

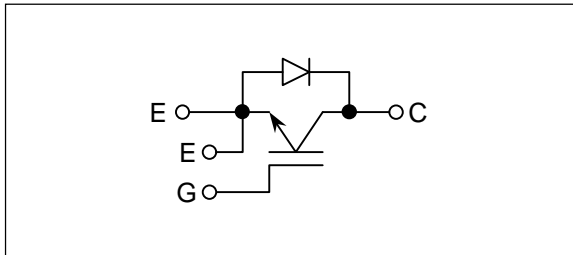
MBN400GR12

[Rated 400A/1200V, Single-pack type]

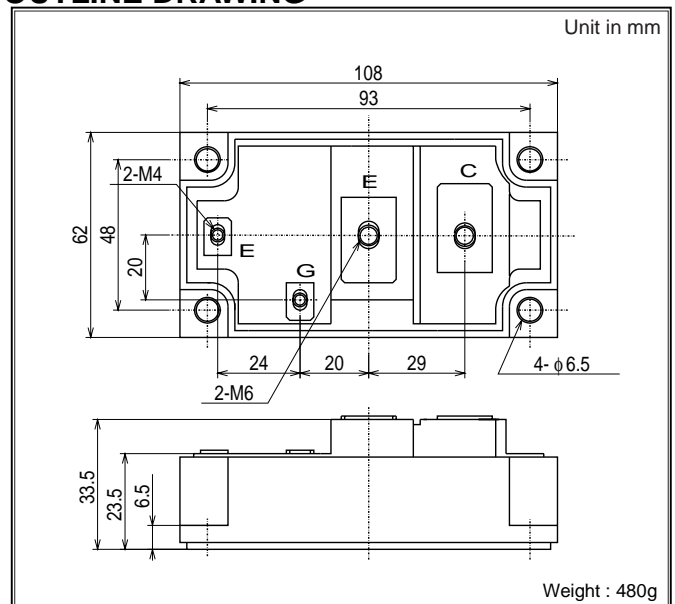
FEATURES

- Low saturation voltage and high speed.
- Low turn-OFF switching loss.
- Low noise due to build-in free-wheeling diode.
(Ultra Soft and Fast recovery Diode (USFD))
- High reliability structure.
- Isolated heat sink (terminals to base).

CIRCUIT DIAGRAM



OUTLINE DRAWING



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

Item	Symbol	Unit	Value	
Collector-Emitter Voltage	V_{CES}	V	1200	
Gate-Emitter Voltage	V_{GES}	V	± 20	
Collector Current	DC	I_C	400	
	1ms	I_{CP}	800	
Forward Current	DC	I_F	400 ^{*1}	
	1ms	I_{FM}	800	
Collector Power Dissipation	P_C	W	2080	
Junction Temperature	T_j	$^\circ\text{C}$	-40 ~ +150	
Storage Temperature	T_{stg}	$^\circ\text{C}$	-40 ~ +125	
Isolation Voltage	V_{iso}	V_{RMS}	2500(AC 1 minute)	
Screw Torque	Terminals (M4/M6)	-	N·m (kgf·cm)	1.37(14) / 2.94(30) ^{*2}
	Mounting			2.94(30) ^{*3}

Notes; *1: RMS current of Diode ≤ 120 Arms

*2: Recommended value 1.18 / 2.45 N·m (12 / 25 kgf·cm)

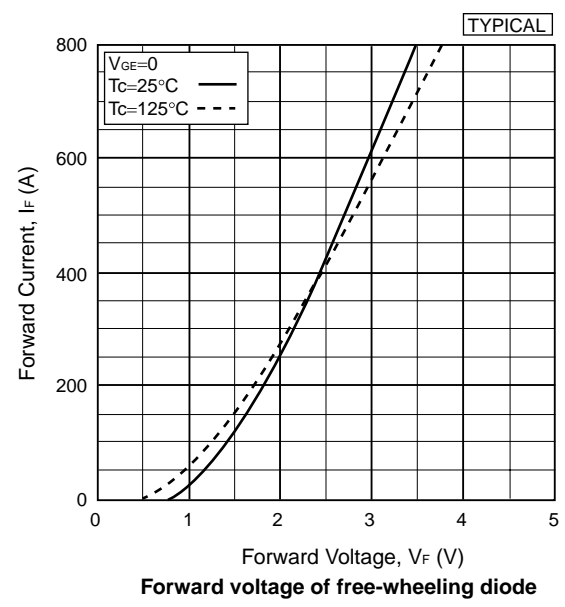
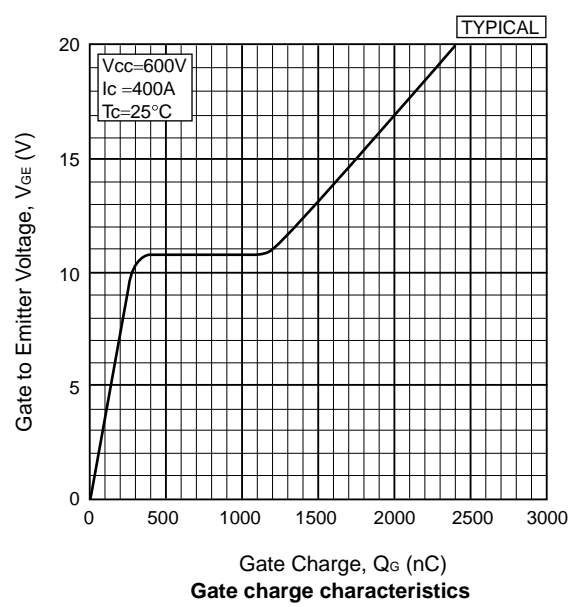
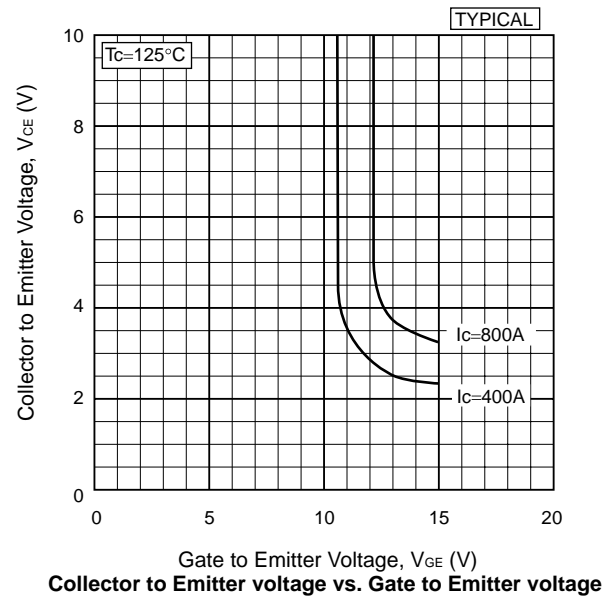
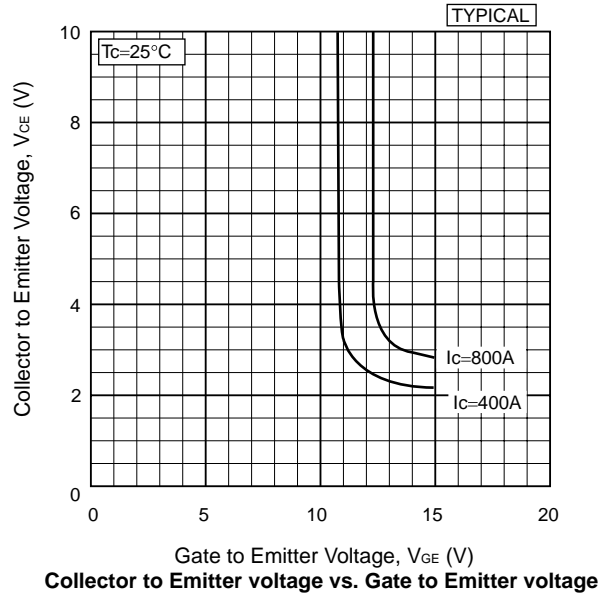
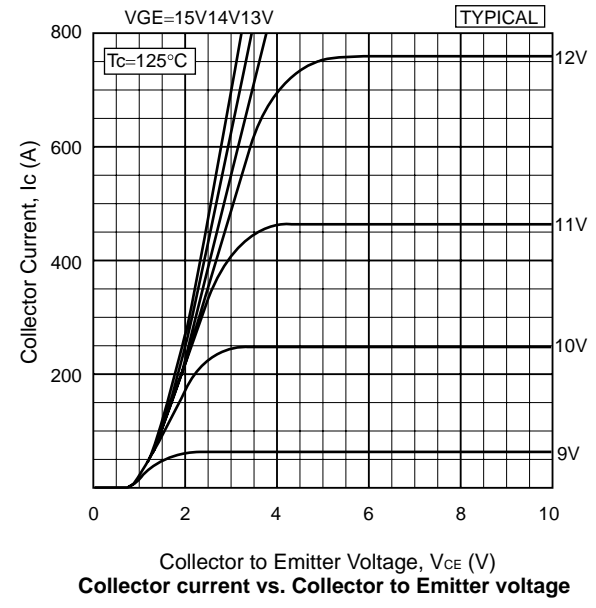
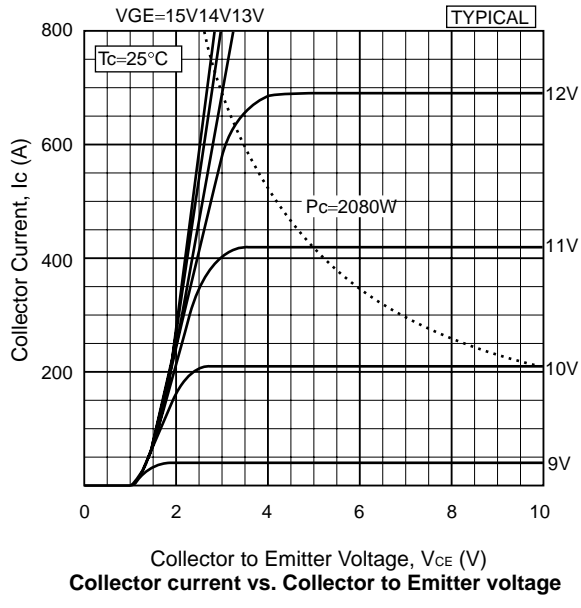
*3: Recommended value 2.45 N·m (25 kgf·cm)

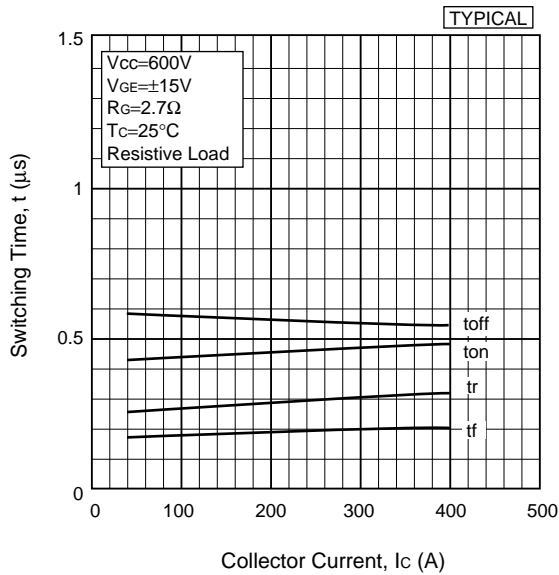
CHARACTERISTICS ($T_c=25^\circ\text{C}$)

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions	
Collector-Emitter Cut-Off Current	I_{CES}	mA	-	-	1.0	$V_{CE}=1200\text{V}$, $V_{GE}=0\text{V}$	
Gate-Emitter Leakage Current	I_{GES}	nA	-	-	± 500	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V	-	2.2	2.8	$I_C=400\text{A}$, $V_{GE}=15\text{V}$	
Gate-Emitter Threshold Voltage	$V_{GE(TH)}$	V	-	-	10	$V_{CE}=5\text{V}$, $I_C=400\text{mA}$	
Input Capacitance	C_{ies}	pF	-	37000	-	$V_{CE}=10\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$	
Switching Times	Rise Time	t_r	-	0.25	0.7	$V_{CC}=600\text{V}$ $R_L=1.5\Omega$ $R_G=2.7\Omega$ ^{*4} $V_{GE}=\pm 15\text{V}$	
	Turn-ON Time	t_{on}	-	0.4	0.9		
	Fall Time	t_f	-	0.2	0.35		
	Turn-Off Time	t_{off}	-	0.7	1.1		
Peak Forward Voltage Drop	V_{FM}	V	-	2.5	3.5	$I_F=400\text{A}$, $V_{GE}=0\text{V}$	
Reverse Recovery Time	t_{rr}	μs	-	-	0.4	$I_F=400\text{A}$, $V_{GE}=-10\text{V}$, $di/dt=400\text{A}/\mu\text{s}$	
Thermal Impedance	IGBT	$R_{th(j-c)}$	$^\circ\text{C}/\text{W}$	-	-	0.06	Junction to case
	FWD	$R_{th(j-c)}$				0.10	

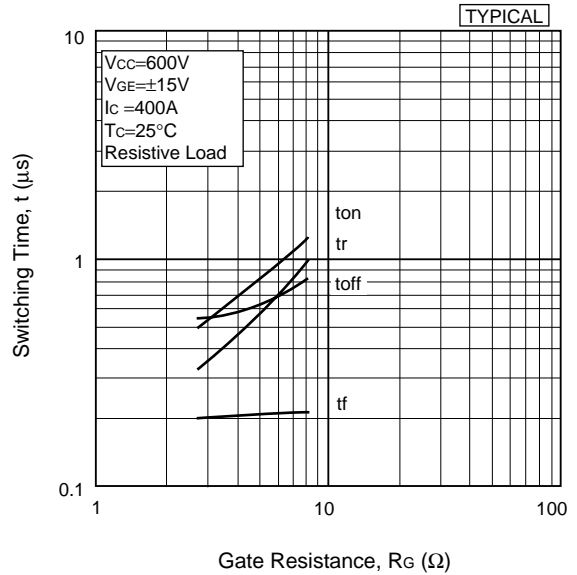
Notes; *4: R_G value is the test condition's value for decision of the switching times, not recommended value, please determine the suitable R_G value after the measurement of switching waveforms (overshoot voltage, etc.) with appliance mounted.

Remark; The specification given herein, is subject to change without prior notice to improve product characteristics.

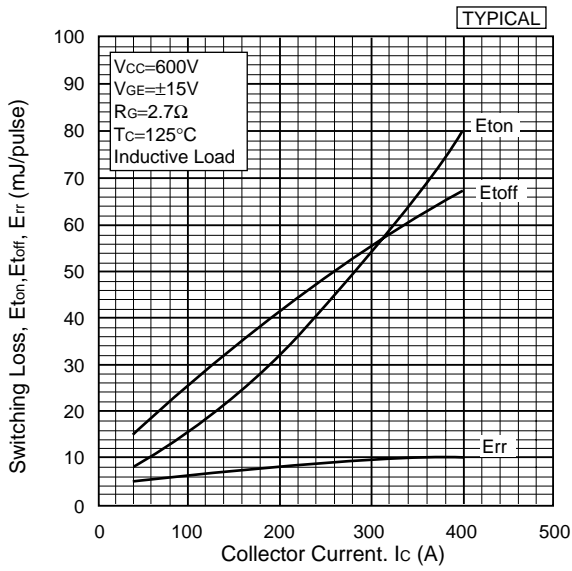




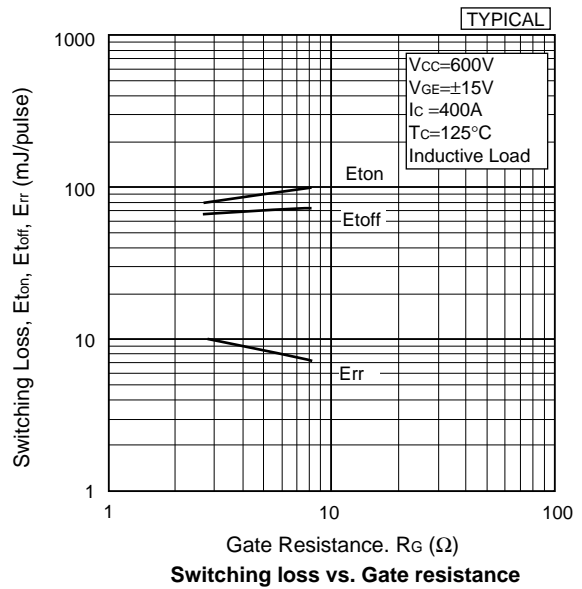
Switching time vs. Collector current



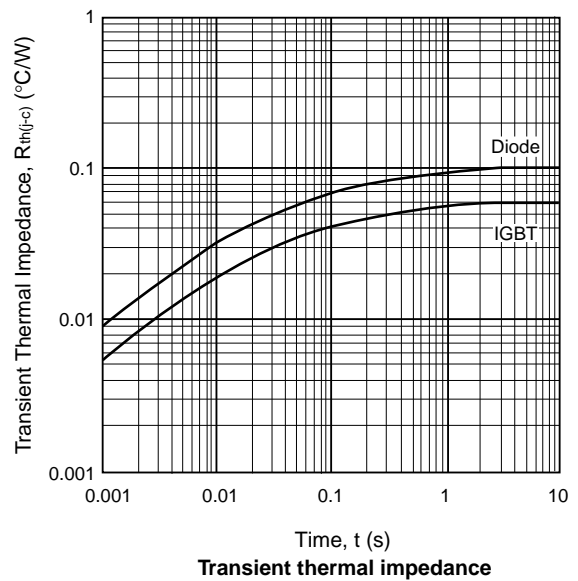
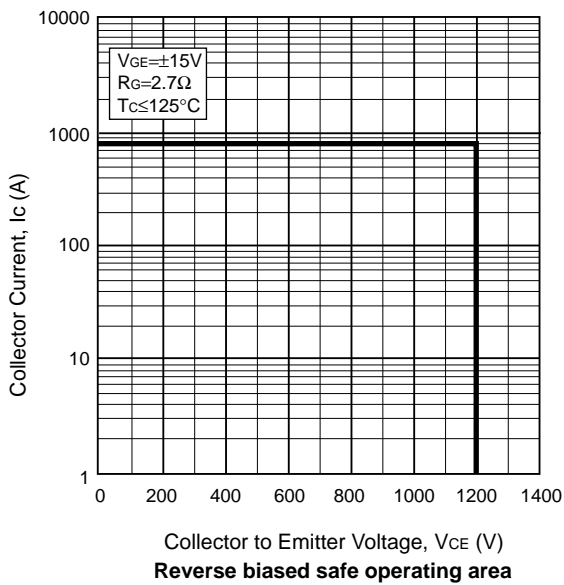
Switching time vs. Gate resistance



Switching loss vs. Collector current



Switching loss vs. Gate resistance



HITACHI POWER SEMICONDUCTORS

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