

**Key Parameters**

$V_{CES}$  = 1200V  
 $I_c$  = 100A

**Features**

- Low  $V_{ce(sat)}$
- Fast switching
- High ruggedness
- High short circuit capability

**Applications**

- Inverter for motor drive
- Frequency converters
- Air conditioning
- Servo motors

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Absolute Maximum Ratings: IGBT, Break-Chopper			
Symbol	Characteristic	Value	Unit
V <sub>CES</sub>	Collector-Emitter Voltage	1200	V
I <sub>CDC</sub>	Continuous DC Collector Current (T <sub>C</sub> =100°C, T <sub>J</sub> =175°C)	100	A
I <sub>CRM</sub>	Peak Collector Current (t <sub>p</sub> =1ms)	150	A
V <sub>GES</sub>	Gate-Emitter Voltage	±20	V
P <sub>tot</sub>	Total Power Dissipation (T <sub>C</sub> =25°C, T <sub>J</sub> =175°C)	620	W

**IGBT Characteristics**

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
BV <sub>CES</sub>	Collector-Emitter breakdown Voltage	V <sub>GE</sub> =0V, I <sub>C</sub> =250μA, T <sub>vj</sub> =25°C	1200			V
I <sub>CEs</sub>	Collector-Emitter leakage Current	V <sub>CE</sub> =1200V, V <sub>GE</sub> =0V, T <sub>vj</sub> =25°C			5.0	mA
I <sub>GES</sub>	Gate-Emitter leakage Current	V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V, T <sub>vj</sub> =25°C			400	ηA
V <sub>GE(th)</sub>	Gate-emitter Threshold Voltage	V <sub>GE</sub> =V <sub>CE</sub> , I <sub>C</sub> =1.5mA, T <sub>vj</sub> =25°C	5.5	6.5	7.5	V
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> =100A, V <sub>GE</sub> =15V, T <sub>vj</sub> =25°C		1.65	2.0	V
		I <sub>C</sub> =100A, V <sub>GE</sub> =15V, T <sub>vj</sub> =125°C		2.1		V
		I <sub>C</sub> =100A, V <sub>GE</sub> =15V, T <sub>vj</sub> =150°C		2.2		V
Q <sub>G</sub>	Gate Charge	V <sub>CC</sub> =600V, V <sub>GE</sub> =15V, I <sub>C</sub> =100A T <sub>vj</sub> =25°C		478		ηC
R <sub>gint</sub>	Internal Gate Resistance			4.0		Ω
C <sub>iss</sub>	Input Capacitance			9.6		ηF
C <sub>oss</sub>	Output Capacitance	V <sub>CE</sub> =25V, V <sub>GE</sub> =0V, f=1MHz, T <sub>vj</sub> =25°C		0.4		ηF
C <sub>rss</sub>	Reverse Transfer Capacitance			0.1		ηF
t <sub>d(on)</sub>	Turn-on Delay Time	I <sub>C</sub> =100A		80		ηs
t <sub>r</sub>	Rise Time	V <sub>CE</sub> = 600 V		32		ηs
t <sub>d(off)</sub>	Turn-off Delay Time	V <sub>GE</sub> =0/15V		316		ηs
t <sub>f</sub>	Fall Time	R <sub>G</sub> = 2Ω		116		ηs
E <sub>on</sub>	Energy Dissipation During Turn-on Time	T <sub>vj</sub> =25°C , L <sub>load</sub> =0.82mH		3.5		mJ
E <sub>off</sub>	Energy Dissipation During Turn-off Time	Energy loss include tail and diode reverse recovery		5.2		mJ
t <sub>d(on)</sub>	Turn-on Delay Time	I <sub>C</sub> =100A		85		ηs
t <sub>r</sub>	Rise Time	V <sub>CE</sub> = 600 V		38		ηs
t <sub>d(off)</sub>	Turn-off Delay Time	V <sub>GE</sub> =0/15V		400		ηs
t <sub>f</sub>	Fall Time	R <sub>G</sub> = 2Ω		190		ηs
E <sub>on</sub>	Energy Dissipation During Turn-on Time	T <sub>vj</sub> =150°C , L <sub>load</sub> =0.82mH		6.5		mJ
E <sub>off</sub>	Energy Dissipation During Turn-off Time	Energy loss include tail and diode reverse recovery		7.7		mJ
I <sub>sc</sub>	SC Data	t <sub>sc</sub> ≤10μs, V <sub>GE</sub> =15V, T <sub>vj</sub> =25°C, V <sub>cc</sub> =600V,		480		A

**Absolute Maximum Ratings: Diode, Break-Chopper**

Symbol	Characteristic	Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage	1200	V
I <sub>F</sub>	Continuous DC forward current	100	A
I <sub>FRM</sub>	Repetitive peak forward current (tp=1ms)	200	A

**Diode Characteristics**

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
V <sub>F</sub>	Forward Voltage	I <sub>F</sub> =100A, T <sub>vj</sub> =25°C		1.95	2.4	V
		I <sub>F</sub> =100A, T <sub>vj</sub> =125°C		1.80		V
		I <sub>F</sub> =100A, T <sub>vj</sub> =150°C		1.75		V
Q <sub>rr</sub>	Recovered Charge	I <sub>F</sub> =100A		4.8		μC
I <sub>rrm</sub>	Peak Reverse Recovery Current	V <sub>R</sub> =600V		126		A
E <sub>rr</sub>	Reverse Recovery Energy	-di <sub>F</sub> /dt =2500A/μs T <sub>vj</sub> =25°C		1.8		mJ

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Absolute Maximum Ratings: Diode, Rectifier										
Symbol	Characteristic	Value	Unit							
V <sub>RRM</sub>	Repetitive peak reverse voltage	1800	V							
I <sub>F(AV)</sub>	Average output current 50/60Hz, sine wave	150	A							
I <sub>FSM</sub>	Surge forward current (V <sub>R</sub> =0V, t <sub>p</sub> =10msec, T <sub>j</sub> =25°C)	1800	A							
I <sup>2</sup> t	V <sub>R</sub> =0V, t <sub>p</sub> =10msec, T <sub>j</sub> =25°C	16200	A <sup>2</sup> s							
Diode Characteristics										
Symbol	Characteristic	Conditions	Value			Unit				
			Min.	Typ.	Max.					
V <sub>F</sub>	Forward Voltage	I <sub>F</sub> =150A, T <sub>vj</sub> =150°C		1.25		V				
I <sub>R</sub>	Diode reverse current	V <sub>R</sub> =1600V, T <sub>j</sub> =150°C			2.0	mA				
Module Characteristics										
Symbol	Characteristic	Conditions	Value			Unit				
			Min.	Typ.	Max.					
V <sub>isol</sub>	Isolation voltage	t=1min, f=50Hz	2500			V				
T <sub>jmax</sub>	Maximum Junction Temperature				175	°C				
T <sub>vj op</sub>	Operating Junction Temperature		-40		150	°C				
T <sub>stg</sub>	Storage Temperature		-40		125	°C				
R <sub>AA'+CC'</sub>	Module lead resistance terminal to chip			1.30		mΩ				
L <sub>SCE</sub>	Stray Inductance, Module			50		nH				
		per IGBT-Break Chopper		0.24		°C/W				
		per Diode- Break Chopper		0.62		°C/W				
		per Diode- Rectifier		0.19		°C/W				
		per IGBT-Break Chopper		0.54		°C/W				
		per Diode- Break Chopper		0.86		°C/W				
		per Diode- Rectifier		0.48		°C/W				
		per Module		0.02		°C/W				
M <sub>t</sub>	Module to sink torque		3.0		6.0	NM				
G	Weight of Module			180		g				
NTC thermistors Characteristics										
Symbol	Characteristic	Conditions	Min.	Typ.	Max.	Unit				
R <sub>25</sub>	Rated resistance			5.0		kΩ				
ΔR/R	Deviation of R100	T <sub>c</sub> =100°C, R <sub>100</sub> =493Ω	-5		5	%				
P <sub>25</sub>	Power Dissipation			20.0		mW				
B <sub>25/50</sub>	B-value	R <sub>2</sub> =R <sub>25</sub> exp[B <sub>25/50</sub> (1/T <sub>2</sub> -1/(298.15K))]		3375		K				
			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Prepared by : ABA</td> <td style="width: 50%;">Date of Publication : 10.2022</td> </tr> <tr> <td>Approved by :</td> <td>Revision : 1</td> </tr> </table>				Prepared by : ABA	Date of Publication : 10.2022	Approved by :	Revision : 1
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• Typical Electrical Characteristics

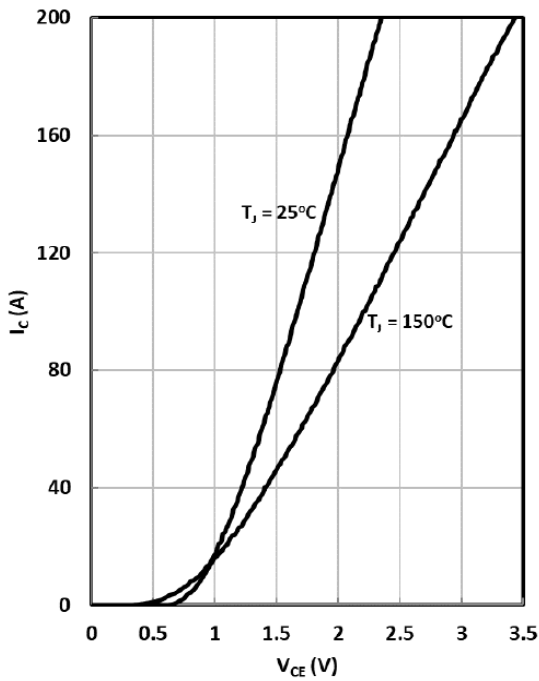


Fig. 1 IGBT (Brake-Chopper) Output Characteristics

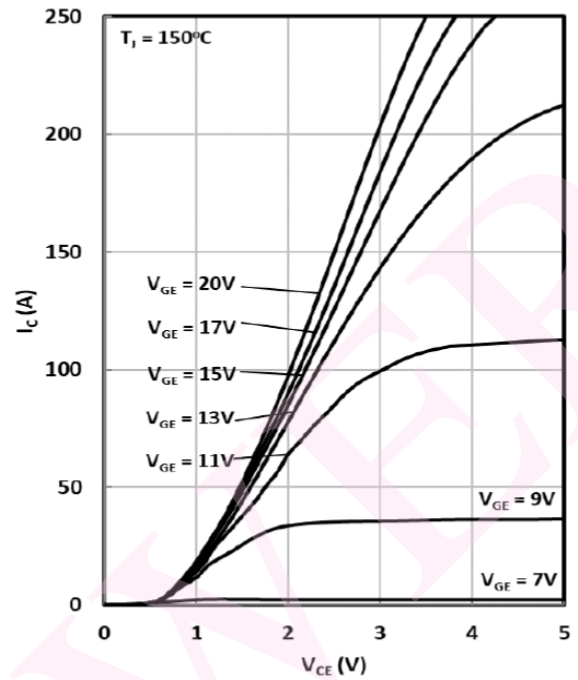


Fig. 2 IGBT (Brake-Chopper) Output Characteristics

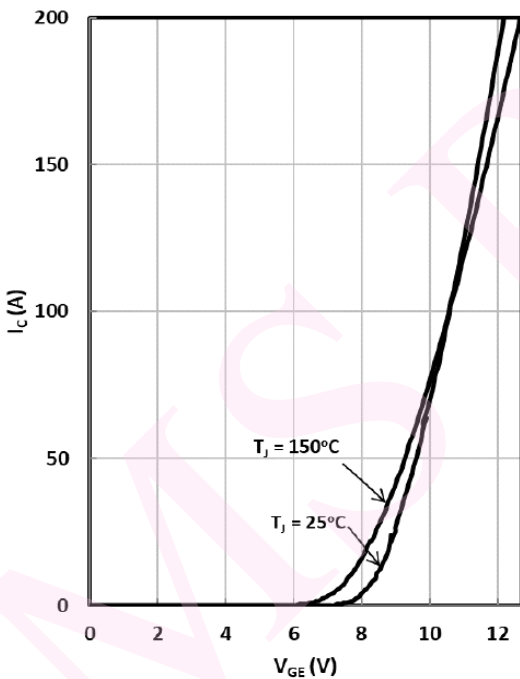


Fig. 3 IGBT (Brake-Chopper) Transfer Characteristics

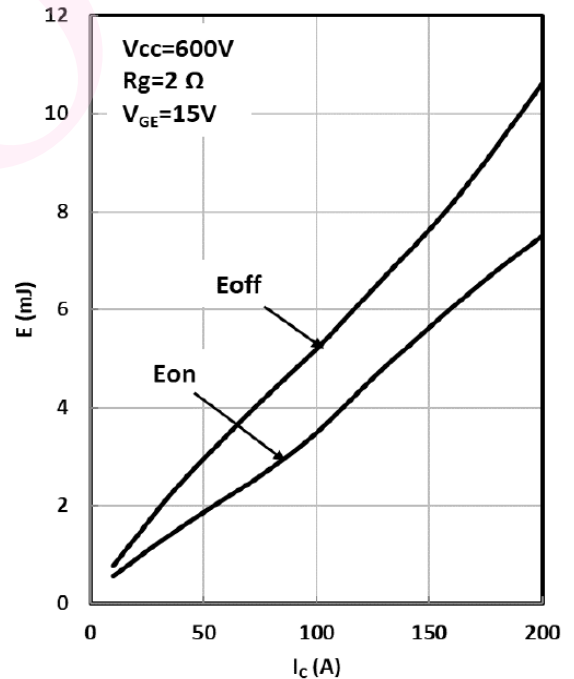
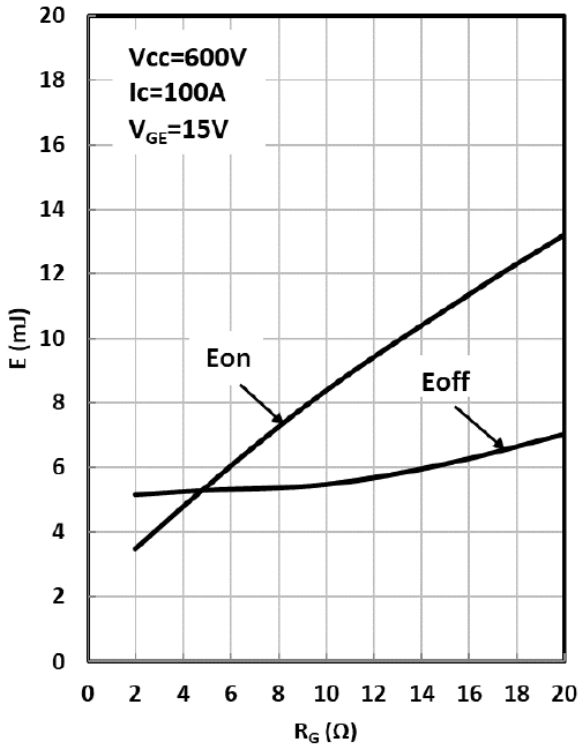
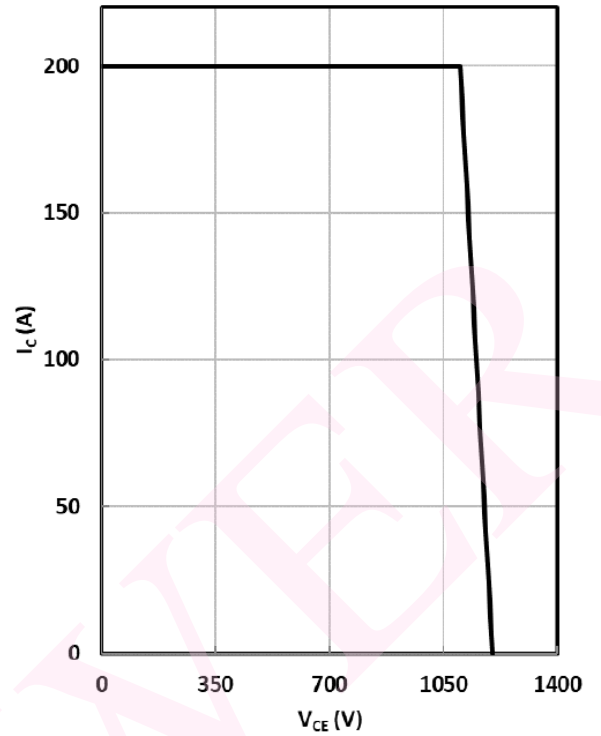


Fig. 4 IGBT (Brake-Chopper) Switching Loss vs. Ic

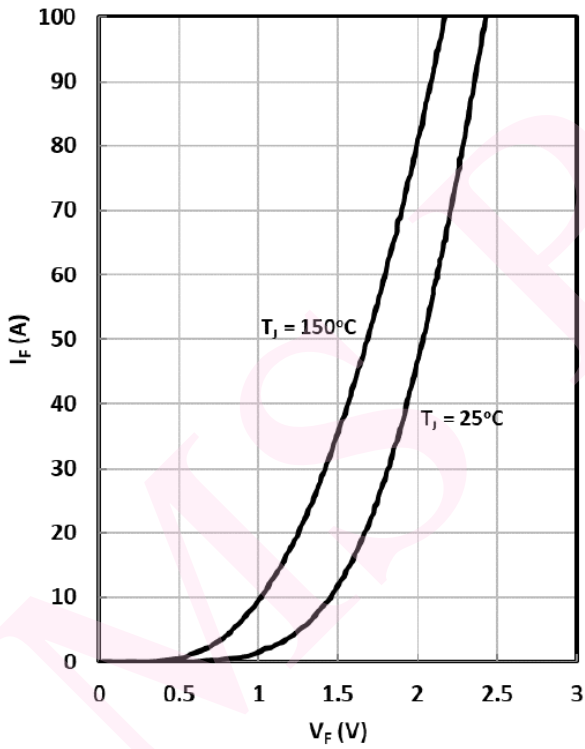
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**Fig. 5 IGBT (Brake-Chopper) Switching Loss vs.  $R_G$**



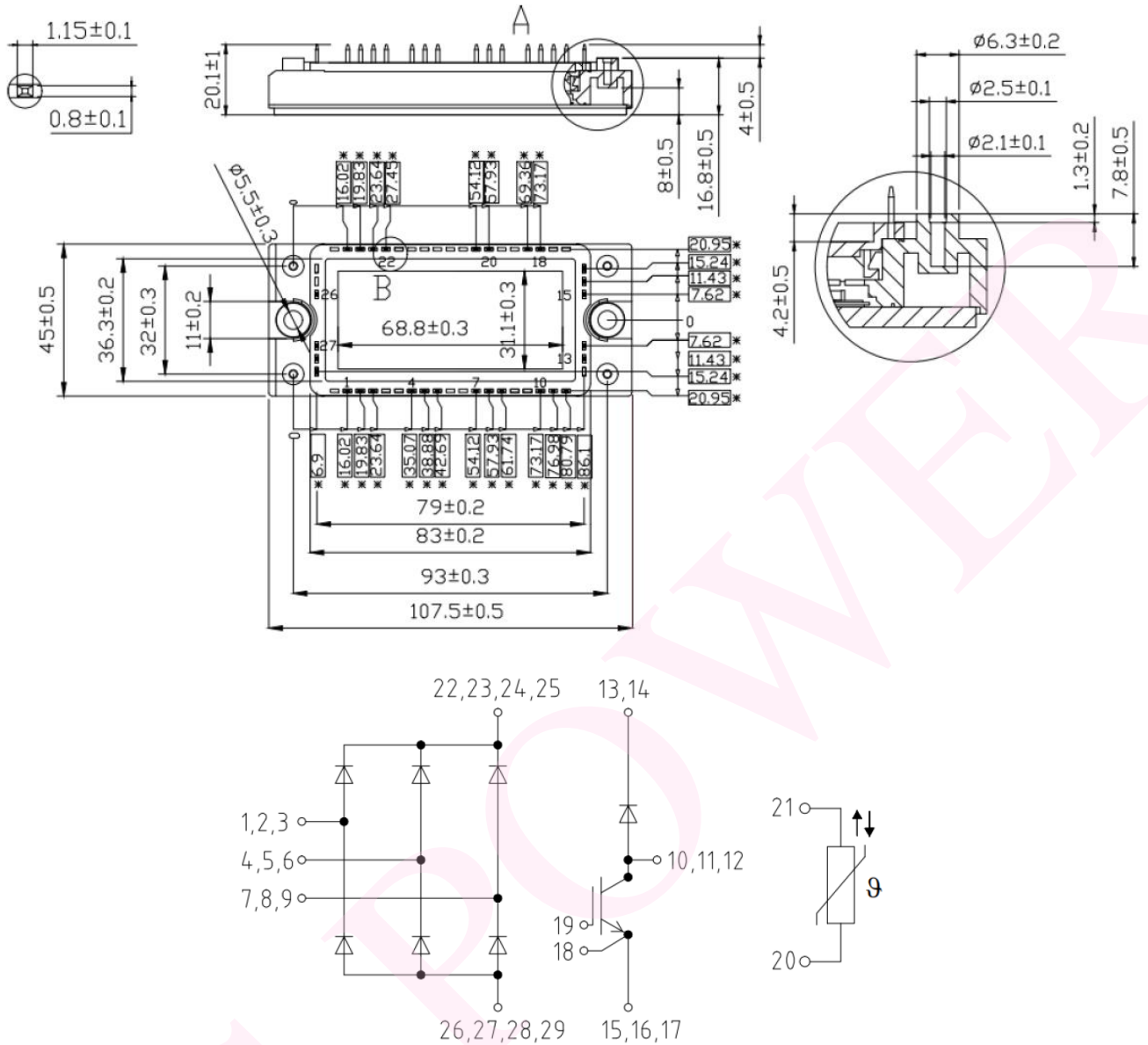
**Fig. 6 RBSOA**



**Fig. 7 Diode (Brake-Chopper) Forward Characteristics**

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