

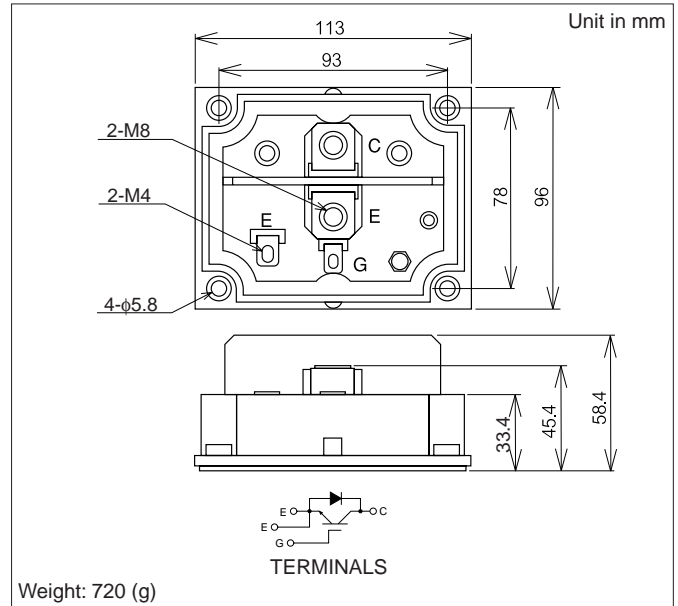
MBN400C33A

Silicon N-channel IGBT

OUTLINE DRAWING

FEATURES

- * High thermal fatigue durability.
($\Delta T_c=70^\circ\text{C}$, $N>20,000$ cycles)
- * 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).

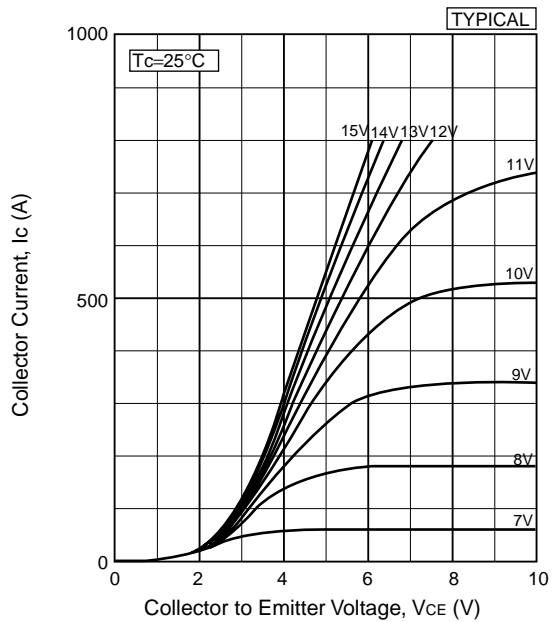
ABSOLUTE MAXIMUM RATINGS ($T_c=25^\circ\text{C}$)

Item	Symbol	Unit	MBN400C33A
Collector Emitter Voltage	V_{CES}	V	3,300
Gate Emitter Voltage	V_{GES}	V	± 20
Collector Current	DC	I_C	400
	1ms	I_{Cp}	800
Forward Current	DC	I_F	400
	1ms	I_{FM}	800
Collector Power Dissipation	P_C	W	4,000
Junction Temperature	T_j	$^\circ\text{C}$	-40 ~ +125
Storage Temperature	T_{stg}	$^\circ\text{C}$	-40 ~ +125
Isolation Voltage	V_{ISO}	V_{RMS}	5,400(AC 1 minute)
Screw Torque	Terminals(M4/M8)	-	2/10 (1)
	Mounting(M5)	-	2.8 (2)

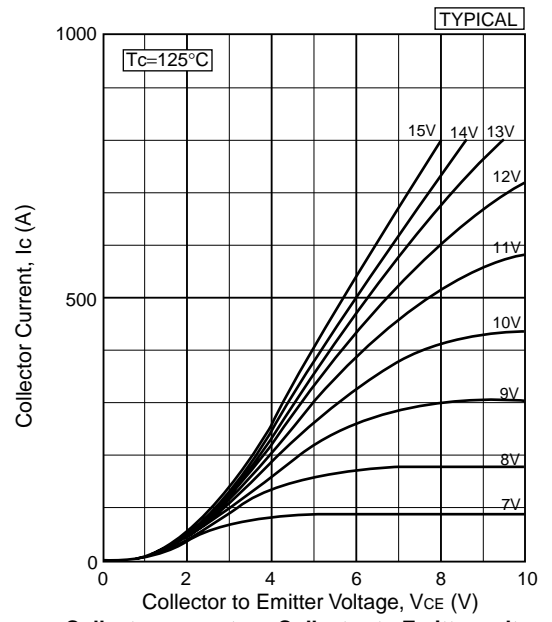
Notes: (1)Recommended Value $1.8\pm 0.2/9\pm 1\text{N.m}$ (2)Recommended Value $2.6\pm 0.2\text{N.m}$ CHARACTERISTICS ($T_c=25^\circ\text{C}$)

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions	
Collector Emitter Cut-Off Current	I_{CES}	mA	-	-	4.0	$V_{CE}=3,300\text{V}, V_{GE}=0\text{V}$	
Gate Emitter Leakage Current	I_{GES}	nA	-	-	± 200	$V_{GE}=\pm 20\text{V}, V_{CE}=0\text{V}$	
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	V	-	4.5	5.5	$I_C=400\text{A}, V_{GE}=15\text{V}$	
Gate Emitter Threshold Voltage	$V_{GE(TO)}$	V	4.0	5.5	7.0	$V_{CE}=10\text{V}, I_C=400\text{mA}$	
Input Capacitance	C_{ies}	nF	-	50	-	$V_{CE}=10\text{V}, V_{GE}=0\text{V}, f=100\text{KHz}$	
Switching Times	Rise Time	t_r	-	1.6	2.6	$V_{CC}=1,650\text{V}, I_C=400\text{A}$ $L=150\text{nH}$ $R_G=10\Omega$ (3) $V_{GE}=\pm 15\text{V}$ $T_c=125^\circ\text{C}$	
	Turn On Time	t_{on}	-	2.3	3.2		
	Fall Time	t_f	-	2.1	2.8		
	Turn Off Time	t_{off}	-	3.4	5.3		
Peak Forward Voltage Drop	V_{FM}	V	-	3.0	4.0	$-I_C=400\text{A}, V_{GE}=0\text{V}$	
Reverse Recovery Time	t_{rr}	μs	-	0.5	0.9	$V_{CC}=1,650\text{V}, -I_C=400\text{A}, L=150\text{nH}$, $T_c=125^\circ\text{C}$ (4)	
Thermal Impedance	IGBT	$R_{th(j-c)}$	$^\circ\text{C/W}$	-	-	0.025	Junction to case
	FWD	$R_{th(j-c)}$		-	-	0.05	

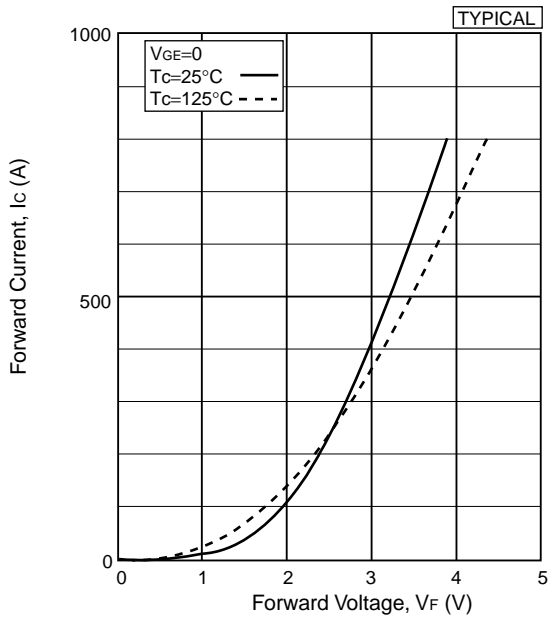
Notes:(3) R_G value is the test condition's value for decision of the switching times, not recommended value.Determine the suitable R_G value after the measurement of switching waveforms (overshoot voltage, etc.) with appliance mounted.(4) Counter arm IGBT $V_{GE}=-15\text{V}$



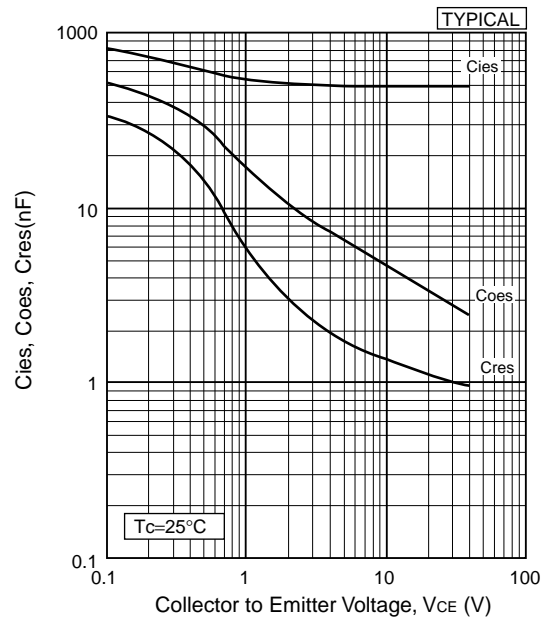
Collector current vs. Collector to Emitter voltage



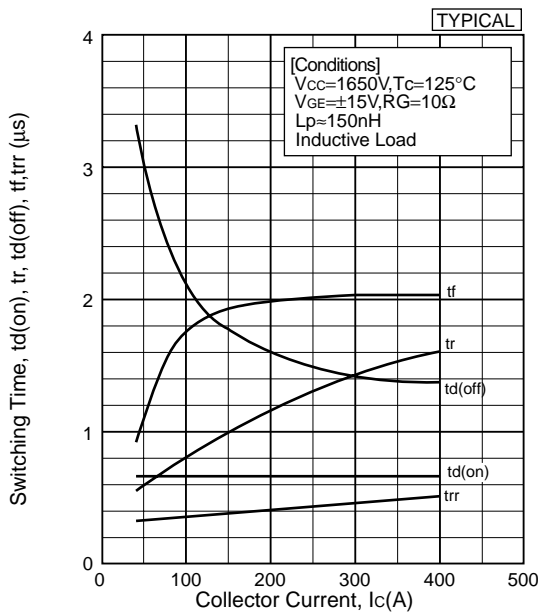
Collector current vs. Collector to Emitter voltage



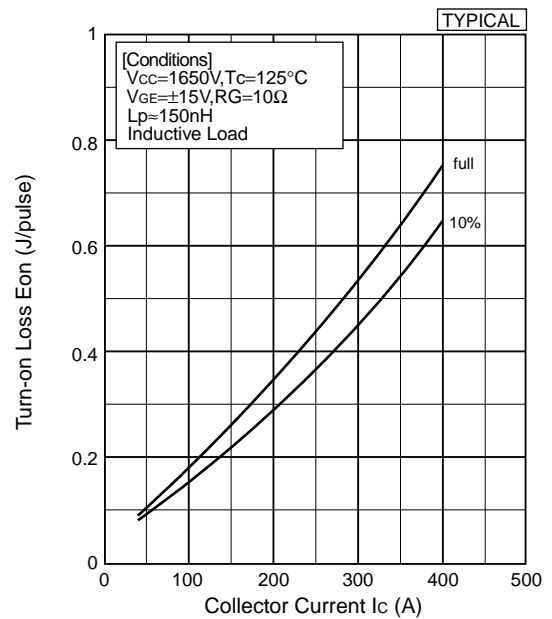
Forward voltage of free-wheeling diode



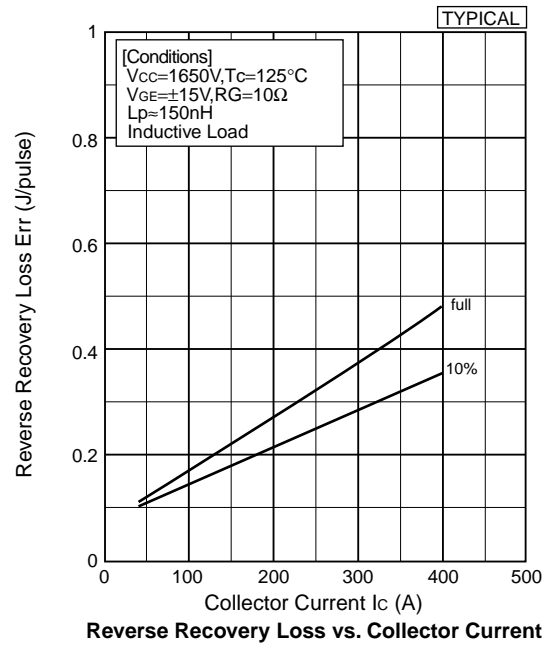
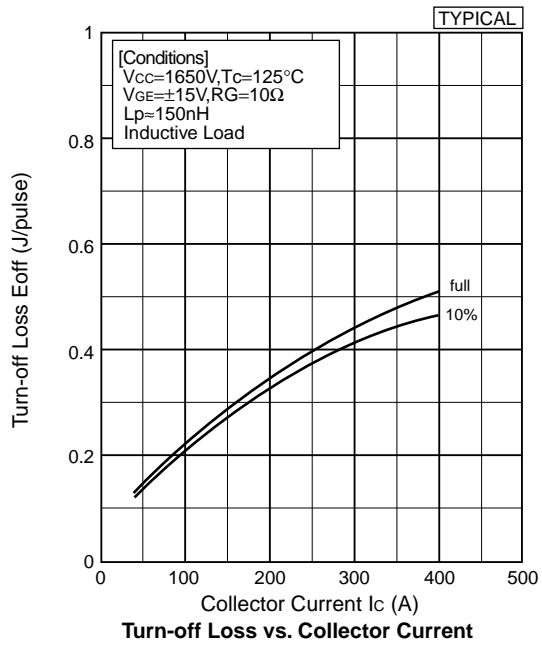
Capacitance vs. Collector to Emitter Voltage



Switching time vs. Collector current



Turn-on Loss vs. Collector Current



HITACHI POWER SEMICONDUCTORS

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