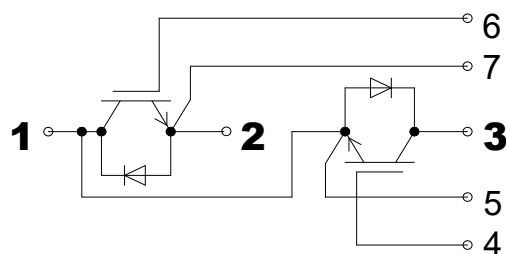


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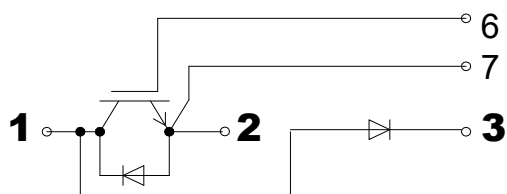
IGBT Modules For Welding Application



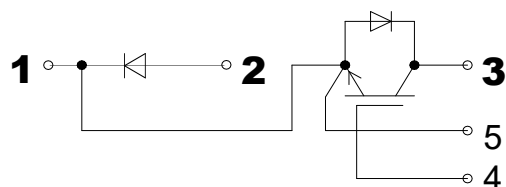
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SGD100NF120SC1



SDG100NF120SC1



Symbol	Test Condition	Value	Unit
IGBT			
V_{CES}		1200	V
I_C	$T_C = 100^{\circ}\text{C}$ per chip	100	A
V_{GES}		± 20	V
$T_{vj} (T_{stg})$		$-40 \sim +150(125)$	$^{\circ}\text{C}$
P_{tot}		400	W
INVERSE DIODE			
I_F	$T_C = 25^{\circ}\text{C}$ per chip	35	A
I_{FSM}		350	A
V_{RRM}		1200	V
I^2t	$T_j = 125^{\circ}\text{C}$, $t = 10\text{ms}$, $V_R = 0\text{V}$	350	A^2s

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Symbol	Test Conditions	Min	Typ	Max	Unit
IGBT Tc = 25°C unless otherwise specified					
V _{GE(th)}	VGE=VCE, IC = 1mA	4.5		5.7	V
I _{CES}	VGE = 0; VCE=VCES; Tj=25(125)°C			1	mA
V _{CE(TO)}	Tj=25(125)°C		1.4(1.6)	1.6(1.8)	V
r _{CE}	VGE=15V		11(15)	14(19)	mΩ
V _{CE(sat)}	IC=100A; VGE=15V; chip level		2.3	2.5	V
C _{ies}	VGE=0V, VCE=25V, f=1MHz		7.2		nF
C _{oes}			1.10		
C _{res}			0.63		
LCE				30	nH
RCC'+EE'	Termial to Case, Tc=25°C		0.35		mΩ
t _{d(on)}	Vcc = 600V, IC = 100A RGON = RGOFF = 10Ω Tj=125°C VGE=±15V		25		ns
t _r			50		ns
t _{d(off)}			290		ns
t _f			90		ns
E _{on} /E _{off}			4.50/2.30		mJ
INVERSE DIODE Tc = 25°C unless otherwise specified					
VF	IF =35A; VGE=0V; Tj = 25°C		1.9	2.2	V
Qrr	IF=35A; VR=300V; Tj=25°C di/dt = 600A/us, VGE=-15V		6.5		μC
IRRM			35		A
Erec			2.00		mJ
THERMAL CHARACTERISTICS					
Rth(j-c)	per IGBT			0.35	K/W
Rth(j-c)D	per FRD			1.20	K/W
Mechanical Data					
Ms		2.5		4	Nm
Weight			158		g

Features

- Planar Gate Field Stop Technology IGBT
- Fast Recovery Free Wheeling Diode
- Low Switching Losses
- $V_{ce(sat)}$ with positive temperature coefficient
- Fast Switching and short tail current
- Switched mode power supplies at $f_{sw}>20KHz$
- Resonant inverters up to 100KHz
- Electronic Welders at $f_{sw}>20KHz$

Application

- Welding inverters

Advantages

- Space and weight savings
- Reduced protection circuits

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IGBT Modules For Welding Application

Fig 1. output characteristic IGBT,
 $I_c=f(V_{CE}), V_{GE}=15V$

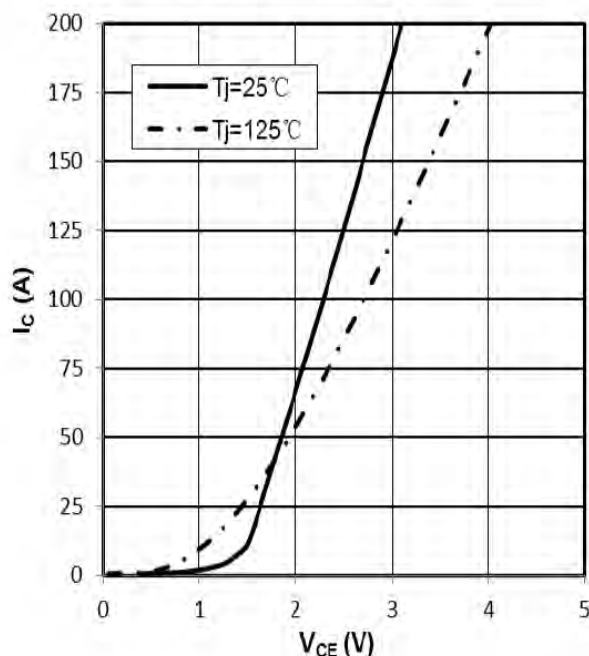


Fig 2. output characteristic IGBT,
 $I_c=f(V_{CE}), T_j=125^\circ\text{C}$

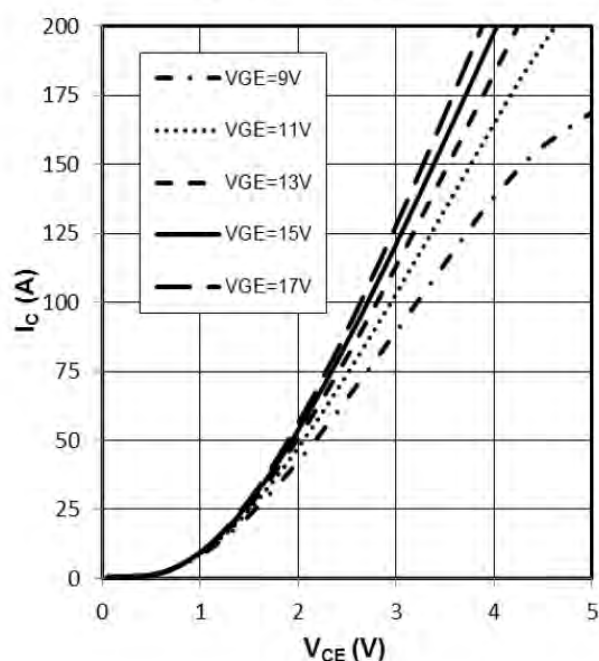


Fig 3. transfer characteristic IGBT,
 $I_c=f(V_{GE}), V_{CE}=20V$

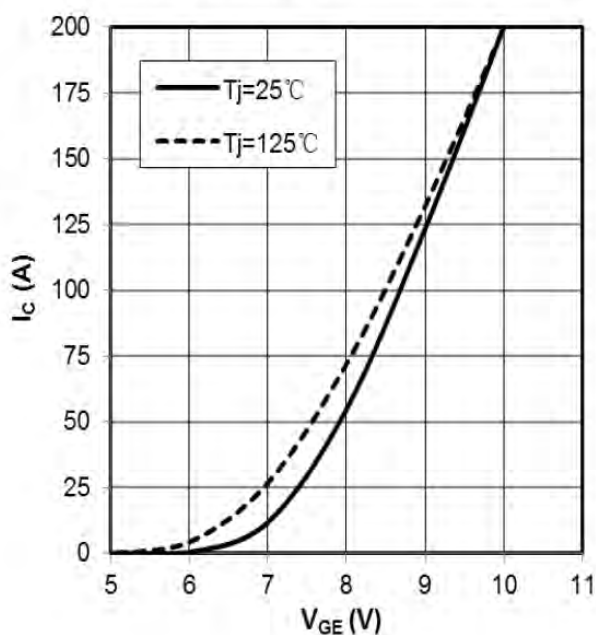
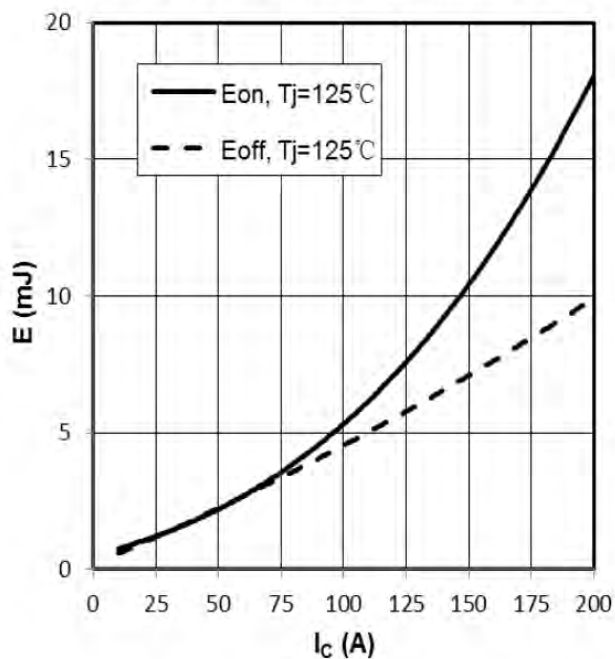


Fig 4. switching losses IGBT, $E_{on}=f(I_c), E_{off}=f(I_c)$,
 $V_{GE}=\pm 15V, R_{Gon}=5.6\Omega, R_{Goff}=5.6\Omega, V_{CE}=600V$



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Fig 5. switching losses IGBT,
 $E_{on}=f(R_g), E_{off}=f(R_g), V_{GE}=\pm 15V, I_C=100A, V_{CE}=600V$

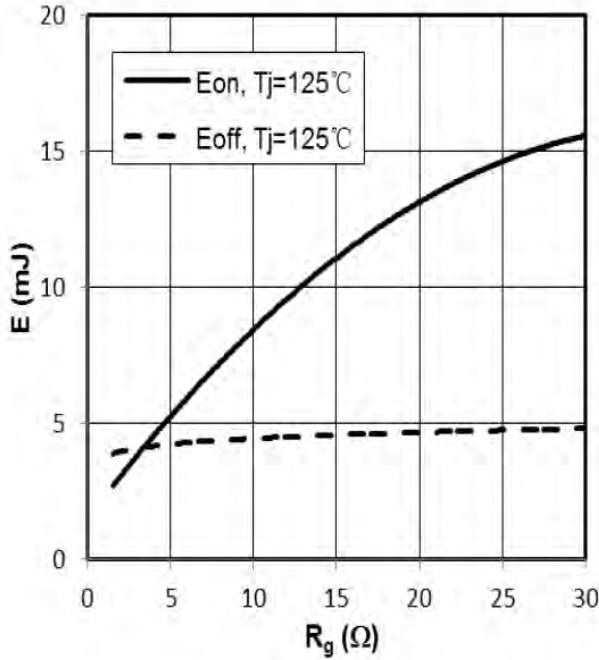


Fig 6. transient thermal impedance IGBT, $Z_{thjc}=f(t)$

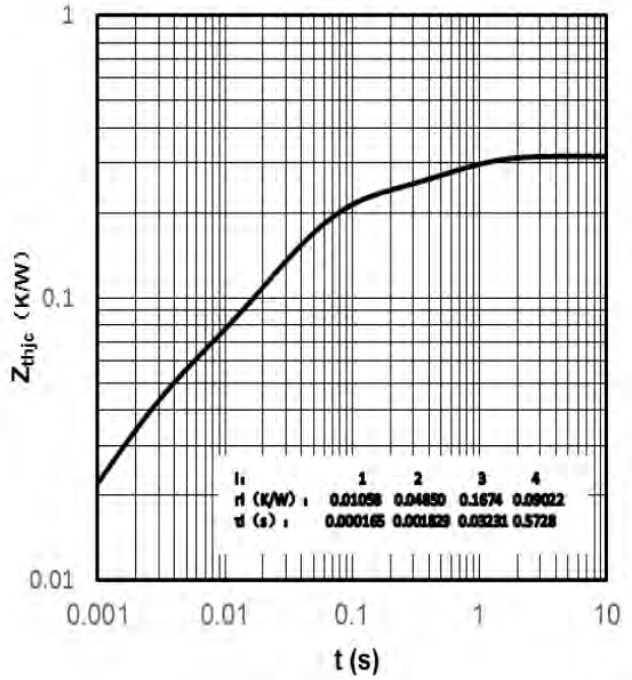


Fig 7. reverse bias safe operating area IGBT,
 $I_C=f(V_{CE}), V_{GE}=\pm 15V, R_{goff}=5.6\Omega, T_{vj}=125^\circ C$

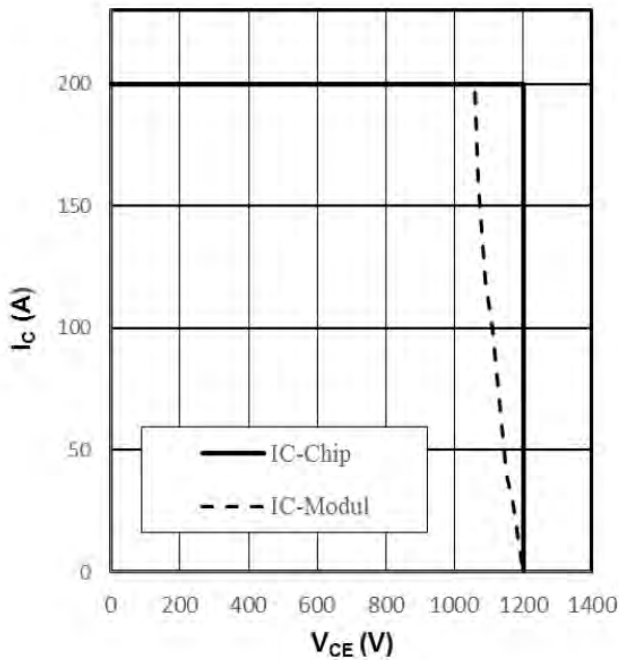
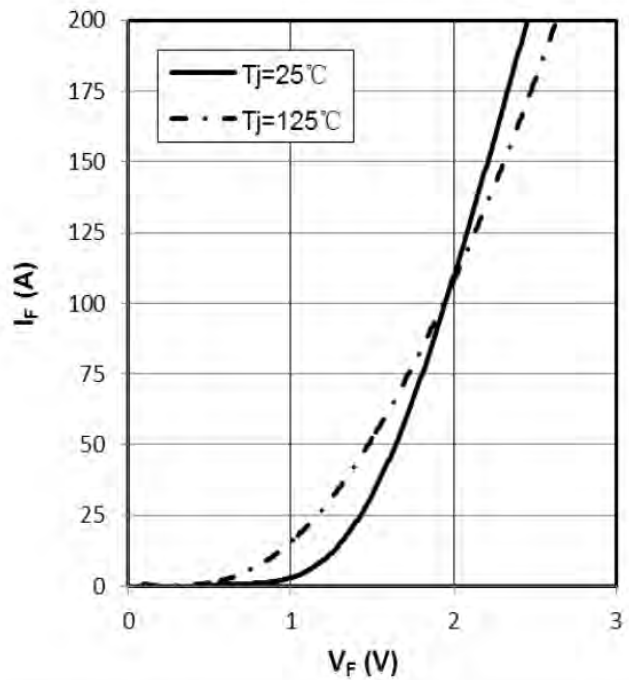


Fig 8. forward characteristic of Diode, $I_F=f(V_F)$



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Fig 9. switching losses Diode,
 $E_{rr}=f(I_F), R_{Gon}=7.5\Omega, V_{CE}=600V$

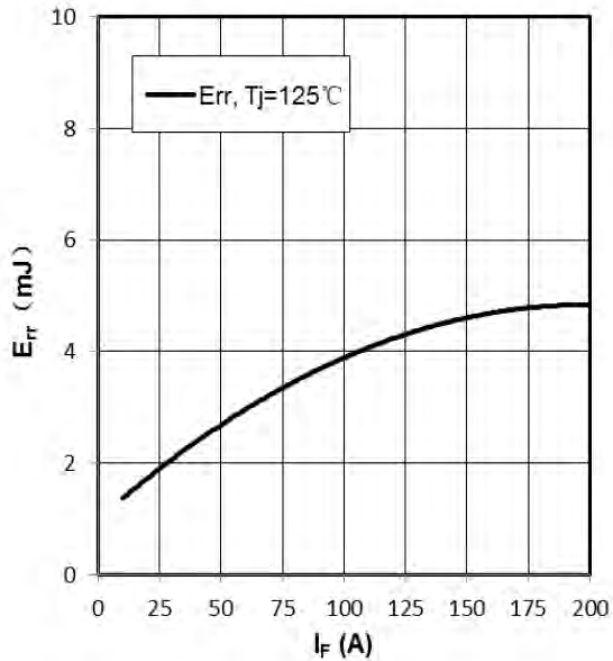
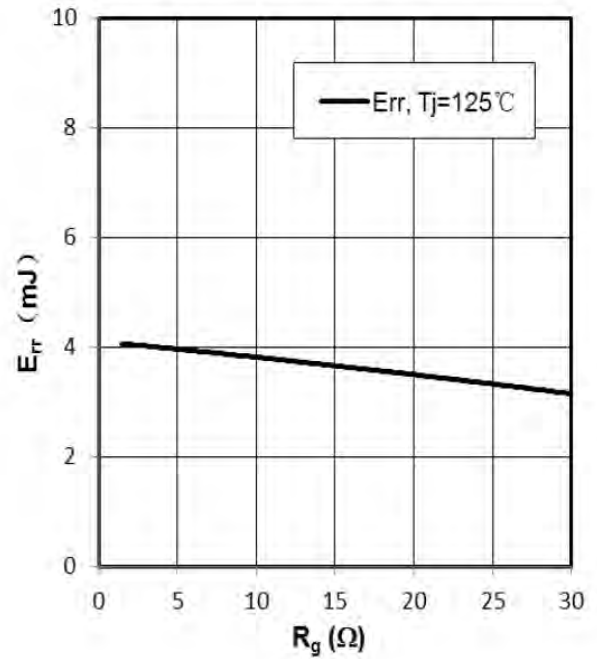


Fig 10. switching losses Diode,
 $E_{rr}=f(R_g), I_F=100A, V_{CE}=600V$



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