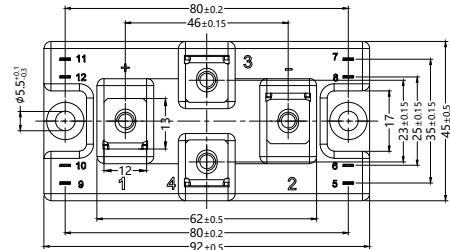
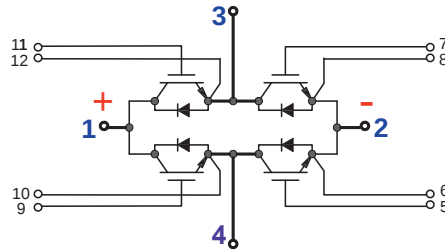
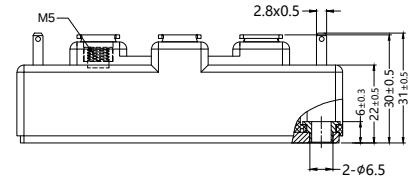


S4G40T120SC9

H bridge IGBT modules



Dimension: mm



$V_{CES} = 1200V$
 $I_{C100} = 4 \times 40A$
 $V_{CESat(typ)} = 1.85V$
 $E_{off(typ)} = 1.4mJ$

Absolute Maximum Ratings

Symbol	Test Conditions		Values	Unit
IGBT				
V _{CES}	T _j =25°C		1200	V
I _C	T _j = 175 °C	T _c =25°C	80	A
		T _c =80°C	40	A
I _{Cnom}	TC = 100 °C Every chip		40	A
I _{CRM}	ICRM = 3xICnom		120	A
V _{GES}			-20 ... +20	V
tpsc	VCC = 800 V VGE ≤ 15 V VCES ≤ 1200 V	T _j =150 °C	10	μs
T _j			-40 ... +175	°C
Inverse diode				
I _F	T _j = 175 °C	T _c =25°C	40	A
		T _c =80°C	20	A
I _{Fnom}			40	A
I _{FRM}	IFRM = 3xIFnom		120	A
I _{FSM}	tp = 10 ms, sin 180°, T _j =25°C		90	A
T _j			-40 ... +150	°C
Module				
I _{t(RMS)}	Tterminal =80 °C		200	A
T _{stg}			-40 ... 125	°C
V _{Isol}	AC sinus 50 Hz, t = 1 min		4000	V

Sirectifier®

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H bridge IGBT modules

Characteristics						
Symbol	Test Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C =40A	T _j =25°C		1.85	2.10	V
	V _{GE} =15V chip level	T _j =150°C		2.10	2.30	V
V _{CE0}	chipelevel	T _j =25°C		0.8	0.9	V
		T _j =150°C		0.7	0.8	V
r _{CE}	V _{GE} =15V	T _j =25°C		14.00	16.00	mΩ
	chipelevel	T _j =150°C		21.00	22.00	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 1.7 mA		5	5.8	6.5	V
I _{CES}	V _{GE} =0V	T _j =25°C			1	mA
	V _{CE} = 1200 V	T _j =150°C				mA
C _{ies}	V _{CE} =25V	f=1MHz		2.70		nF
C _{oes}	V _{GE} =0V	f=1 MHz		0.17		nF
C _{res}		f=1MHz		0.09		nF
Q _G	V _{GE} = - 8 V...+ 15 V			270		nC
R _{Gint}	T _j =25°C			4.0		Ω
t _{d(on)}	V _{CC} = 600 V I _C =40A V _{GE} =±15V R _{G on} =1Ω R _{G off} =1Ω di/dt _{on} = 1700 A/μs di/dt _{off} =670A/μs	T _j =150°C		55		ns
t _r		T _j =150°C		39		ns
E _{on}		T _j =150°C		3.3		mJ
t _{d(off)}		T _j =150°C		265		ns
t _f		T _j =150°C		30		ns
E _{off}		T _j =150°C		1.4		mJ
R _{th(j-c)}	per IGBT				0.58	K/W



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H bridge IGBT modules

Characteristics						
Symbol	Test Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F =20A V _{GE} =0V chiplevel	T _j =25°C		1.90	2.54	V
		T _j =150°C		2.08	2.60	V
V _{F0}	chiplevel	T _j =25°C		1.3	1.5	V
		T _j =150°C		0.9	1.1	V
r _F	chiplevel	T _j =25°C		18.0	20.0	mΩ
		T _j =150°C		25.0	28.0	mΩ
I _{RRM}	I _F =20A di/dt _{off} =1380A/μs V _{GE} =±15V V _{CC} = 600 V	T _j =150°C		20		A
Q _{rr}		T _j =150°C		8.0		μC
E _{rr}		T _j =150°C		3.0		mJ
R _{th(j-c)}	per diode				0.88	K/W
Module						
L _{CE}					30	nH
R _{CC'+EE'}	terminal-chip	T _C =25°C		0.65		mΩ
		T _C =125°C		1		mΩ
R _{th(c-s)}	per module			0.04	0.05	K/W
M _s	to heat sink M5		3		5	Nm
M _t		to terminals M5	2.5		5	Nm
						Nm
Weight					170	g

S4G40T120SC9

H bridge IGBT modules

Features

- Trench Field Stop technology
- Ultra fast free wheeling diodes technology
- Low switching losses
- Switching frequency up to 20KHz
- Positive temperature coefficient for easy paralleling
- MOS input, voltage controlled

Application

- AC and DC motor control
- AC servo and robot drives
- Power supplies
- Welding inverters

Advantages

- space and weight savings
- reduced protection circuits

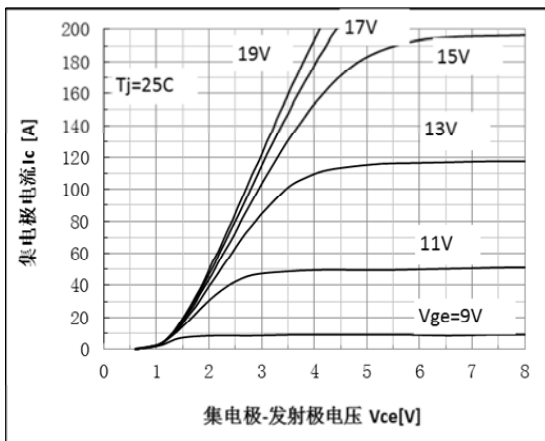


Fig.1 Output characteristic curve

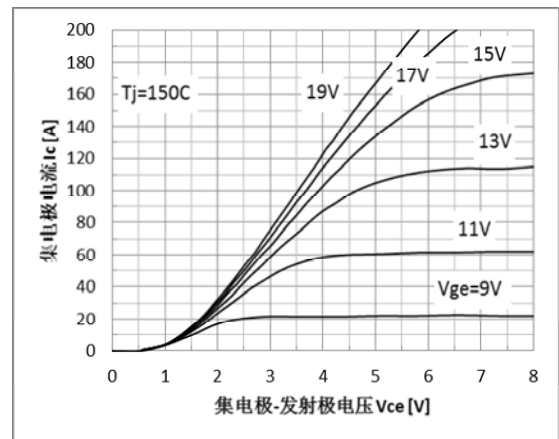


Fig. 2 Output characteristic curve

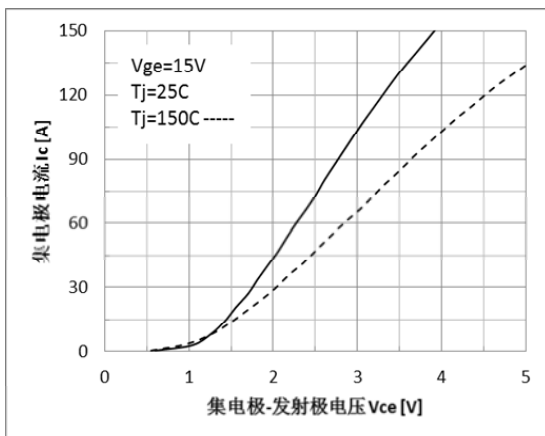


Fig.3 Saturation pressure drop characteristics

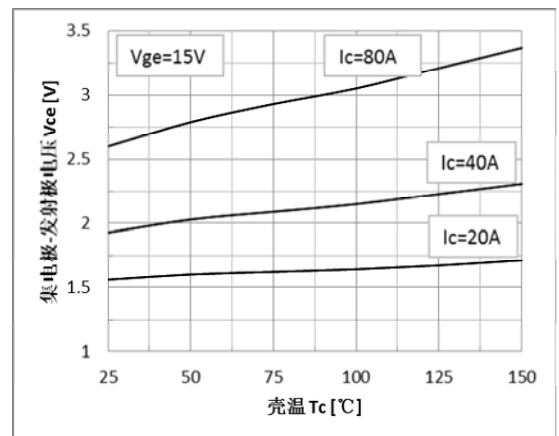


Fig.4 Saturation pressure drop temperature characteristics

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H bridge IGBT modules

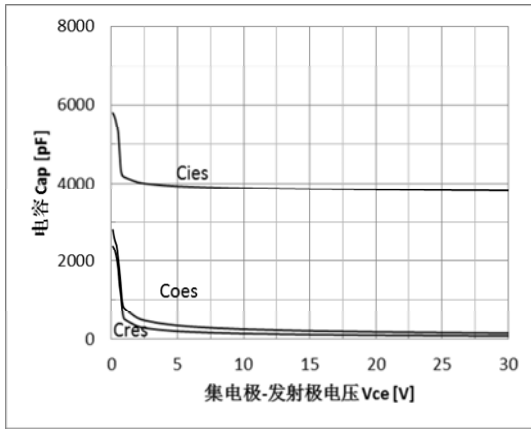


Fig.5 Capacitance characteristics

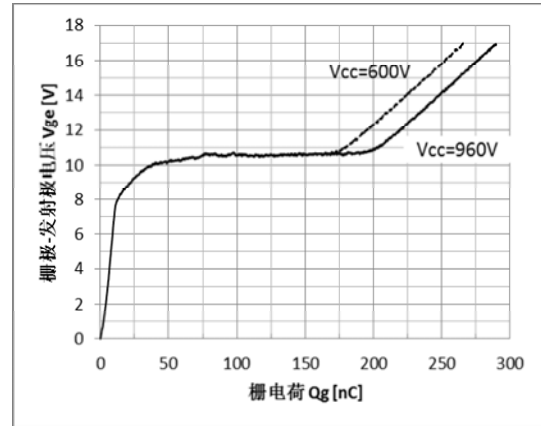


Fig.6 Gate charge characteristic

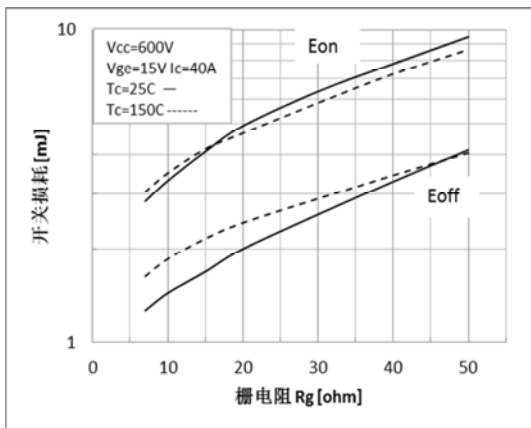


Fig.7 Switching loss - gate resistance characteristic curve

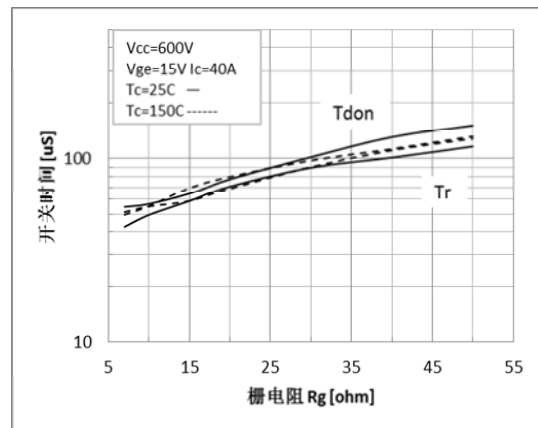


Fig.8 Turn-on - gate resistance characteristic curve

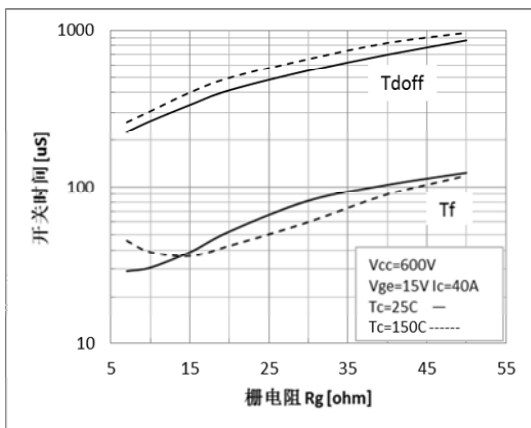


Fig.9 Turn-off - gate resistance characteristic curve

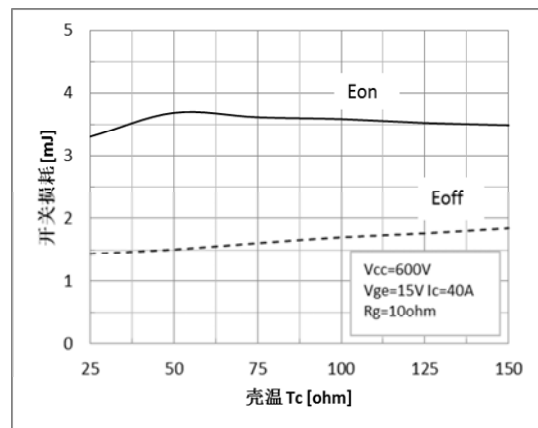


Fig.10 Temperature characteristics of switching losses

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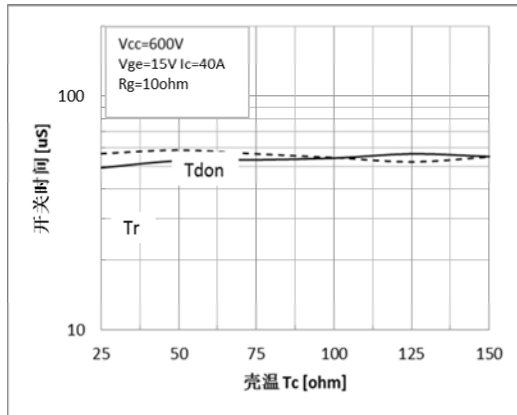


Fig.11 Turn-on temperature characteristics

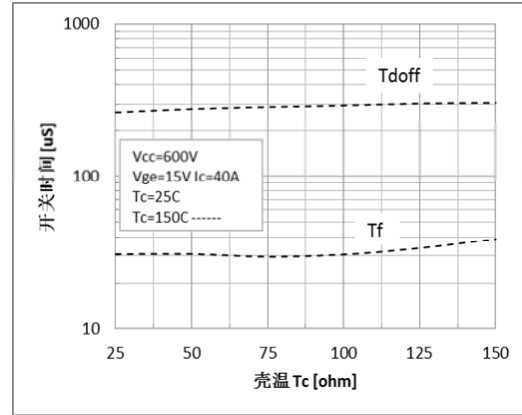


Fig.12 Turn-off temperature characteristics

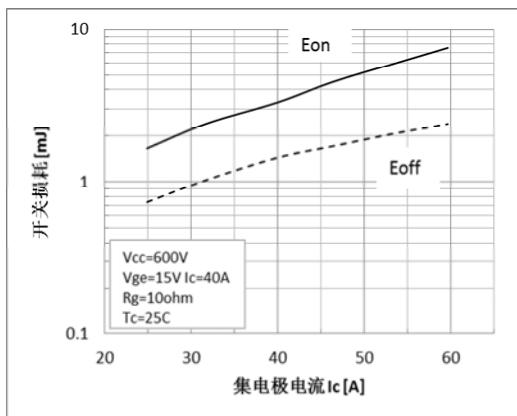


Fig.13 Switching loss and current characteristics

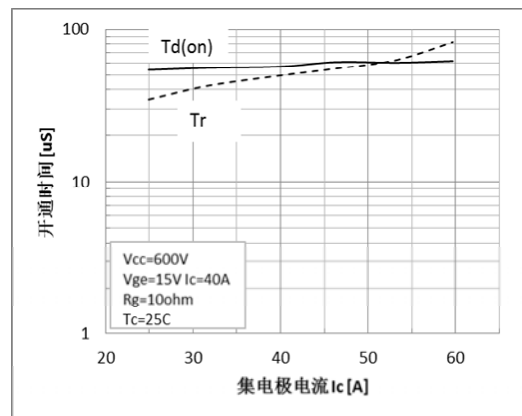


Fig.14 Turn-on and current characteristics

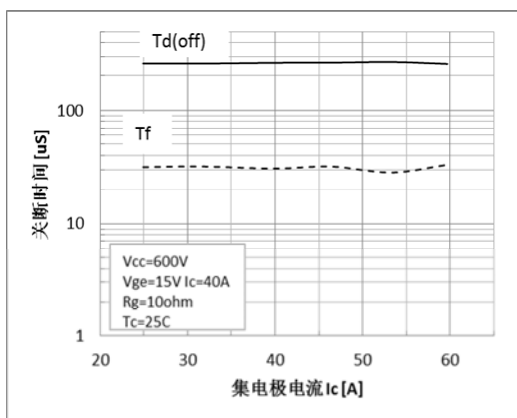


Fig.15 Turn-off and current characteristics

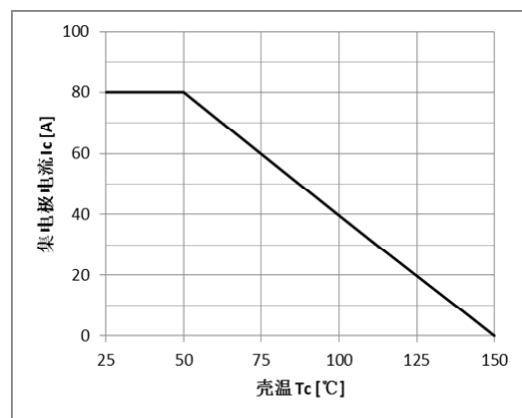


Fig.16 Collector current-temperature characteristics

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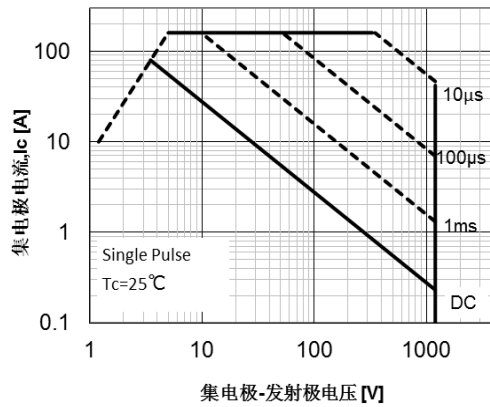


Fig.17 Forward Safe Workspac

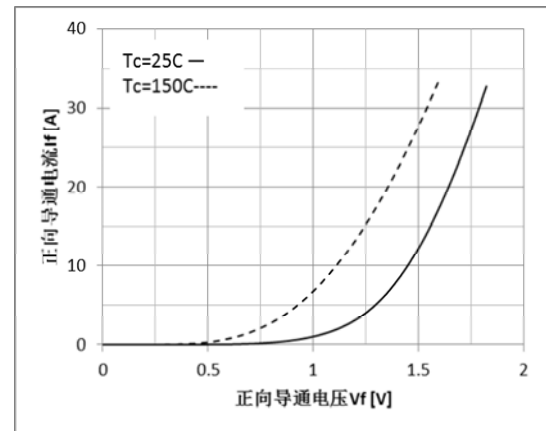


Fig.18 Forward characteristics of the diode

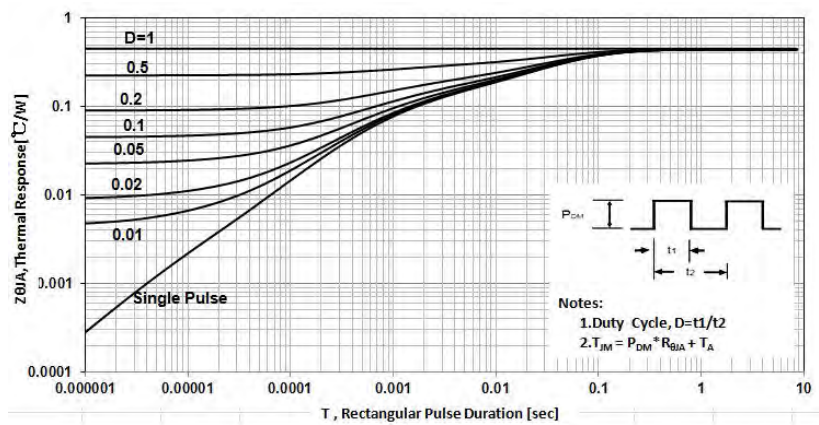


Fig.19 Transient thermal resistance characteristics