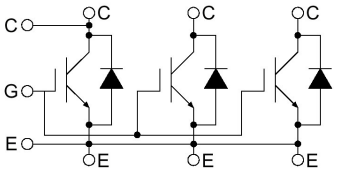
MBN1200E33C

Silicon N-channel IGBT

FEATURES

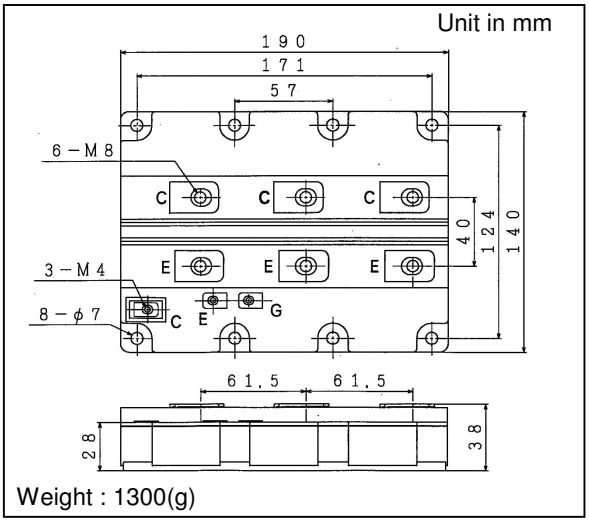
- High thermal fatigue durability.
  (delta Tc=70℃, N>30,000cycles)
- Low noise due to ultra soft fast recovery diode.
- High speed, low loss IGBT module.
- Low driving power due to low input capacitance MOS gate.
- High reliability, high durability module.
- Isolated head sink (terminal to base).

CIRCUIT DIAGRAM



TERMINALS

OUTLINE DRAWING



ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Item		Symbol	Unit	MBN1200E33C
Collector Emitter Voltage		V_{CES}	V	3,300
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	1,200
	1ms	I_{Cp}		2,400
Forward Current	DC	I_F	A	1,200
	1ms	I_{FM}		2,400
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 (Tc=25°C)

Item		Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current		I_{CES}	mA	-	-	12	V_{CE}=3,300V, V_{GE}=0V, Tj=25°C
				-	20	60	V_{CE}=3,300V, V_{GE}=0V, Tj=125°C
Gate Emitter Leakage Current		I_{GES}	nA	-	-	±500	V_{GE}=±20V, V_{CE}=0V, Tj=25°C
Collector Emitter Saturation Voltage		$V_{CE(sat)}$	V	-	4.1	4.7	I_C=1,200A, V_{GE}=15V, Tj=25°C
				-	4.8	5.3	I_C=1,200A, V_{GE}=15V, Tj=125°C
Gate Emitter Threshold Voltage		$V_{GE(TO)}$	V	4.5	5.5	6.5	V_{CE}=10V, I_C=1200mA, Tj=25°C
Input Capacitance		C_{ies}	nF	-	140	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Switching Times	Rise Time	t_r	μs	-	2.0	3.2	V_{CC}=1,650V, Ic=1,200A
	Turn On Time	t_{on}		-	2.9	3.8	L=100nH
	Fall Time	t_f		-	1.7	3.2	R_G=3.3Ω (3)
	Turn Off Time	t_{off}		-	3.5	5.6	V_{GE}=±15V, Tj=125°C
Peak Forward Voltage Drop		V_{FM}	V	-	2.2	2.8	Ic=1,200A, V_{GE}=0V, Tj=25°C
				-	2.3	2.75	Ic=1,200A, V_{GE}=0V, Tj=125°C
Reverse Recovery Time		t_{rr}	μs	-	0.8	1.4	Vcc=1,650V, Ic=1,200A, L=100nH Tj=125°C
Turn On Loss		$E_{on(10\%)}$	J/P	-	2.3	2.6	V_{CC}=1,650V, Ic=1,200A, L=100nH
Turn Off Loss		$E_{off(10\%)}$	J/P	-	1.4	2.1	R_G=3.3Ω (3)
Reverse Recovery Loss		$E_{rr(10\%)}$	J/P	-	1.5	2.1	V_{GE}=±15V, Tj=125°C
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.0085	Junction to case
	FWD	Rth(j-c)		-	-	0.017	

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.
Counter arm IGBT V_{GE}=-15V

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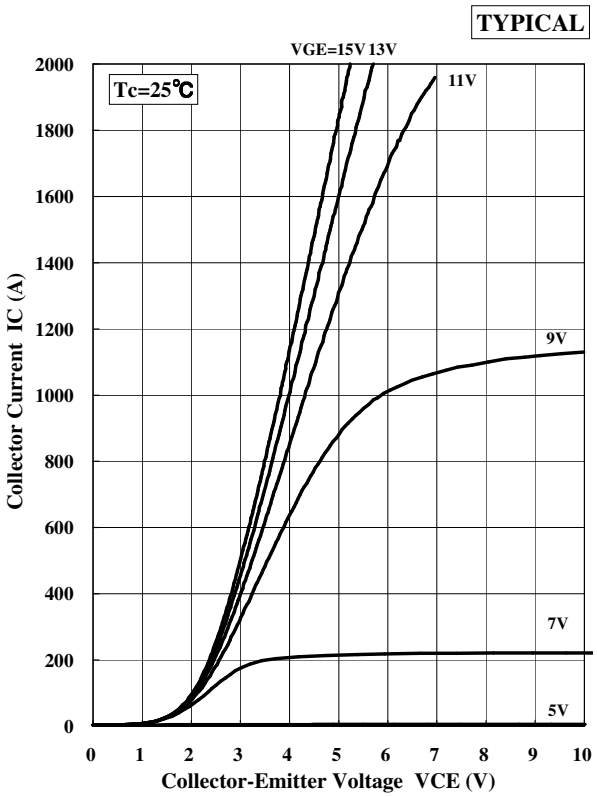
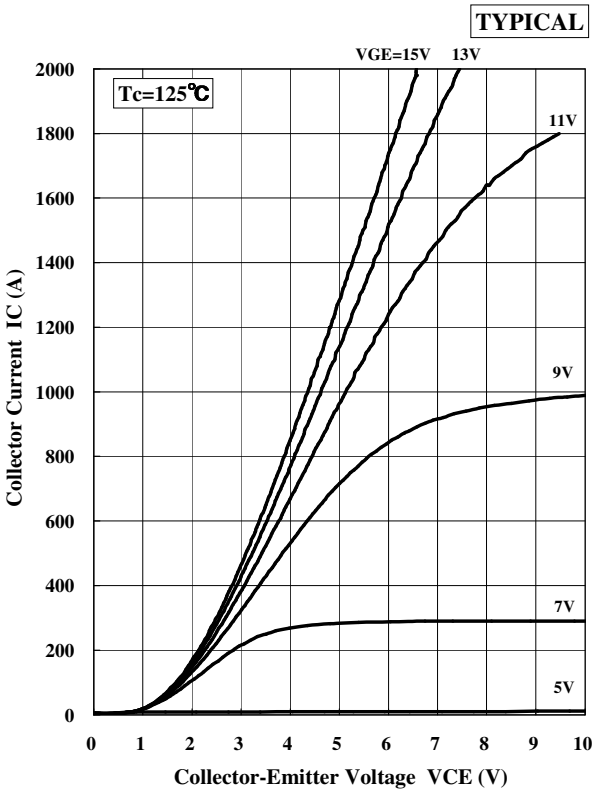
CHARACTERISTICS CURVE

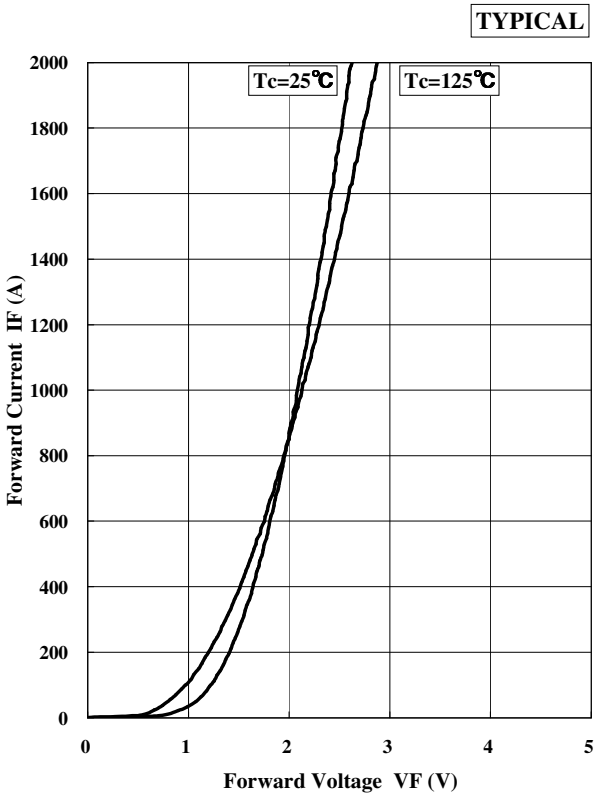
STATIC CHARACTERISTICS



Collector Current vs.Collector to Emitter Voltage



Collector Current vs.Collector to Emitter Voltage



Forward Voltage of free-wheeling diode

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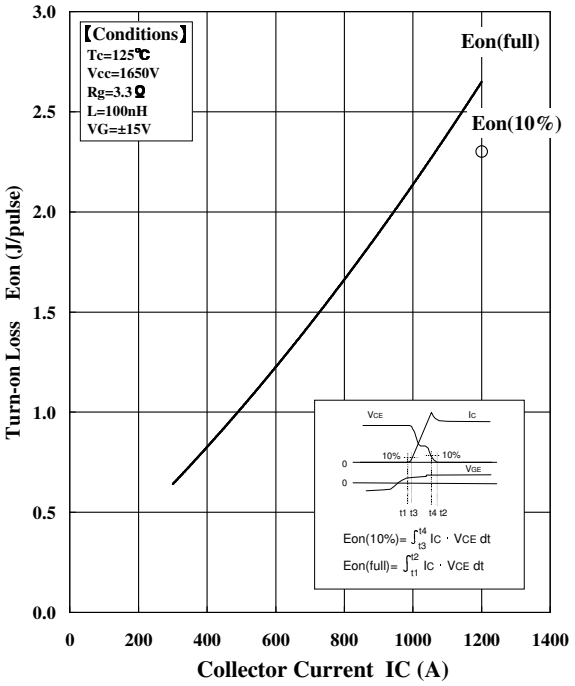
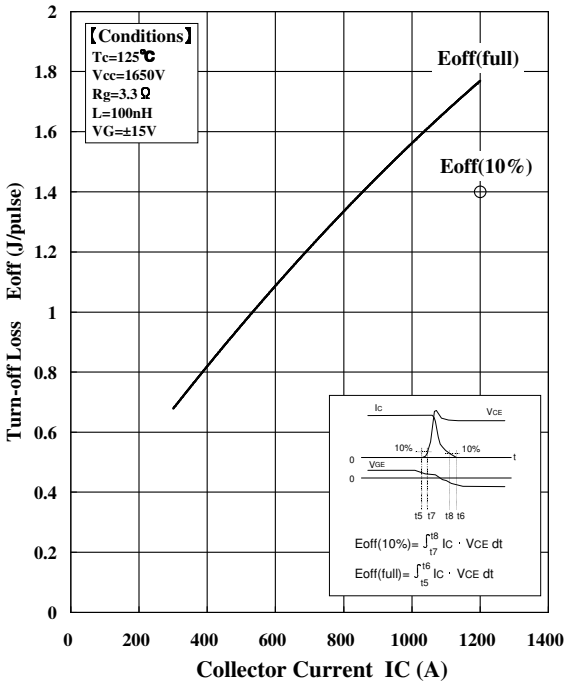
DEPENDENCE OF CURRENT

TYPICAL



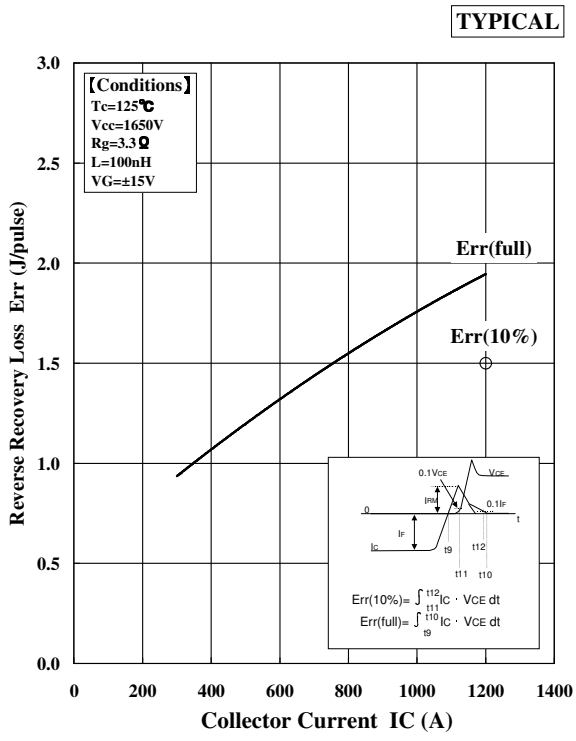
Turn-on Loss vs. Collector Current

TYPICAL



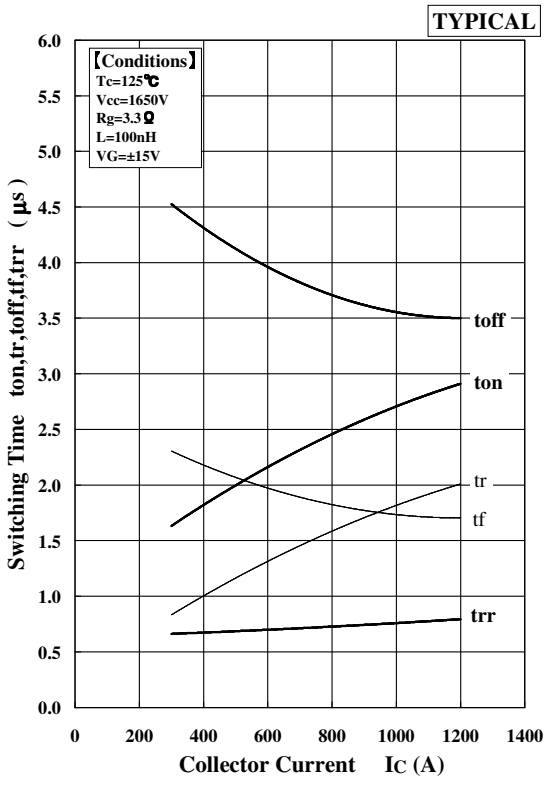
Turn-off Loss vs. Collector Current

TYPICAL



Turn-on Loss vs. Collector Current

TYPICAL



Switching Time vs. Collector Current

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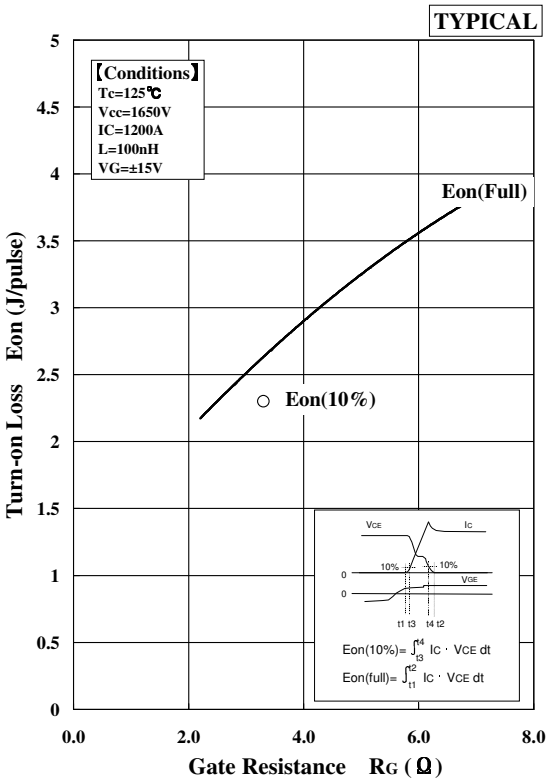
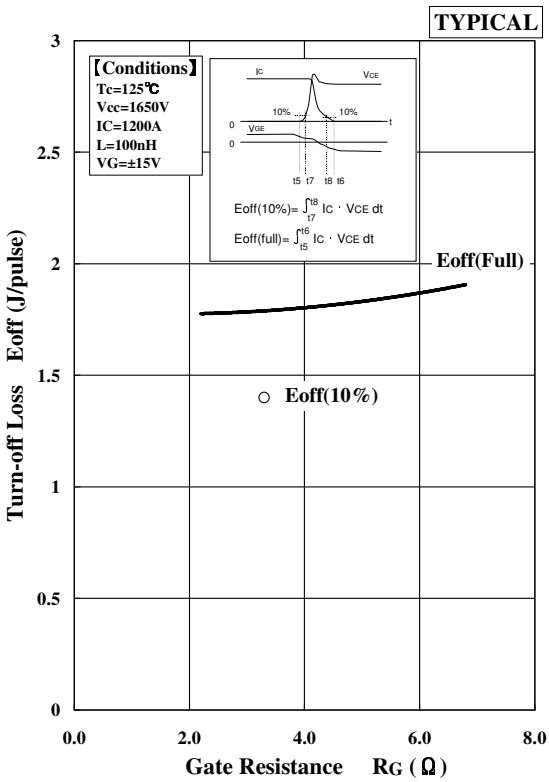
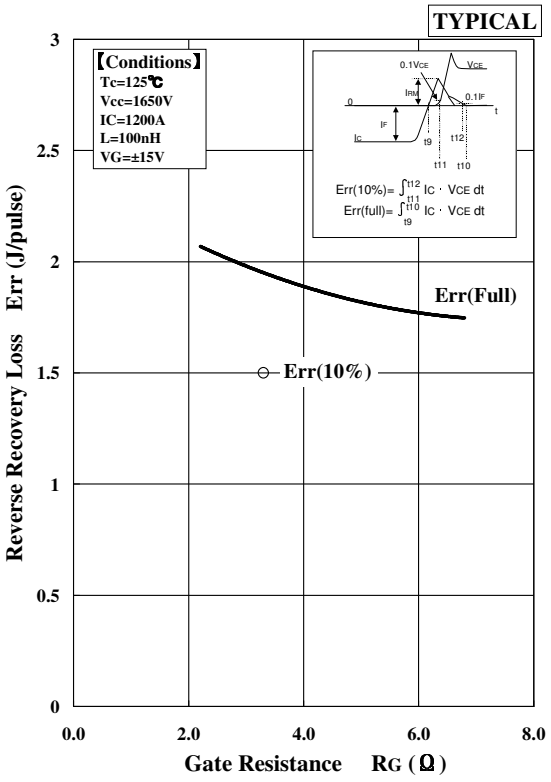
DEPENDENCE OF RG



Turn-on Loss vs. Gate Resistance



Turn-off Loss vs. Gate Resistance



Recovery Loss vs. Gate Resistance

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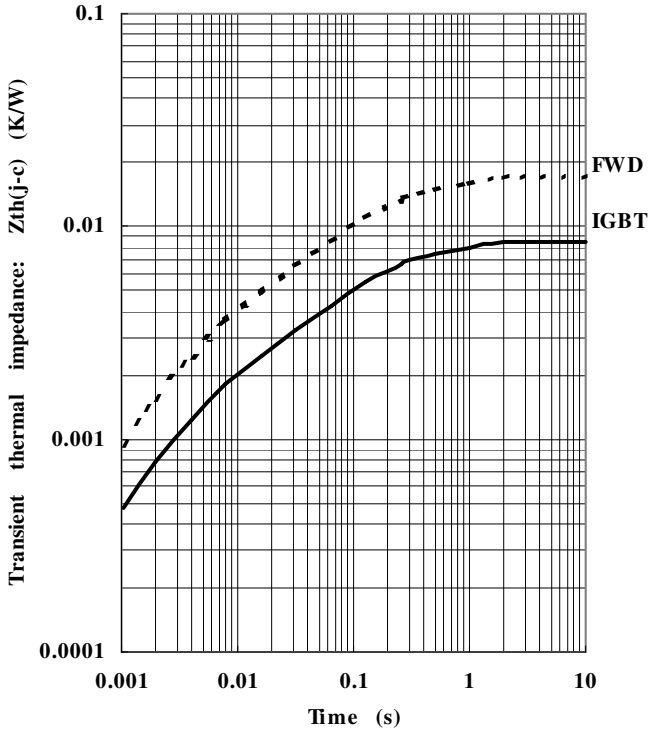
TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve

HITACHI POWER SEMICONDUCTORS

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