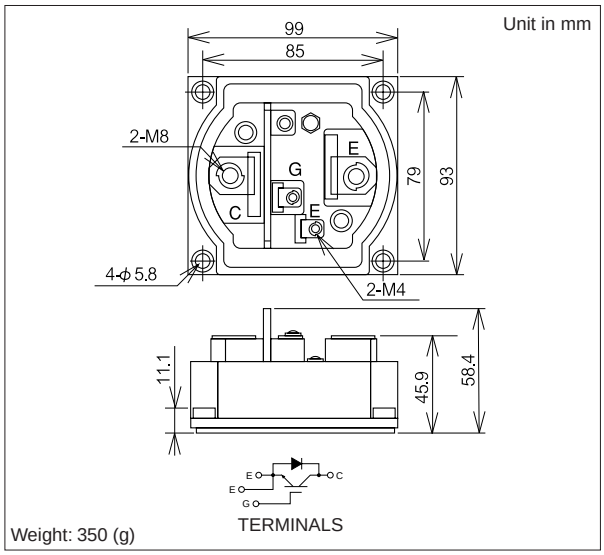
MBN400C20

Silicon N-channel IGBT

OUTLINE DRAWING



FEATURES

- High thermal fatigue durability.
  (delta Tc=70°C,N>20,000cycles)
- low noise due to built-in free-wheeling diode - ultra soft fast recovery diode(USFD).
- High speed,low loss IGBT module.
- Low driving power due to low input capacitance MOS gate.
- High reliability,high durability module.
- Isolated head sink (terminal to base).

ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

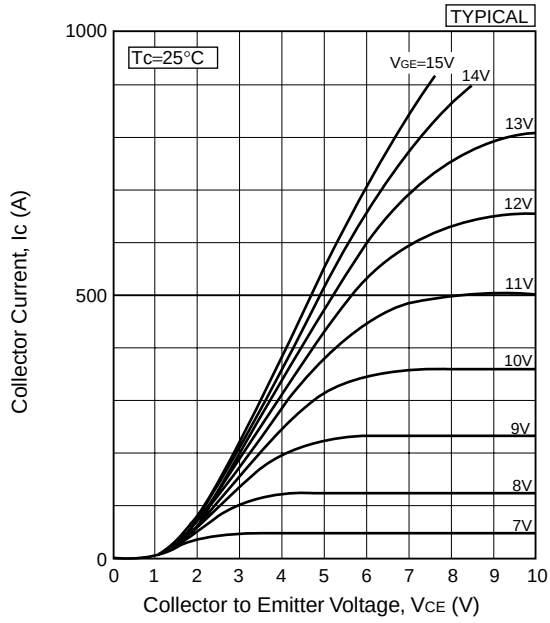
Item		Symbol	Unit	MBN400C20
Collector Emitter Voltage		V_{CES}	V	2,000
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	400
	1ms	I_{Cp}		800
Forward Current	DC	I_F	A	400
	1ms	I_{FM}		800
Collector Power Dissipation		Pc	W	3,000
Junction Temperature		T_j	°C	-40 ~ +125
Storage Temperature		T_{stg}	°C	-40 ~ +125
Isolation Voltage		V_{ISO}	V_{RMS}	4,000(AC 1 minute)
Screw Torque	Terminals(M4/M8)	-	N.m	2/10 (1)
	Mounting(M5)	-		2.8 (2)

Notes: (1)Recommended Value 1.8±0.2/9±1N.m (2)Recommended Value 2.6±0.2N.m

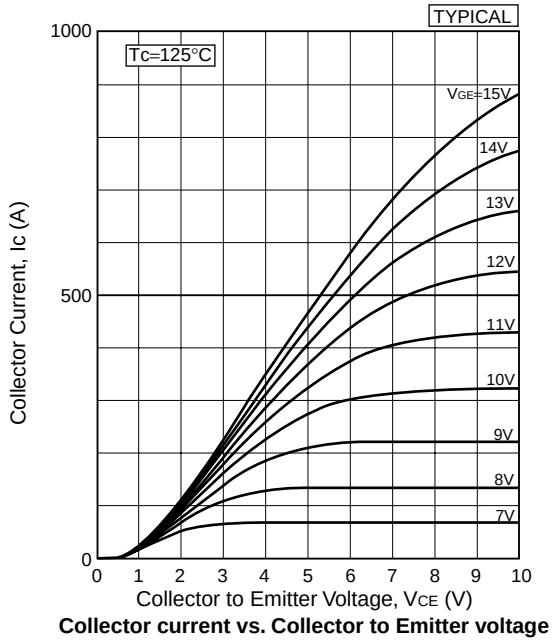
CHARACTERISTICS (Tc=25°C)

Item		Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current		I_{CES}	mA	-	-	4.0	V_{CE}=2,000V,V_{GE}=0V
Gate Emitter Leakage Current		I_{GES}	nA	-	-	±200	V_{GE}=±20V,V_{CE}=0V
Collector Emitter Saturation Voltage		$V_{CE(sat)}$	V	-	4.2	5.2	I_C=400A,V_{GE}=15V
Gate Emitter Threshold Voltage		$V_{GE(TO)}$	V	4.0	5.1	7.0	V_{CE}=10V, I_C =400mA
Input Capacitance		C_{ies}	nF	-	46	100	V_{CE}=10V,V_{GE}=0V,f=100KHz
Switching Times	Rise Time	t_r	μs	-	1.4	2.3	V_{CC}=1,000V,Ic=400A
	Turn On Time	t_{on}		-	1.7	2.6	L=200nH
	Fall Time	t_f		-	1.8	2.4	R_G=12Ω (3)
	Turn Off Time	t_{off}		-	4.0	5.9	V_{GE}=±15V Tc=125°C
Peak Forward Voltage Drop		V_{FM}	V	-	2.4	3.4	–Ic=400A,V_{GE}=0V
Reverse Recovery Time		t_{rr}	μs	-	0.5	0.9	Vcc=1,000V,–Ic=400A,L=200nH, Tc=125°C (4)
Thermal Impedance	IGBT	Rth(j-c)	°C/W	-	-	0.033	Junction to case
	FWD	Rth(j-c)		-	-	0.10	

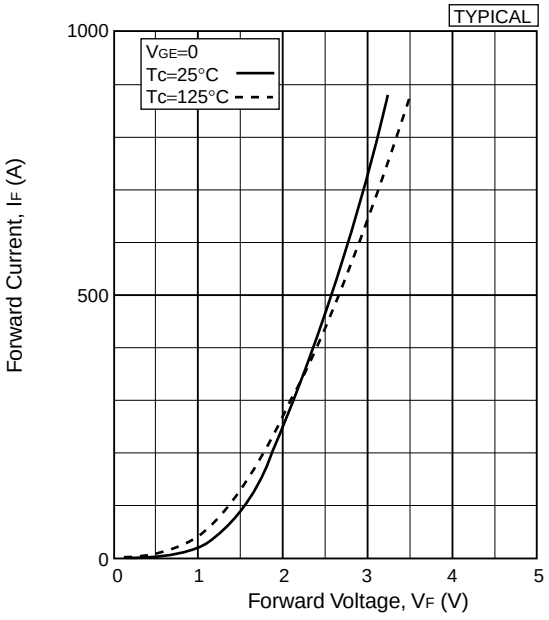
Notes:(3) R_G value is the test condition's value for decision of the switching times, not recommended value.
Determine the suitable R_G value after the measurement of switching waveforms (overshoot voltage,etc.)with appliance mounted.
(4) Counter arm IGBT V_{GE}=–15V



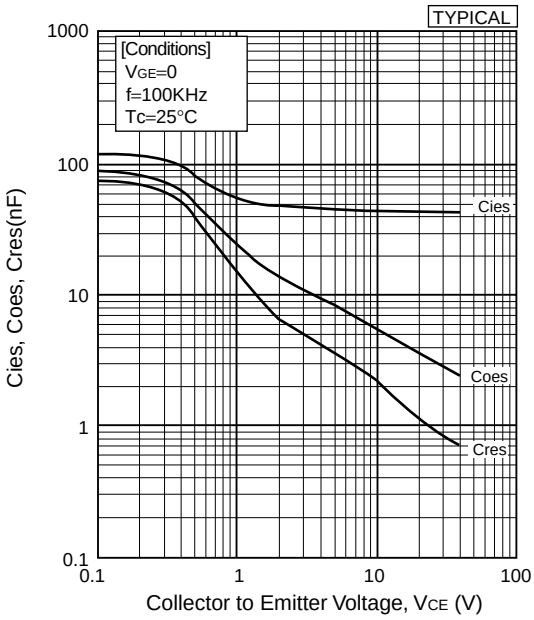
Collector current vs. Collector to Emitter voltage



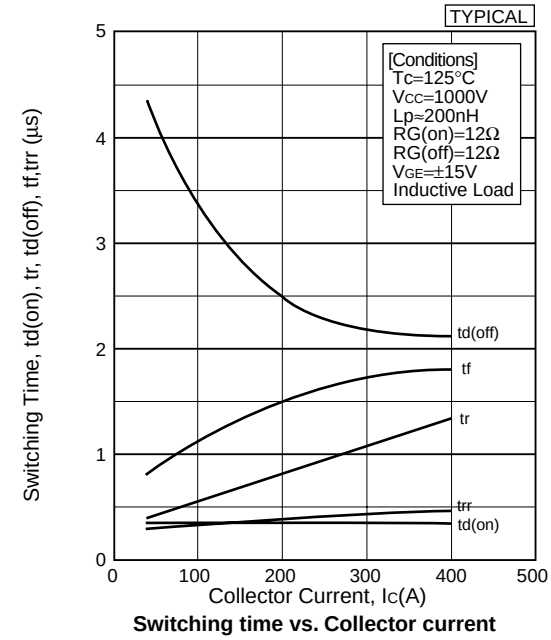
Collector current vs. Collector to Emitter voltage



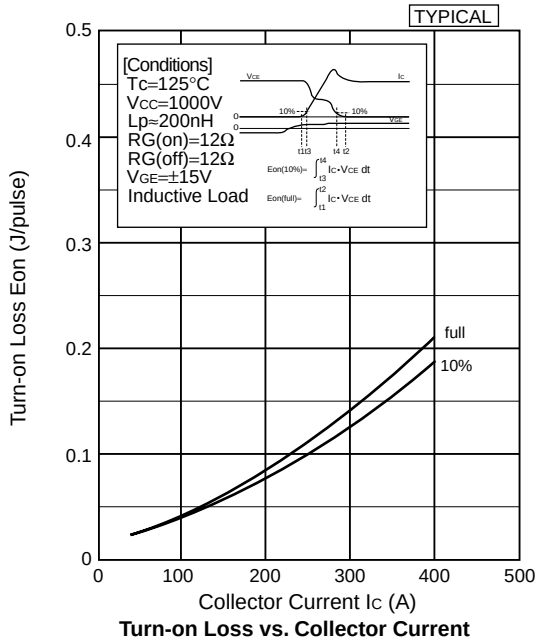
Forward voltage of free-wheeling diode



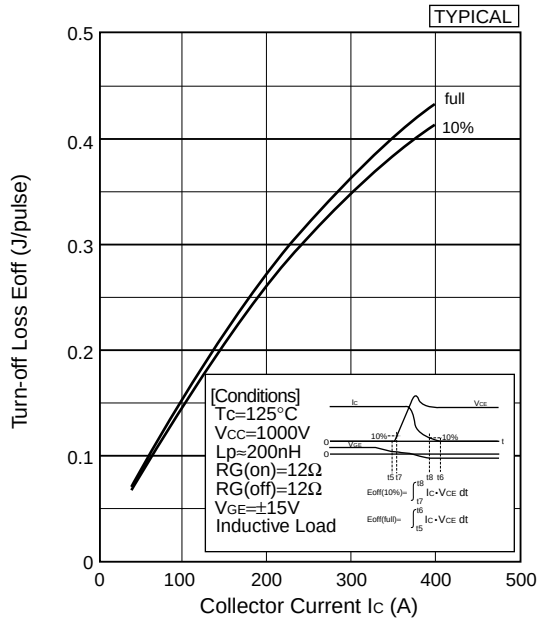
Capacitance vs. Collector to Emitter Voltage



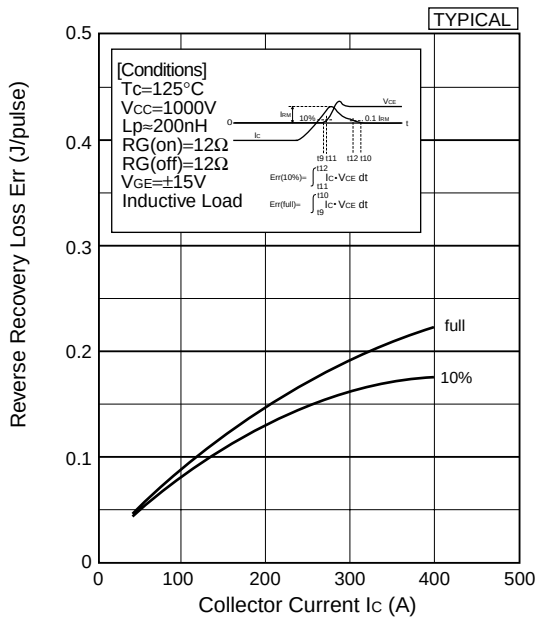
Switching time vs. Collector current



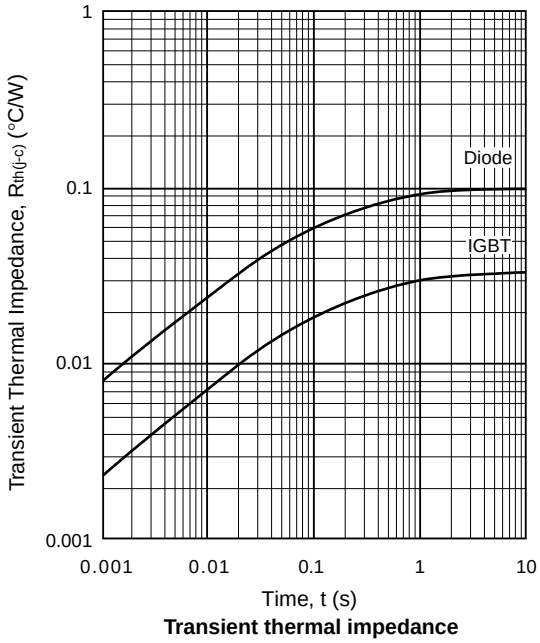
Turn-on Loss vs. Collector Current



Turn-off Loss vs. Collector Current



Reverse Recovery Loss vs. Collector Current



Transient thermal impedance

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 adviced to contact Hitachi sales department for the latest version of this data sheets.
2. Please be sure to read "Precautions for Safe Use and Notices" in the individual brochure before use.
3. In cases where extremely high reliability is required(such as use in nuclear power control, aerospace and aviation, traffic equipment, life-support-related medical equipment, fuel control equipment and various kinds of safety equipment), safety should be ensured by using semiconductor devices that feature assured safety or by means of users' fail-safe precautions or other arrangement. Or consult Hitachi's sales department staff.
4. In no event shall Hitachi be liable for any damages that may result from an accident or any other cause during operation of the user's units according to this data sheets. Hitachi assumes no responsibility for any intellectual property claims or any other problems that may result from applications of information, products or circuits described in this data sheets.
5. In no event shall Hitachi be liable for any failure in a semiconductor device or any secondary damage resulting from use at a value exceeding the absolute maximum rating.
6. No license is granted by this data sheets under any patents or other rights of any third party or Hitachi, Ltd.
7. This data sheets may not be reproduced or duplicated, in any form, in whole or in part , without the expressed written permission of Hitachi, Ltd.
8. The products (technologies) described in this data sheets are not to be provided to any party whose purpose in their application will hinder maintenance of international peace and safety not are they to be applied to that purpose by their direct purchasers or any third party. When exporting these products (technologies), the necessary procedures are to be taken in accordance with related laws and regulations.

■ For inquiries relating to the products, please contact nearest overseas representatives which is located "Inquiry" portion on the top page of a home page.

Hitachi power semiconductor home page address http://www.hitachi.co.jp/pse

HITACHI