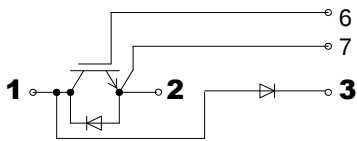


SGG200T60UC1

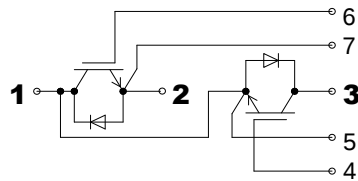
IGBT Modules



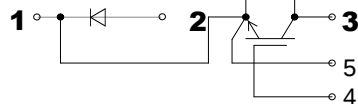
**SGD200T60UC1
(Boost Chopper)**



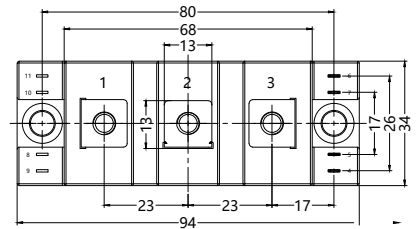
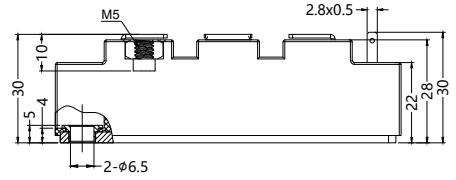
**SGG200T60UC1
(Half Bridge)**



**SDG200T60UC1
(Buck Chopper)**



Dimensions in mm (1mm = 0.0394")



$T_C = 25^{\circ}\text{C}$, unless otherwise specified

Symbol	Conditions	Values	Units
IGBT			
V_{CES}		600	V
I_C	$T_C=25(100)^{\circ}\text{C}$	400(200)	A
I_{CRM}	$T_C=25^{\circ}\text{C}$, $t_p=1\text{ms}$	400	A
V_{GES}		± 20	V
T_{vj}		$-40...+175$	$^{\circ}\text{C}$
InverseDiode			
$I_F = -I_C$	$T_C=25(80)^{\circ}\text{C}$	400(200)	A
I_{FRM}	$T_C=25^{\circ}\text{C}$, $t_p=1\text{ms}$	400	A
I_{FSM}	$t_p=10\text{ms}$; $\sin 180^{\circ}$; $T_j=25^{\circ}\text{C}$	1450	A
V_{RRM}		600	V
Module			
$I_{t(RMS)}$	$T_{\text{terminal}} = 80^{\circ}\text{C}$	200	A
T_{stg}		$-40\sim 125$	$^{\circ}\text{C}$
V_{isol}	AC, 1min	4000	V

Features

- Trench FS IGBT technology
- Low switching losses
- Switching frequency up to 30kHz
- Square RBSOA, no latch up
- High short circuit capability
- Positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- Soft switching diode Technology
- Package with copper baseplate
- Isolation voltage 4000 V

Application

- Inverter welding Machines
- UPS
- AC inverter Drives



Advantages

- space and weight savings
- reduced protection circuits

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SGG200T60UC1

IGBT Modules

Characteristics

$T_c = 25^{\circ}\text{C}$, unless otherwise specified

Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE}=V_{CE}, I_c=3\text{mA}$	5.0	5.5	6.5	V
I_{CES}	$V_{GE}=0; V_{CE}=V_{CES}; T_j=25^{\circ}\text{C}$			0.40	mA
$V_{CE(TO)}$	$T_j=25^{\circ}\text{C}$		0.9	1.0	V
r_{CE}	$V_{GE}=15\text{V}, T_j=25(150)^{\circ}\text{C}$		2.8 (4.3)	4.5(6.0)	m Ω
$V_{CE(sat)}$	$I_c=200\text{A}; V_{GE}=15\text{V}; \text{chip level}$		1.65	1.90	V
C_{ies}	under following conditions $V_{GE}=0, V_{CE}=25\text{V}, f=1\text{MHz}$		11.89		nF
C_{oes}			0.70		
C_{res}			0.38		
L_{CE}				30	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c=25(125)^{\circ}\text{C}$		0.75(1.02)		m Ω
$t_{d(on)}$	under following conditions: $V_{CC}=300\text{V},$ $I_c=200\text{A } R_{Gon}=R_{Goff}=1\Omega,$ $T_j=150^{\circ}\text{C } V_{GE}=\pm 15\text{V}$		128		ns
t_r			70		ns
$t_{d(off)}$			505		ns
t_f			48		ns
$E_{on}/E_{off}/E_{ts}$			14/7.8/21.8		mJ
Inverse Diode under following conditions:					
$V_F = V_{EC}$	$I_F=200\text{A}; V_{GE}=0\text{V}; T_j=25^{\circ}\text{C}$		1.55		V
$V_{(FO)}$	$T_j=25(125)^{\circ}\text{C}$		0.95(1.05)	1.00(1.20)	V
r_F	$T_j = 25(125)^{\circ}\text{C}$		2.2(2.4)	2.5(2.7)	m Ω
I_{RM}	$I_F=200\text{A}; T_j=150^{\circ}\text{C}$		100		A
Q_{rr}	$di/dt=2000\text{A/us}$		30		uC
E_{rr}	$V_{GE}=\pm 15\text{V}$		5.8		mJ
Thermal Characteristics					
$R_{th(j-c)}$	per IGBT			0.22	K/W
$R_{th(j-c)D}$	per Inverse Diode			0.40	K/W
$R_{th(c-s)}$	per module			0.05	K/W
Mechanical Data					
M_s	to heatsink M6	3		5	Nm
M_t	to terminals M5	2.5		5	Nm
Weight	typical			155	g

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IGBT Modules

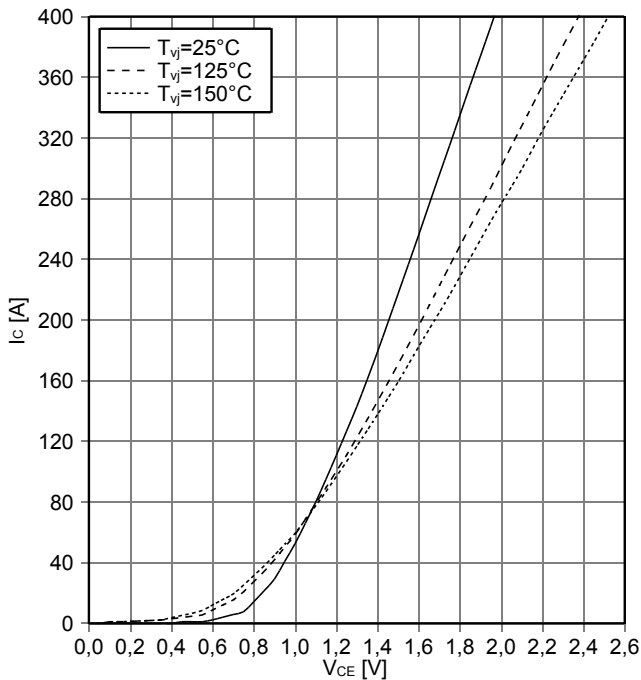


Fig.1 Output characteristic IGBT, Inverter (typical)
 $I_C = f(V_{CE})$ $V_{GE} = 15\text{ V}$

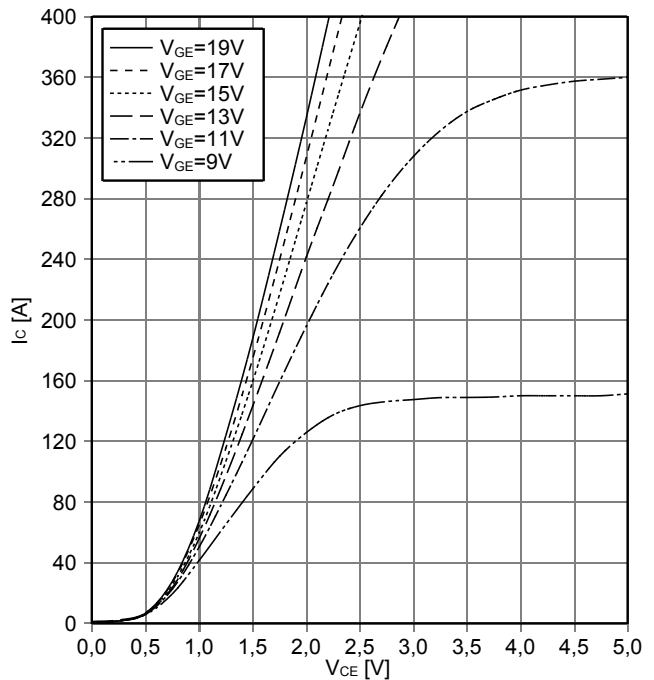


Fig.2 Output characteristic IGBT, Inverter (typical)
 $I_C = f(V_{CE})$ $T_{vj} = 150^\circ\text{C}$

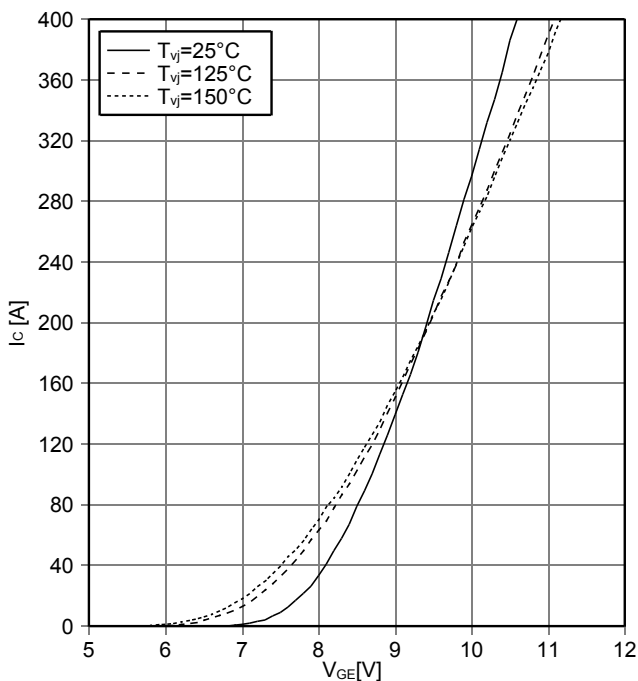


Fig.3 Transfer characteristic IGBT, Inverter (typical)
 $I_C = f(V_{GE})$ $V_{CE} = 20\text{ V}$

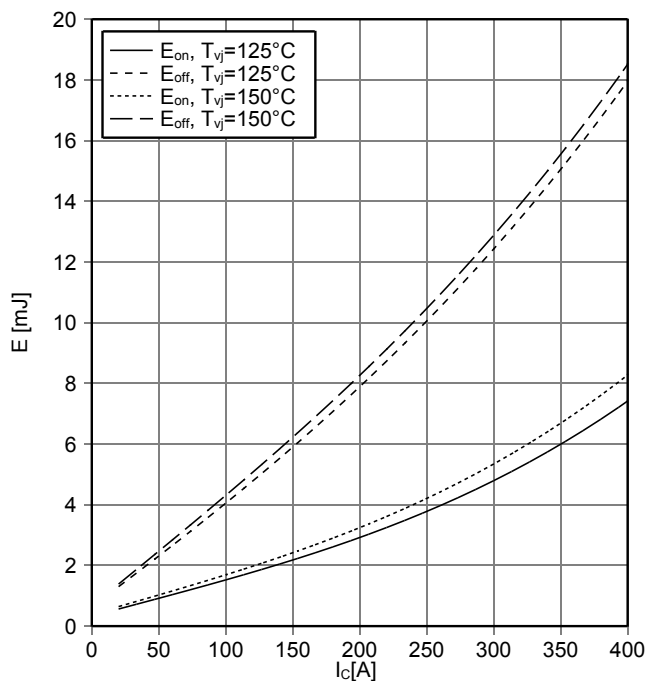


Fig.4 Switching losses IGBT, Inverter (typical)
 $E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 3.9\Omega$,
 $R_{Goff} = 3.9\Omega$, $V_{CE} = 300\text{ V}$

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IGBT Modules

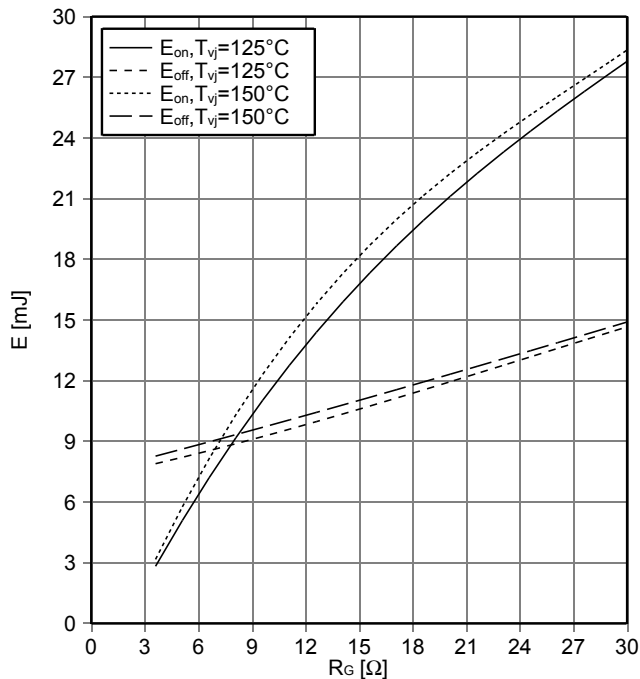


Fig.5 Switching losses IGBT, Inverter (typical)
 $E_{on}=f(R_g), E_{off}=f(R_g), V_{GE} = \pm 15 \text{ V}, I_c=200\text{A}, V_{CE}=300 \text{ V}$

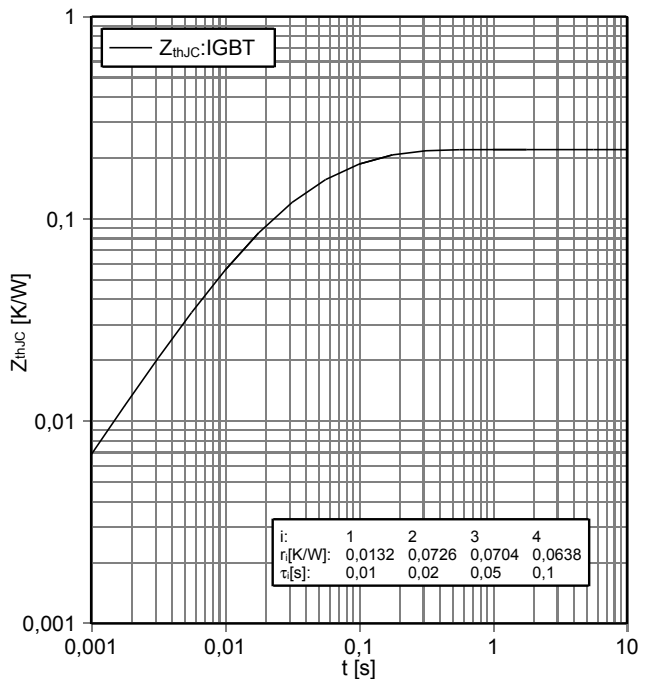


Fig.6 Transient thermal impedance IGBT, Inverter
 $Z_{thJC}=f(t)$

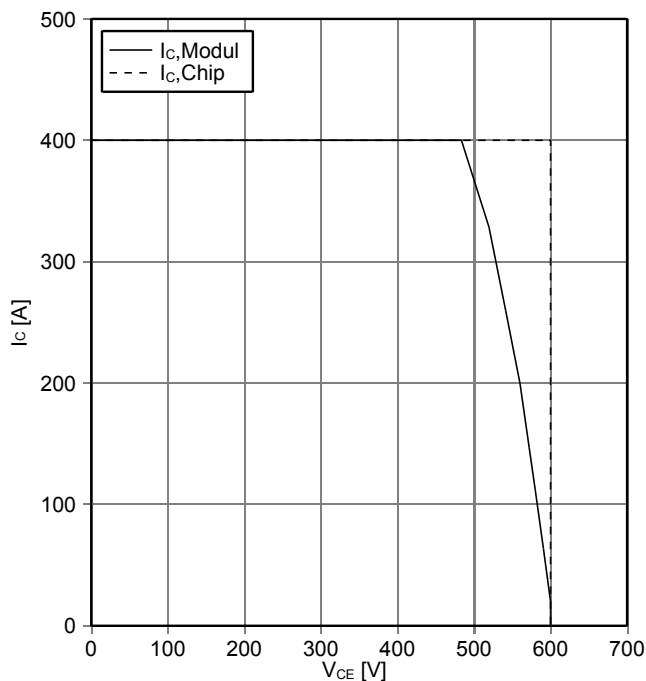


Fig.7 Reverse bias safe operating area IGBT, Inverter (RBSOA)
 $I_c = f(V_{CE}), V_{GE}=\pm 15\text{V}, R_{Goff}=3.9\Omega, T_{vj}=150^{\circ}\text{C}$

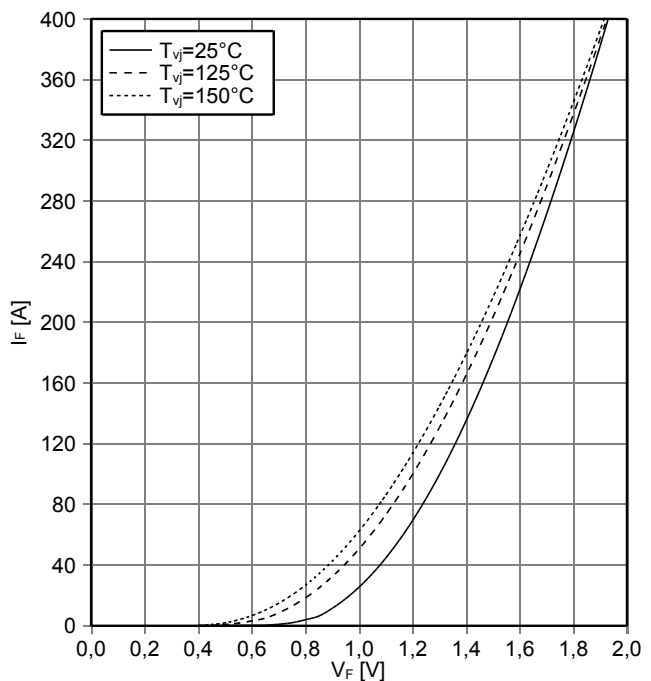


Fig.8 Forward characteristic of Diode, Inverter (typical)
 $I_F=f(V_F)$

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IGBT Modules

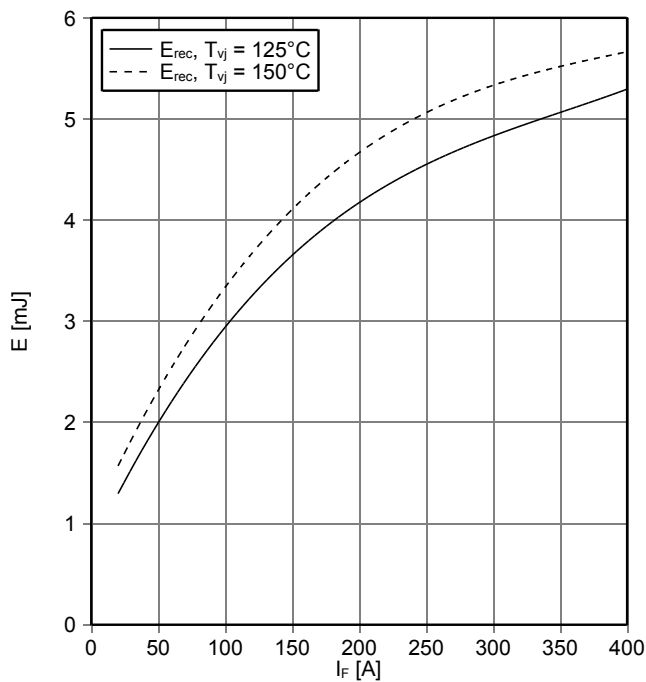


Fig.9 Switching losses Diode, Inverter (typical)
 $E_{rec}=f(I_F), R_{Gon}=3.9\Omega, V_{CE}=300\text{ V}$

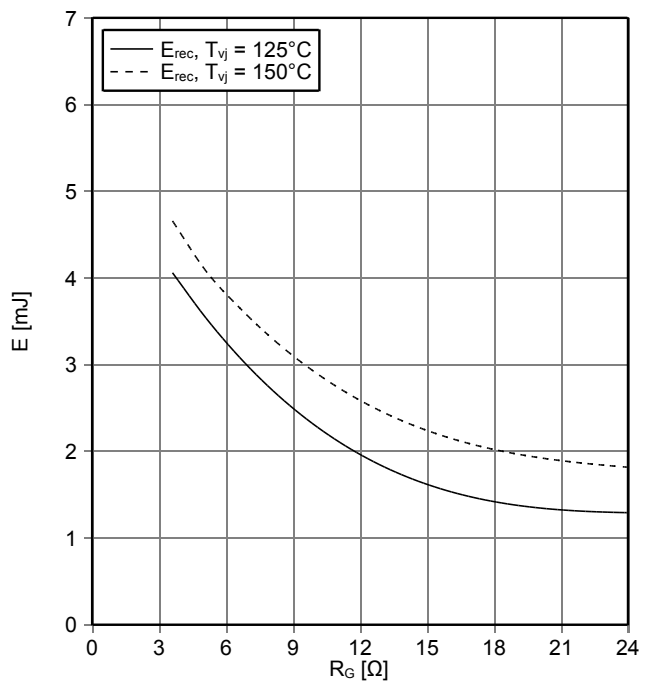


Fig.10 Switching losses Diode, Inverter (typical)
 $E_{rec}=f(R_G), I_F=200\text{ A}, V_{CE}=300\text{ V}$

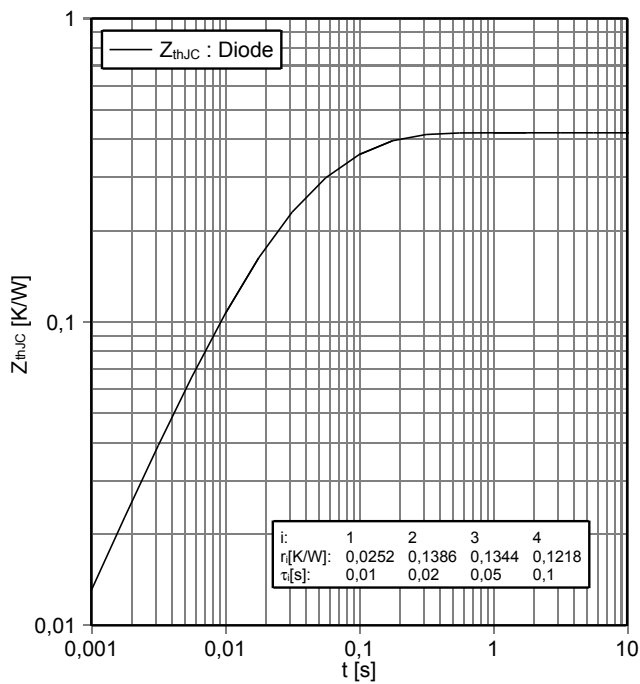


Fig.11 Transient thermal impedance Diode, Inverter
 $Z_{thJC}=f(t)$