, T _j =125 °C

2) DIODE

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current	I _{A(S)}	mA	-	-	12.0	V _{AK} =3,300V, T _j =25 °C
Peak Forward Voltage Drop	V _F	V	2.4	2.9	3.4	I _F =800A, T _j =125 °C At Main terminal (Terminal resistance:0.5mΩ typical)
Reverse Recovery Time	t _{rr}	μs	0.4	1.0	1.7	V _{CC} =1,650V, I _F =800A, (4) L _s =200nH, T _j =125 °C, R _G =3.9Ω/3.9Ω, C _{GE} =100nF

Notes: (3) R_G and C_{GE} value are the test condition's value for decision 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.
(4)Counter arm IGBT V_{GE}=±15V

- * 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.

MBL1000E33E2-B

THERMAL CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Thermal Impedance	IGBT	Rth(j-c)	-	-	0.012	Junction to case
	FWD	Rth(j-c)	-	-	0.024	
	Chopper Diode	Rth(j-c)	-	-	0.026	
Contact Thermal Impedance	Rth(c-f)	K/W	-	0.005	-	Case to f fin ($\lambda_{grease}=1W/(m \cdot K)$, heat-sink flatness $\leq 50\mu m$)

DEFINITION OF TEST CIRCUIT

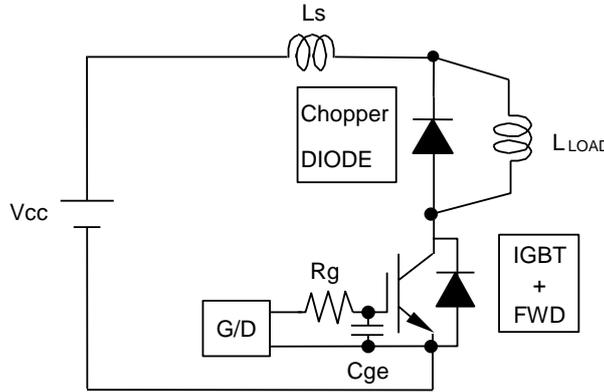


Fig.1 Switching test circuit

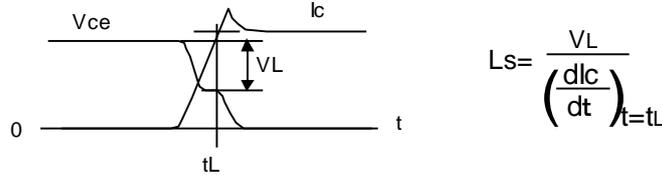


Fig.2 Definition of Ls

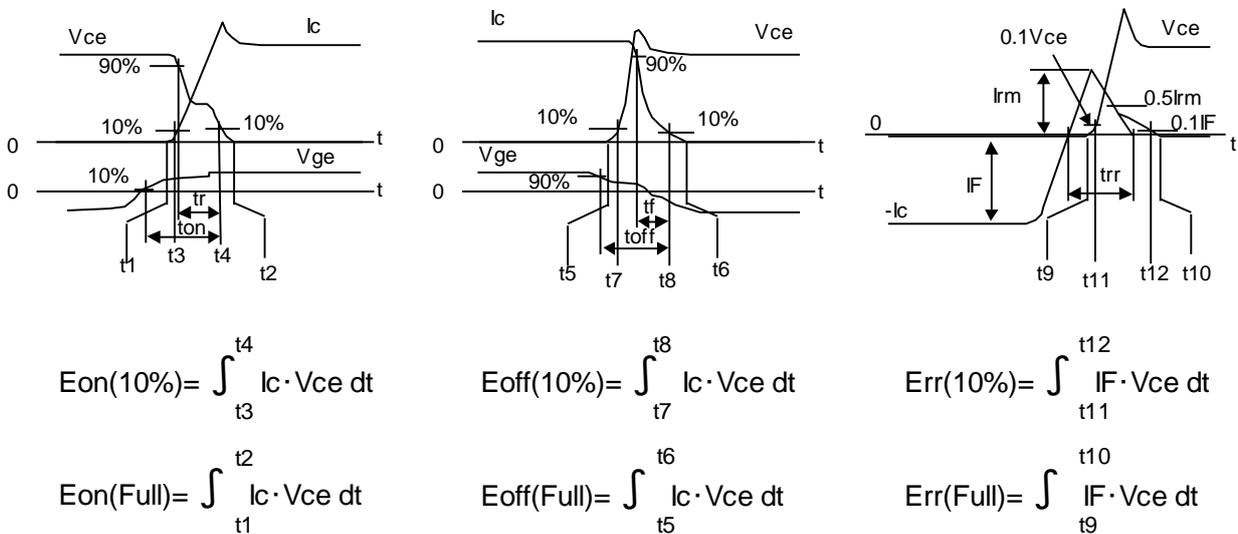
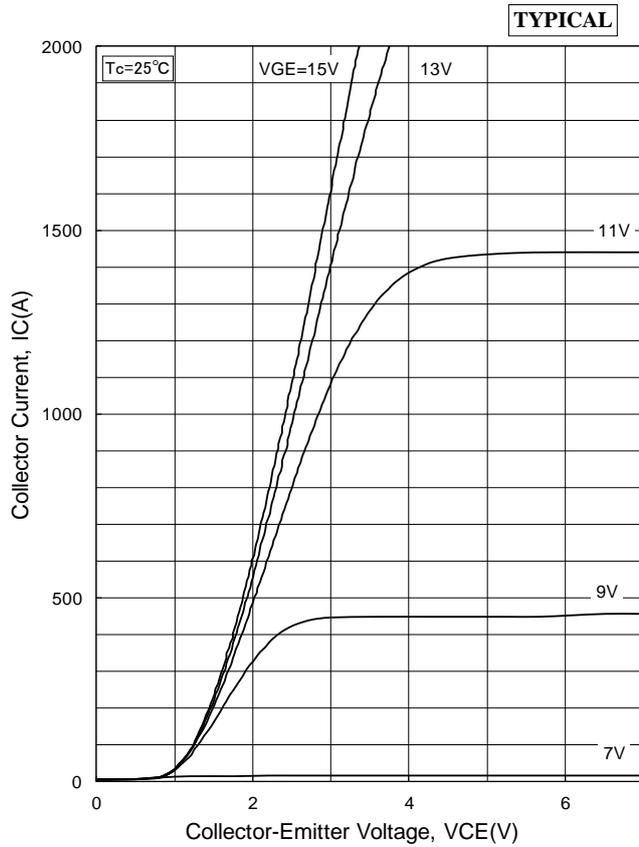


Fig.3 Definition of switching loss

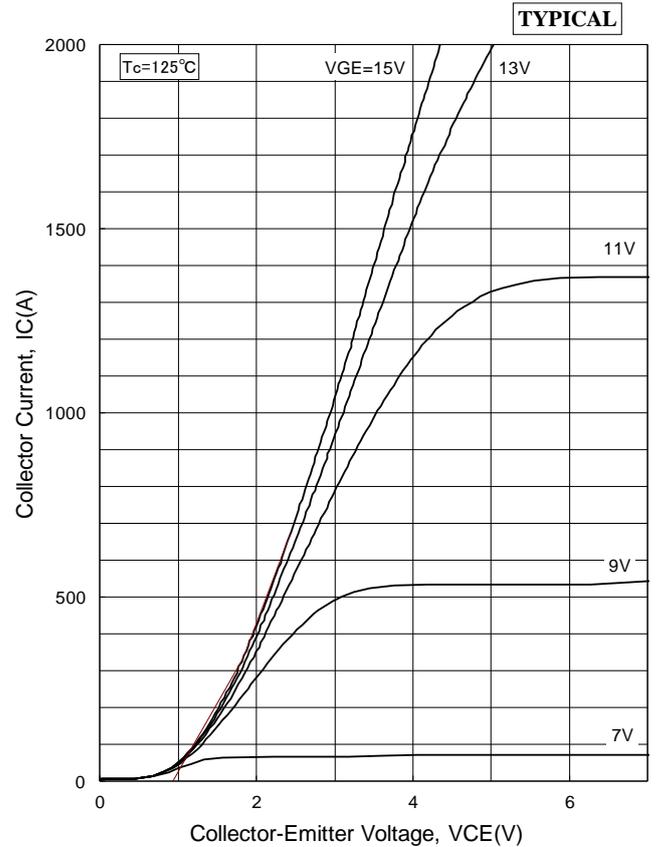
MBL1000E33E2-B

CHARACTERISTICS CURVE

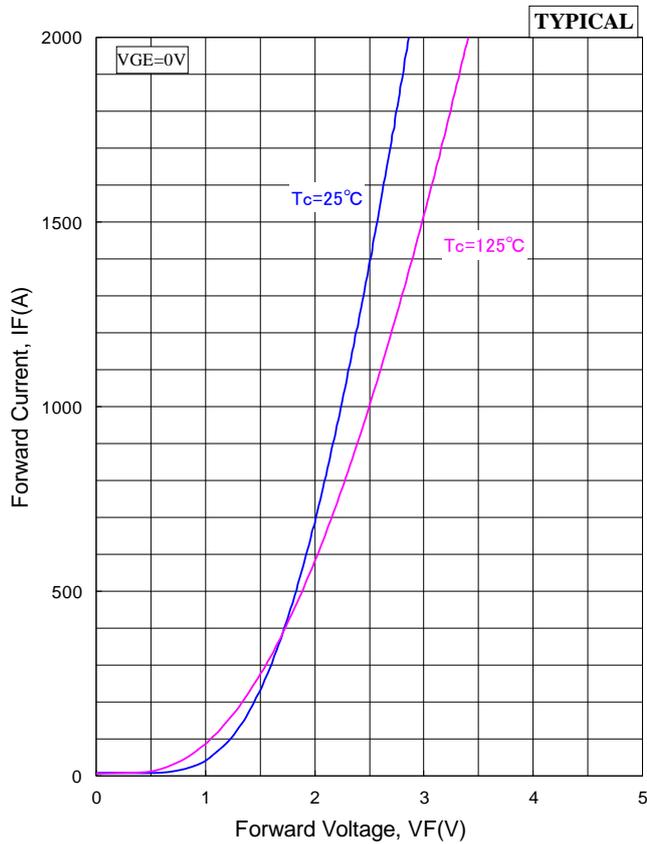
STATIC CHARACTERISTICS



Collector Current vs. Collector to Emitter Voltage



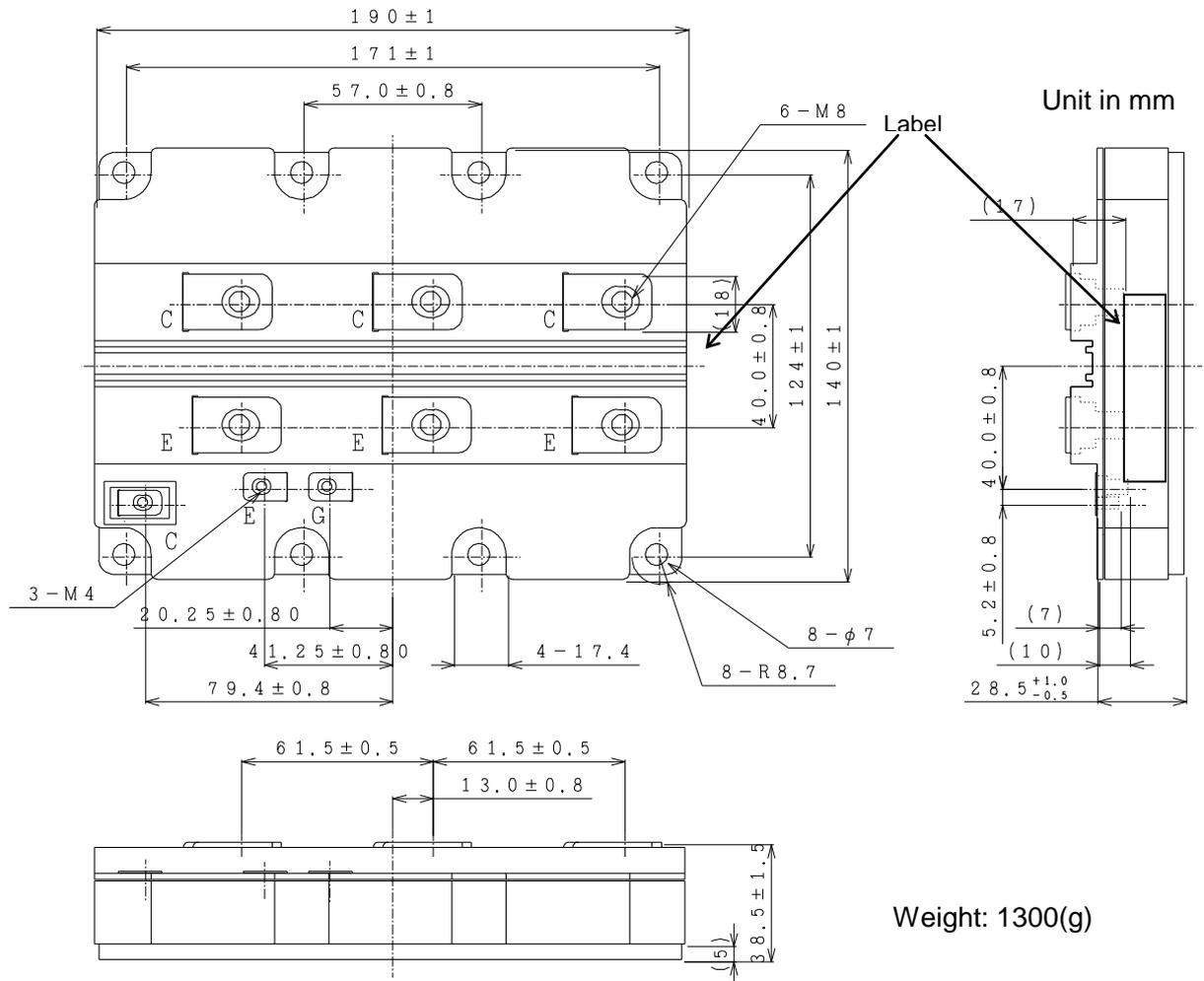
Collector Current vs. Collector to Emitter Voltage



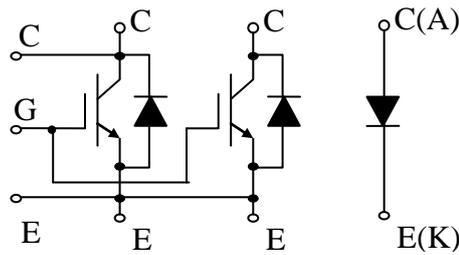
Forward Voltage of free-wheeling diode

MBL1000E33E2-B

OUTLINE DRAWINGS



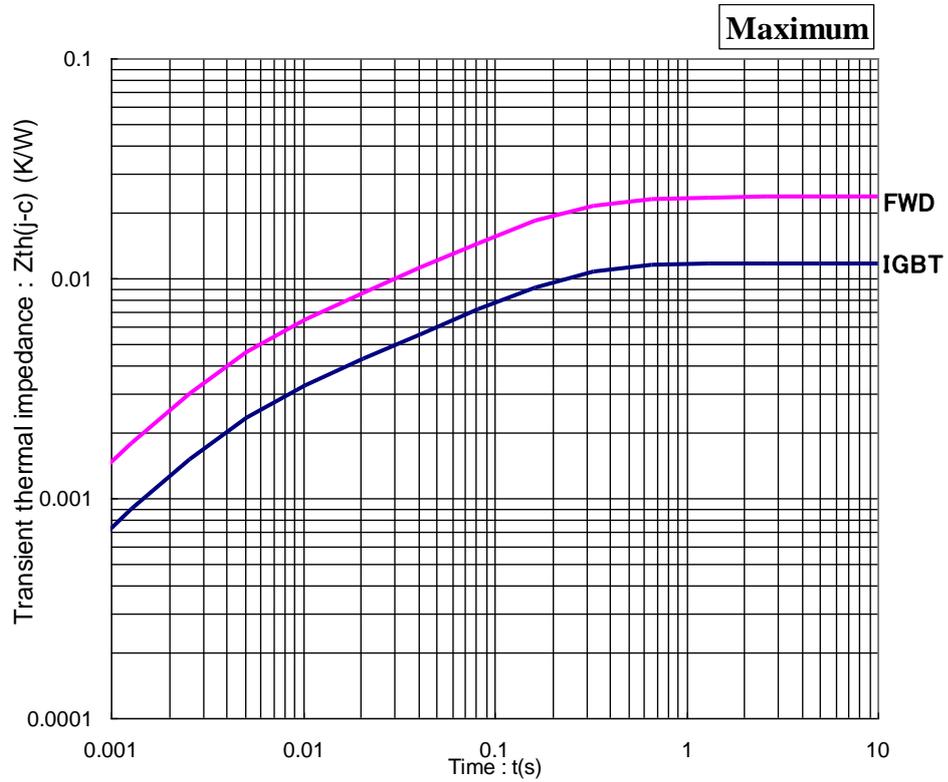
Weight: 1300(g)



Circuit diagram

MBL1000E33E2-B

TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve

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

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HITACHI POWER SEMICONDUCTORS

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