MBN1600E17F

Silicon N-channel IGBT 1700V F version

FEATURES

∗ Soft switching behavior & low conduction loss:
Soft low-injection punch-through with trench gate IGBT.
∗ Low driving power:
Low input capacitance advanced trench gate.
∗ Ultra soft fast recovery diode.

ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Item		Symbol	Unit	MBN1600E17F
Collector Emitter Voltage		V_{CES}	V	1,700
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	1,600
	1ms	I_{Cp}		3,200
Forward Current	DC	I_F	A	1,600
	1ms	I_{FM}		3,200
Junction Temperature		$T_{j\,op}$	°C	-50 ~ +150
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	2/15 (1)
	Mounting (M6)	-		6 (2)

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

ELECTRICAL CHARACTERISTICS

Item		Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current		I_{CES}	mA	-	5	-	V_{CE}=1,700V, V_{GE}=0V, Tj=25°C
				-	20	80	V_{CE}=1,700V, V_{GE}=0V, Tj=150°C
Gate Emitter Leakage Current		I_{GES}	nA	-500	-	+500	V_{GE}=±20V, V_{CE}=0V, Tj=25°C
Collector Emitter Saturation Voltage		$V_{CE(sat)}$	V	-	2.0	-	I_C=1,600A, V_{GE}=15V, Tj=25°C
				1.9	2.4	2.8	I_C=1,600A, V_{GE}=15V, Tj=150°C
Gate Emitter Threshold Voltage		$V_{GE(TO)}$	V	4.1	5.5	7.1	V_{CE}=10V, I_C=160mA, Tj=25°C
Input Capacitance		C_{ies}	nF	-	87	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Internal Gate Resistance		Rge	Ω	-	2.3	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Switching Times	Rise Time	t_r	μs	-	0.4	0.8	V_{CC}=900V, Ic=1,600A
	Turn On Time	t_{on}		-	1.0	2.0	Ls=65nH (3)
	Fall Time	t_f		-	1.4	2.8	R_G(on/off)=3.9Ω/3.9Ω (3)
	Turn Off Time	t_{off}		-	3.2	6.4	V_{GE}=±15V, Tj=150°C
Peak Forward Voltage Drop		V_{FM}	V	-	1.8	-	IF=1,600A, V_{GE}=0V, Tj=25°C
				1.3	2.0	2.7	IF=1,600A, V_{GE}=0V, Tj=150°C
Reverse Recovery Time		t_{rr}	μs	-	0.65	1.3	V_{CC}=900V, Ic=1,600A Ls=65nH (3) R_G(on/off)= 3.9Ω/3.9Ω (3) V_{GE}=±15V, Tj=150°C
Turn On Loss		E_{on}	J/P	-	0.6	-	
Turn Off Loss		E_{off}	J/P	-	1.3	-	
Reverse Recovery Loss		E_{rr}	J/P	-	0.85	-	
Stray inductance in module		L_{SCE}	nH	-	18	-	
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.015	Junction to case
	FWD	Rth(j-c)		-	-	0.023	
Contact Thermal Impedance		Rth(c-f)	K/W	-	0.008	-	Case to fin (λgrease=1W/(m·K), heat-sink flatness ≤50um)

Notes:(3) Ls and R_G are the test condition's values 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.

* 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.
* ELECTRIC CHARACTERISTICS values are according to IEC 60747-2 and IEC 60747-9.

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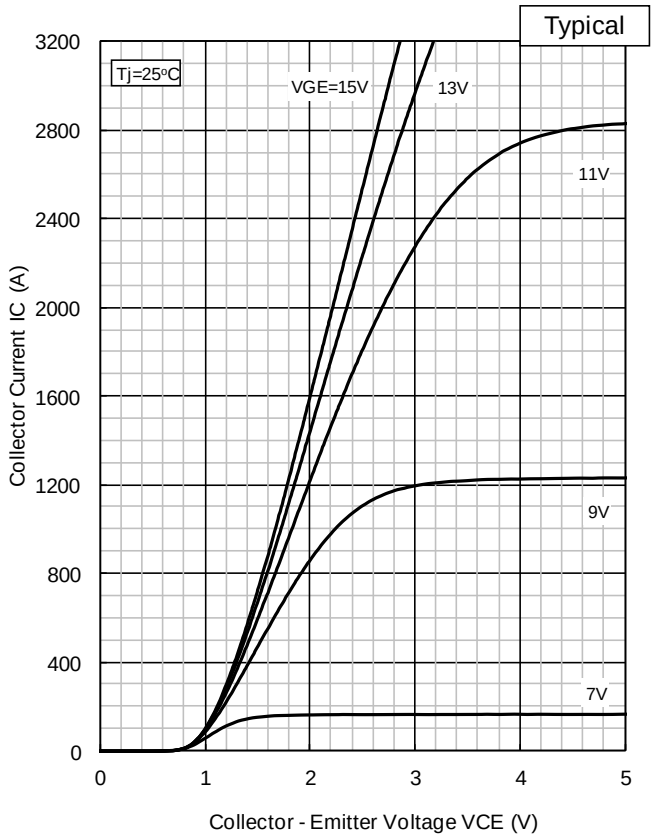
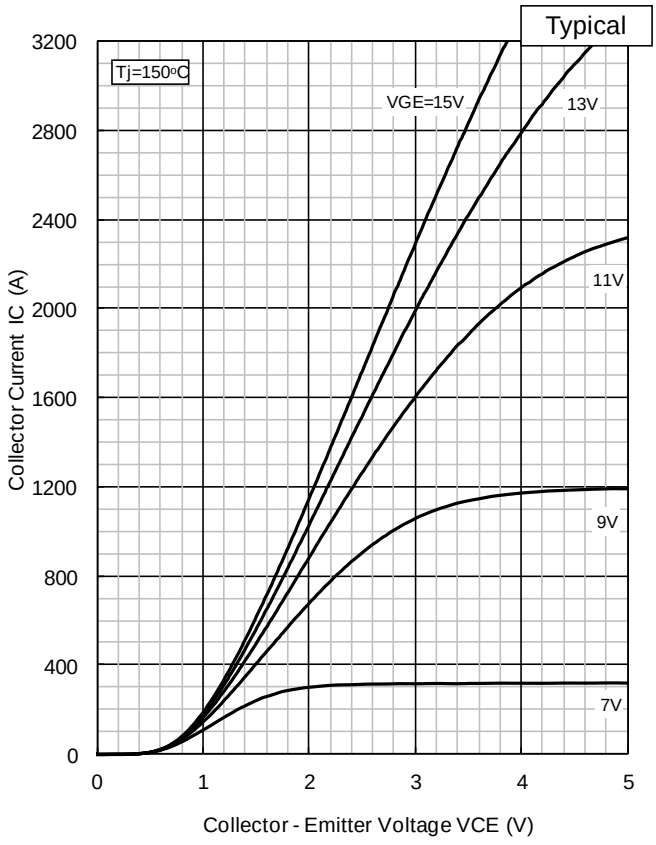
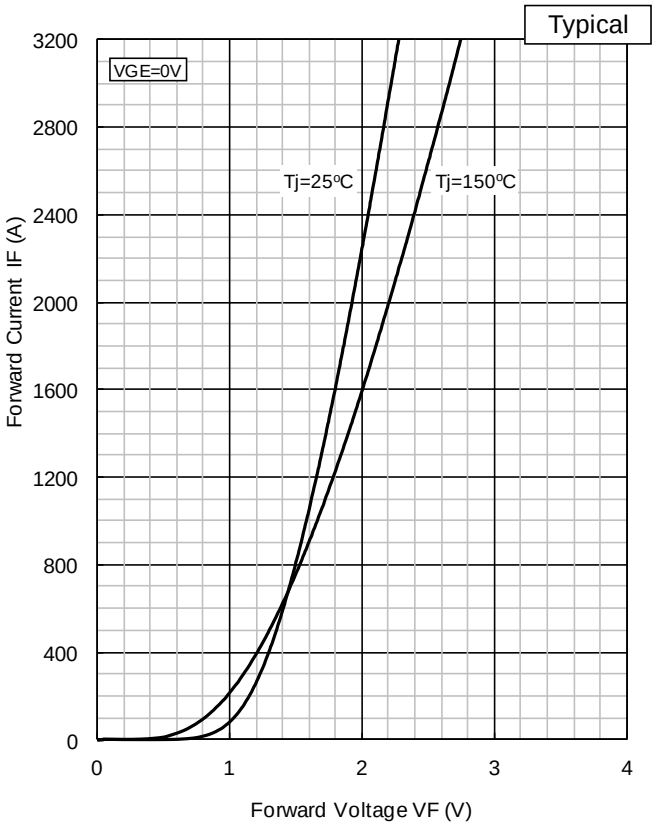
STATIC CHARACTERISTICS



IC vs. VCE (Tj=25°C)



IC vs. VCE (Tj=150°C)



IF vs. VF

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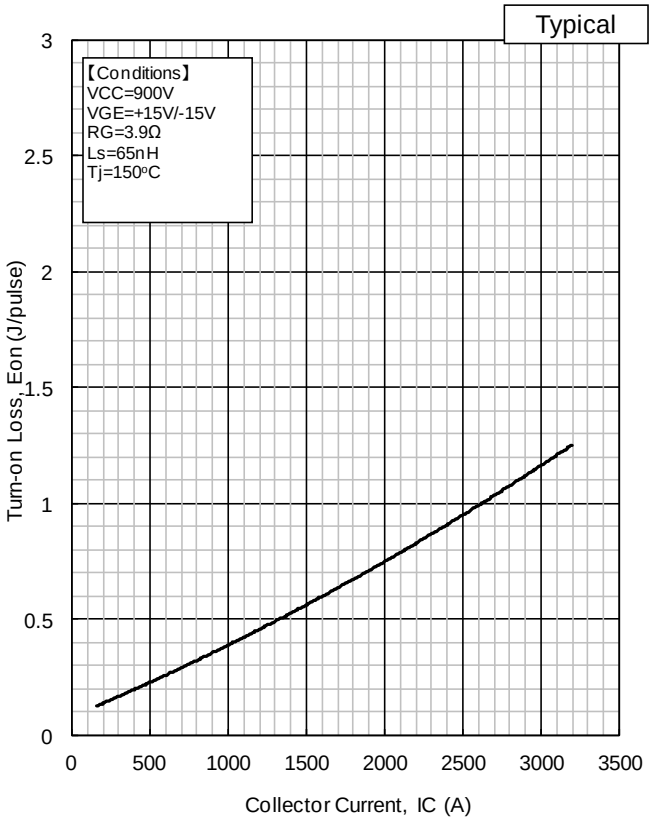
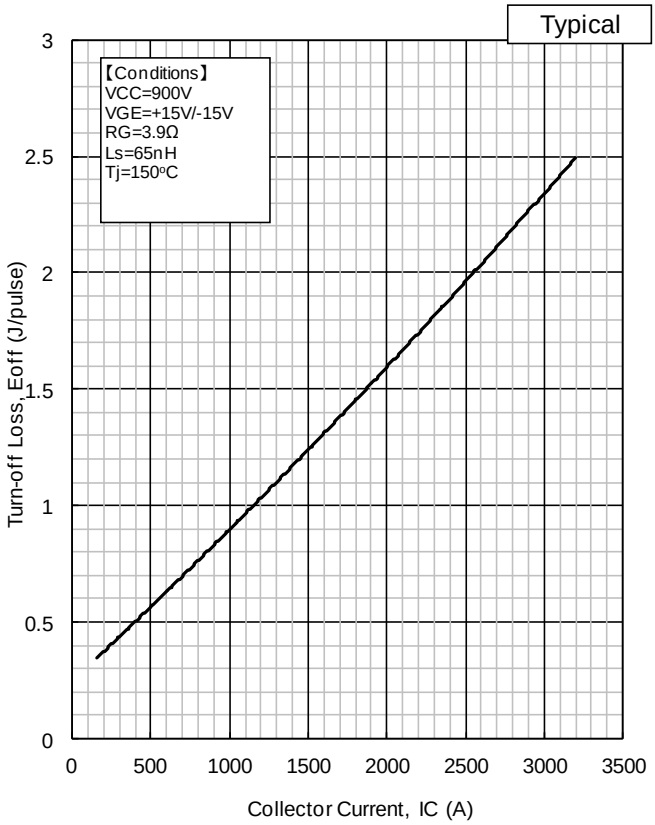
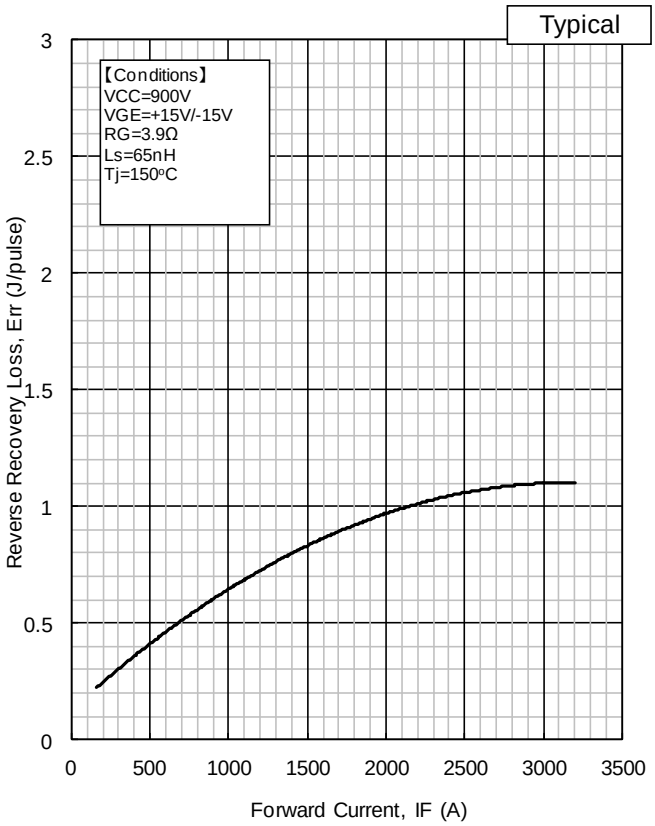
DYNAMIC CHARACTERISTICS



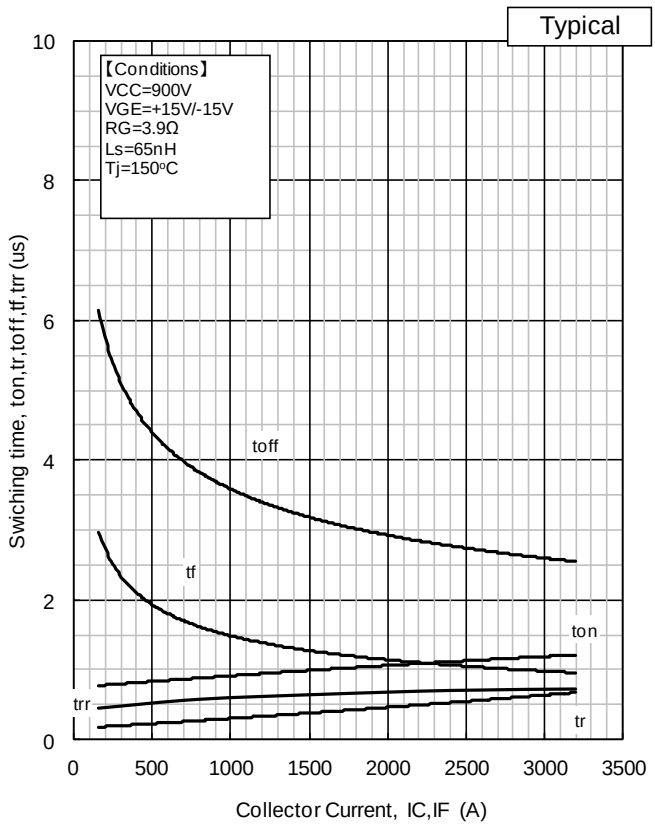
Turn-on loss vs. Collector current



Turn-off loss vs. Collector current



Recovery loss vs. Forward current



Switching time vs. Collector current

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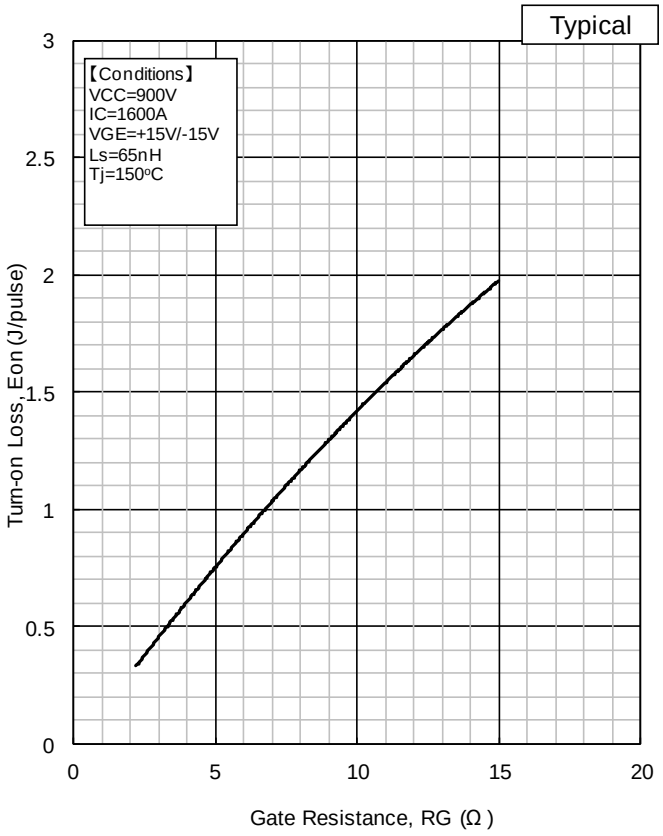
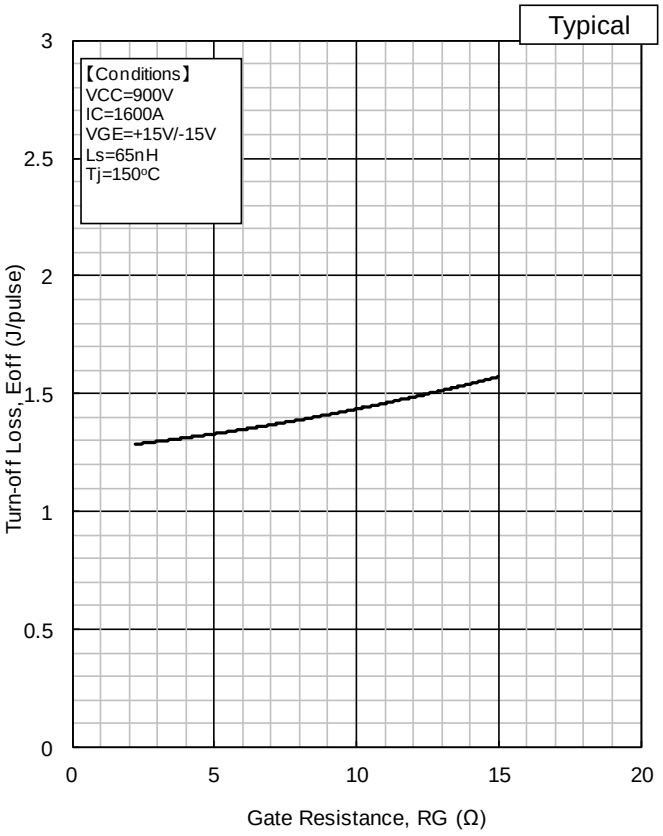
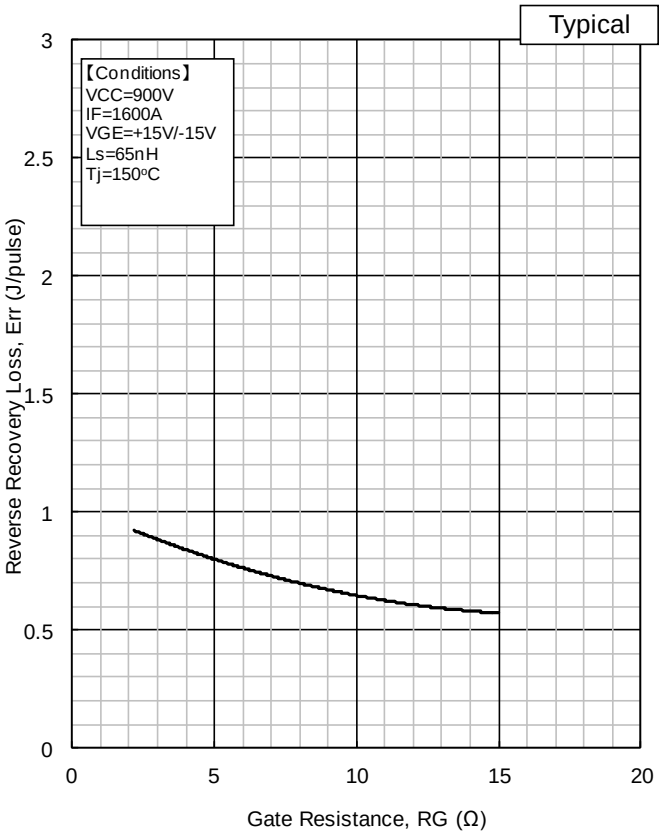
DYNAMIC CHARACTERISTICS



Turn-on loss vs. Gate Resistance



Turn-off loss vs. Gate Resistance



Recovery loss vs. Gate Resistance

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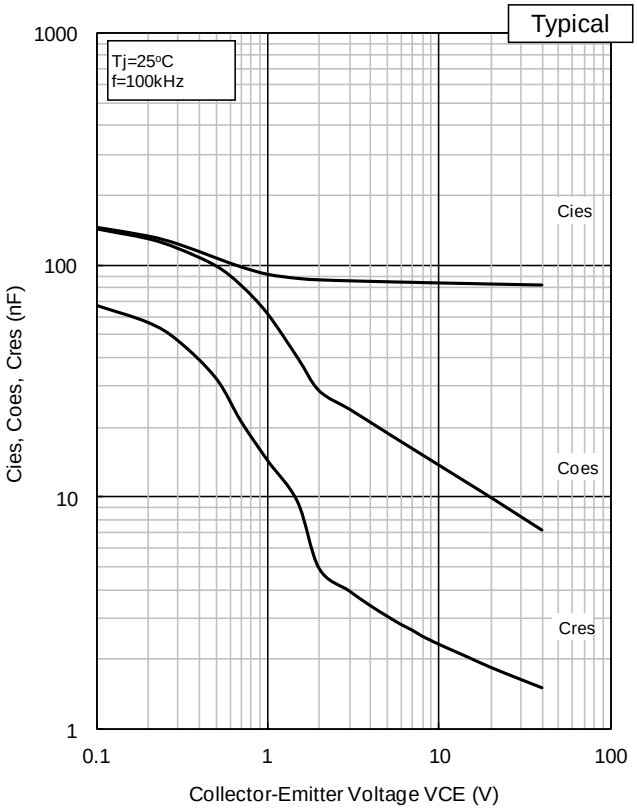
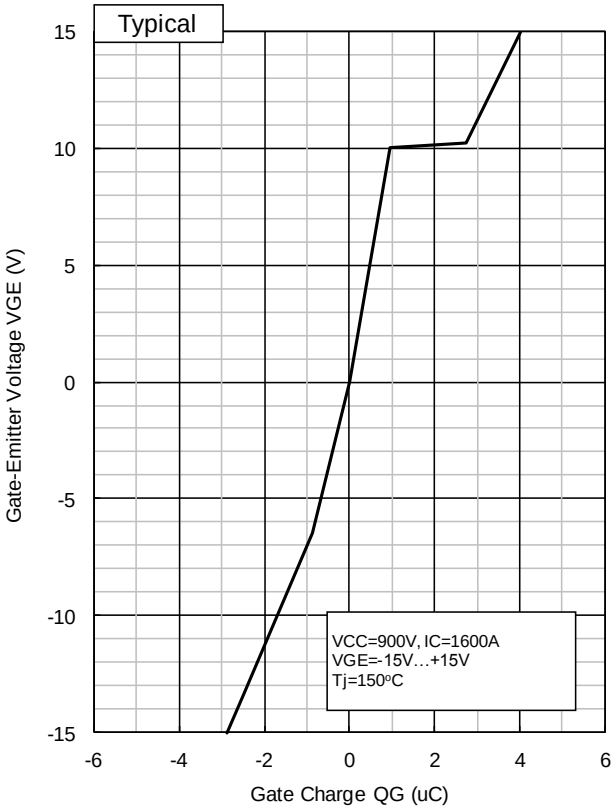
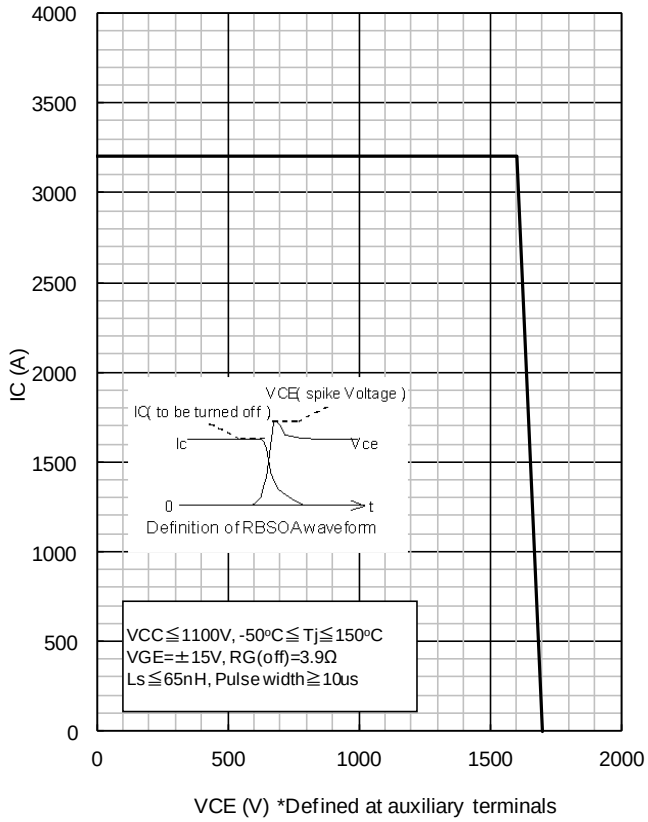


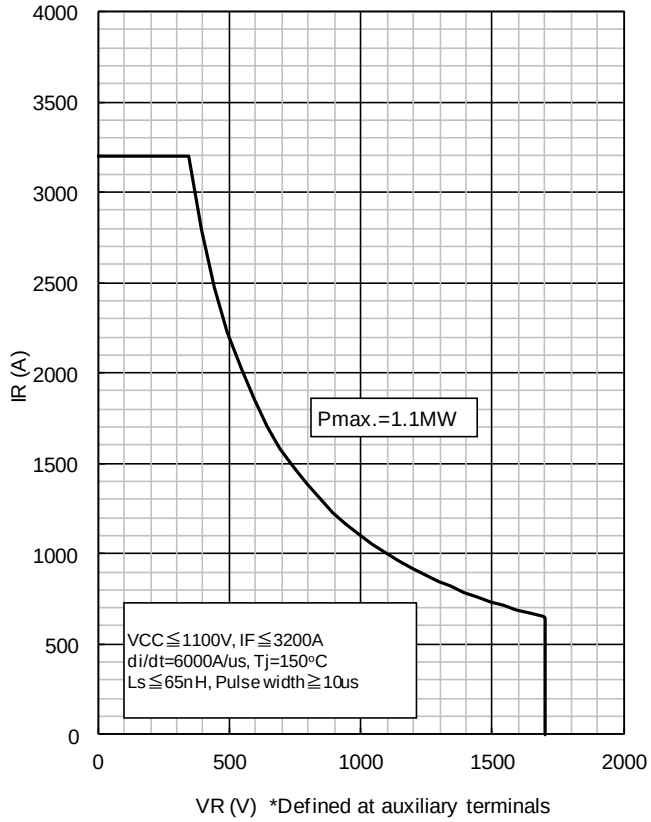
Cies, Coes, Cres - VCE



QG - VGE



RBSOA



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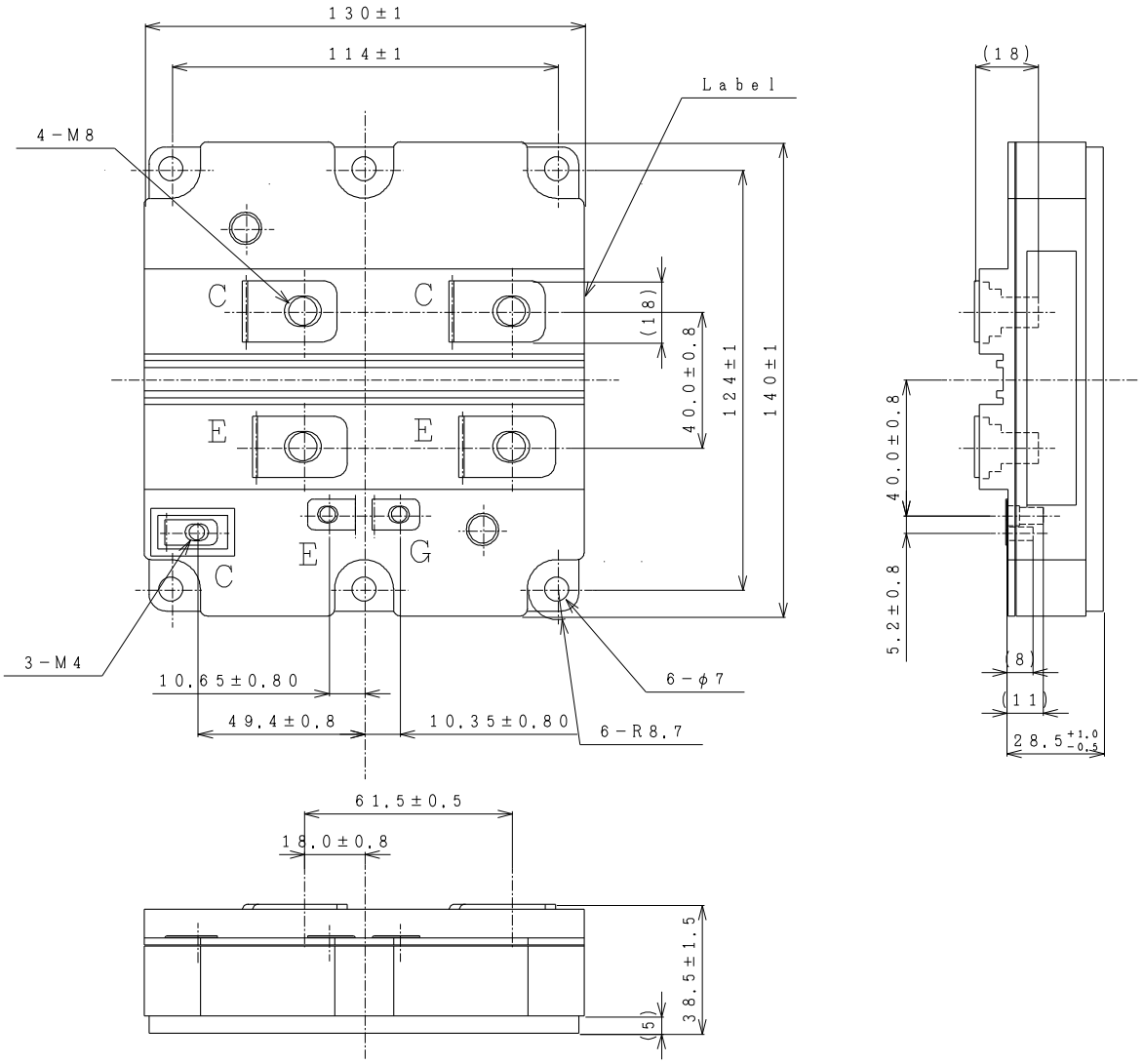
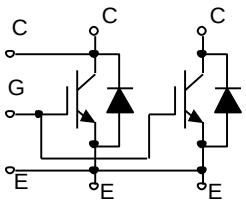
Outline Drawing

Unit in mm



Weight: 900g



Circuit Diagram

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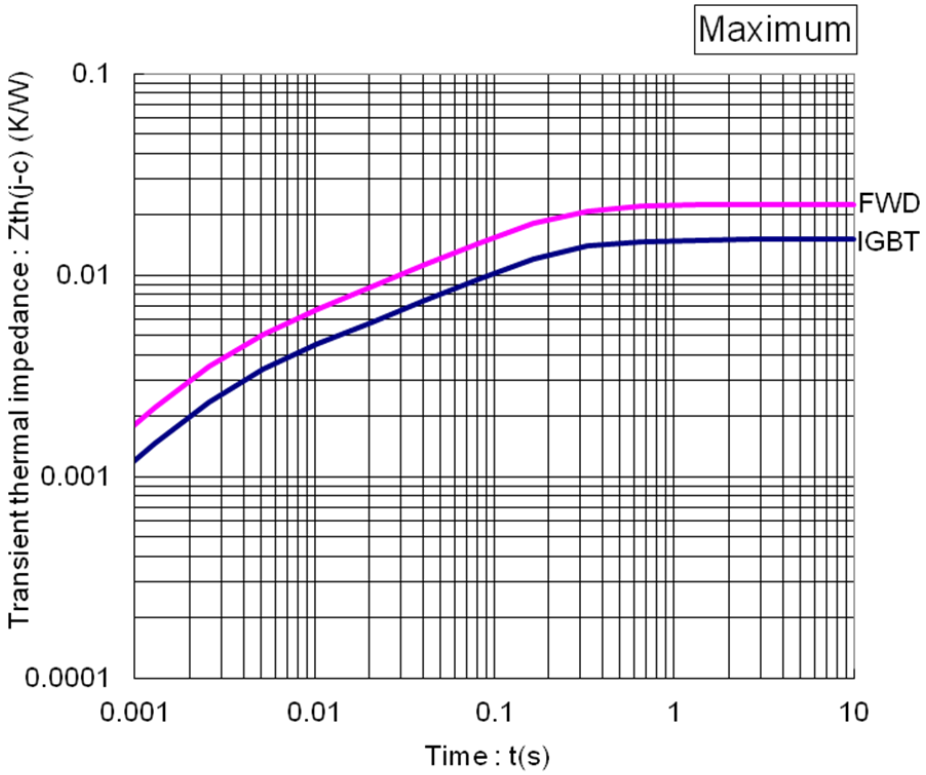
TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve

Curve Approximation Model
Σ rth[n]*(1-exp(-t/τth[n]))

n	1	2	3	4	Unit
τ th[n]	1.50E-01	2.58E-02	3.09E-03	5.61E-04	sec
rth[n,IGBT]	8.97E-03	2.93E-03	2.70E-03	3.97E-04	K/W
rth[n,Diode]	1.36E-02	4.73E-03	4.01E-03	6.26E-04	K/W

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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