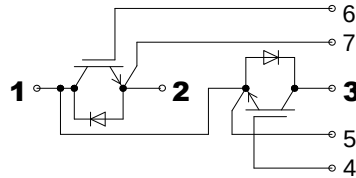


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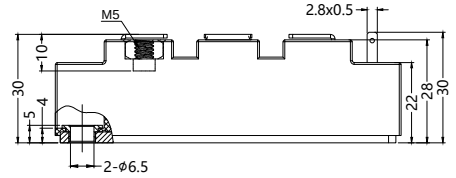
IGBT Modules



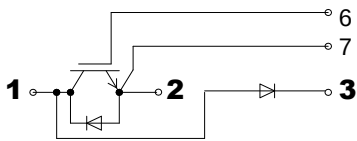
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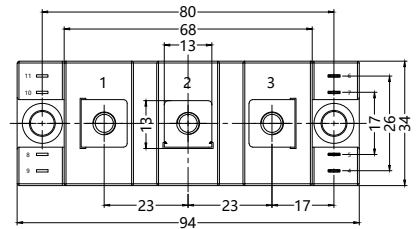
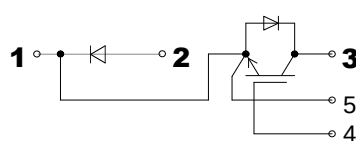
Dimensions in mm (1mm = 0.0394")



SGD50T120UC1



SDG50T120UC1



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

Symbol	Conditions	Values	Units
IGBT			
V_{CES}		1200	V
I_C	$T_C = 25(100)^{\circ}\text{C}$	100(50)	A
I_{CRM}	$T_C = 25^{\circ}\text{C}$, $t_P = 1\text{ms}$	200	A
V_{GES}		± 20	V
T_{vj}		$-40 \dots +175$	$^{\circ}\text{C}$
Invers Diode			
$I_F = -I_C$	$T_C = 25(80)^{\circ}\text{C}$	40(20)	A
I_{FRM}	$T_C = 25^{\circ}\text{C}$, $t_P = 1\text{ms}$	60	A
I_{FSM}	$t_P = 10\text{ms}$; $\sin 180^{\circ}$; $T_j = 25^{\circ}\text{C}$	90	A
V_{RRM}		1200	V
Module			
$I_{t(RMS)}$	$T_{terminal} = 80^{\circ}\text{C}$	100	A
T_{stg}		$-40 \sim 125$	$^{\circ}\text{C}$
V_{isol}	AC, 1min	2500	V

Features

- Trench FS IGBT4 technology
- Low switching losses
- Switching frequency up to 20KHz
- 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 base plate
- Isolation voltage 4000V

Advantages

- space and weight savings
- reduced protection circuits



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SGG50T120UC1

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	6.0	6.8	V
I_{CES}	$V_{GE} = 0$; $V_{CE} = V_{CES}$; $T_j = 25^\circ\text{C}$			1.0	mA
$V_{CE(TO)}$	$T_j = 25^\circ\text{C}$		0.8	0.9	V
r_{CE}	$V_{GE} = 15\text{V}$, $T_j = 25(150)^\circ\text{C}$		14.0(21)	16(22)	m Ω
$V_{CE(sat)}$	$I_C = 50\text{A}$; $V_{GE} = 15\text{V}$; chip level		2.10	2.30	V
C_{ies}	under following conditions		4.8		nF
C_{oes}	$V_{GE} = 0$, $V_{CE} = 25\text{V}$, $f = 1\text{MHz}$		0.27		nF
C_{res}			0.14		nF
L_{CE}				30	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c = 25(125)^\circ\text{C}$		0.65(1.09)		m Ω
$t_{d(on)}$	under following conditions:		58		ns
t_r	$V_{CC} = 600\text{V}$, $I_C = 50\text{A}$		49		ns
$t_{d(off)}$	$R_{Gon} = R_{Goff} = 1\Omega$, $T_j = 150^\circ\text{C}$		295		ns
t_f	$V_{GE} = \pm 15\text{V}$		40		ns
$E_{on}/E_{off}/E_{ts}$			4.3/2.4/6.7		mJ
Inverse Diode under following conditions:					
$V_F = V_{EC}$	$I_F = 50\text{A}$; $V_{GE} = 0\text{V}$; $T_j = 25^\circ\text{C}$		1.90	2.54	V
$V_{(FO)}$	$T_j = 25(150)^\circ\text{C}$		1.3(0.90)	1.5(1.1)	V
r_F	$T_j = 25(150)^\circ\text{C}$		18(25)	20(28)	m Ω
I_{RM}	$I_F = 50\text{A}$; $T_j = 150^\circ\text{C}$		5.4		A
Q_{rr}	$di/dt = 100\text{A}/\mu\text{s}$		0.15		μC
E_{rr}	$V_{GE} = \pm 15\text{V}$		3.8		mJ
Thermal Characteristics					
$R_{th(j-c)}$	per IGBT			0.45	K/W
$R_{th(j-c)D}$	per Inverse Diode			1.20	K/W
$R_{th(c-s)}$	per module			0.33	K/W
Mechanical Data					
M_s	to heatsink M5	3		5	Nm
M_t	to terminals M5	2.5		5	Nm
Weight	typical			160	g

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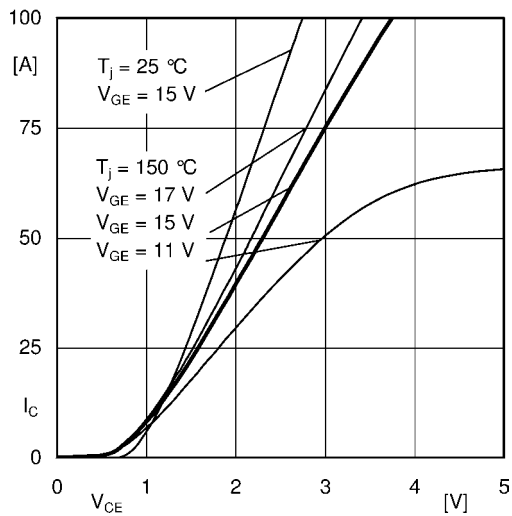


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

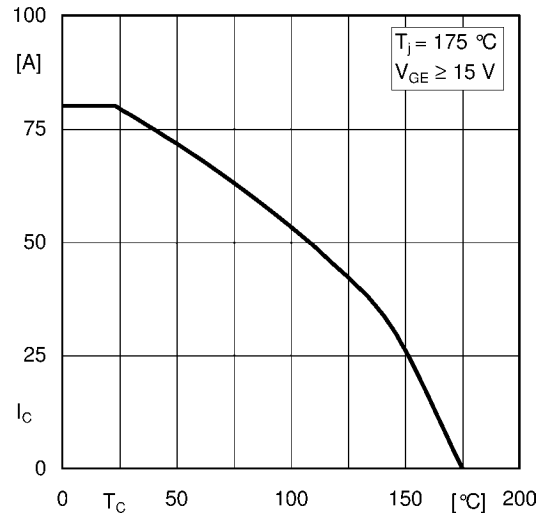


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

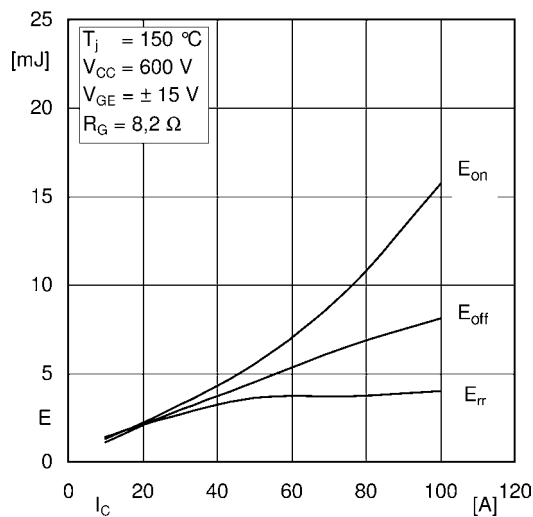


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

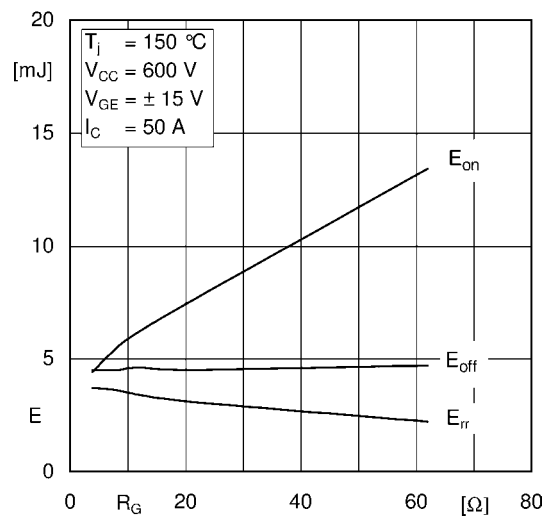


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

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IGBT Modules

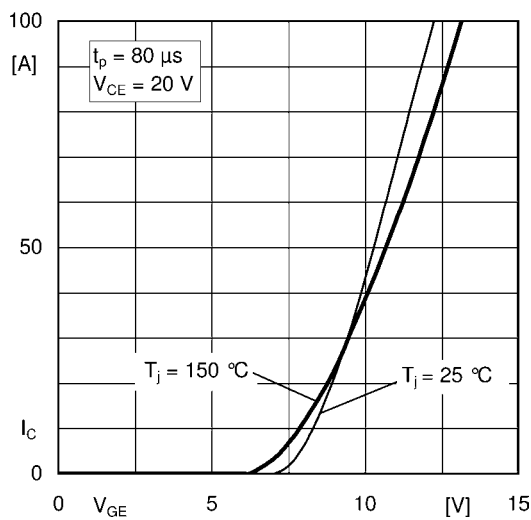


Fig. 5: Typ. transfer characteristic

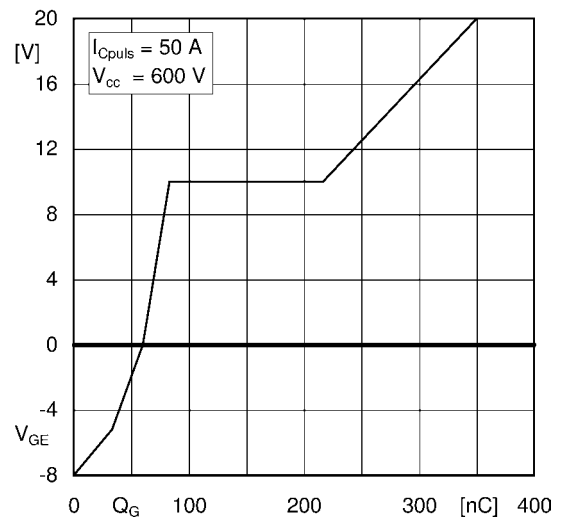


Fig. 6: Typ. gate charge characteristic

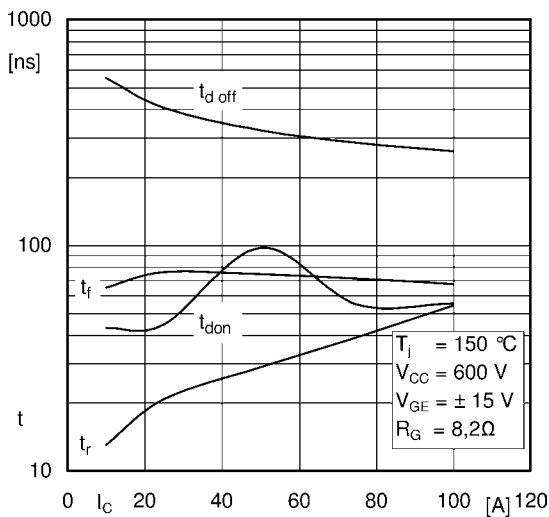


Fig. 7: Typ. switching times vs. I_C

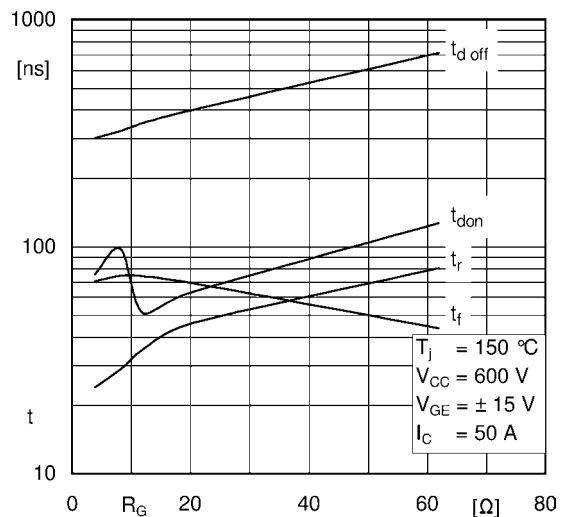


Fig. 8: Typ. switching times vs. gate resistor R_G

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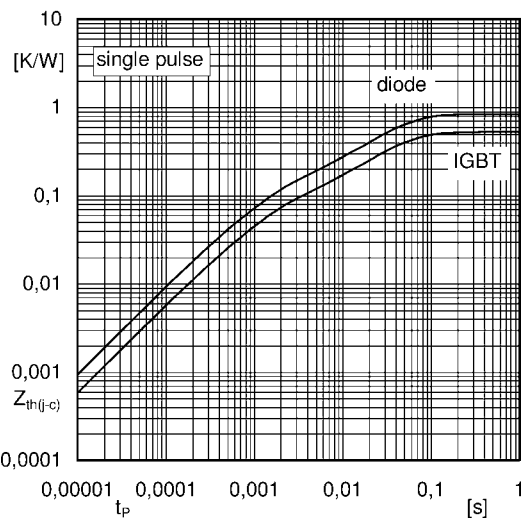


Fig. 9: Transient thermal impedance

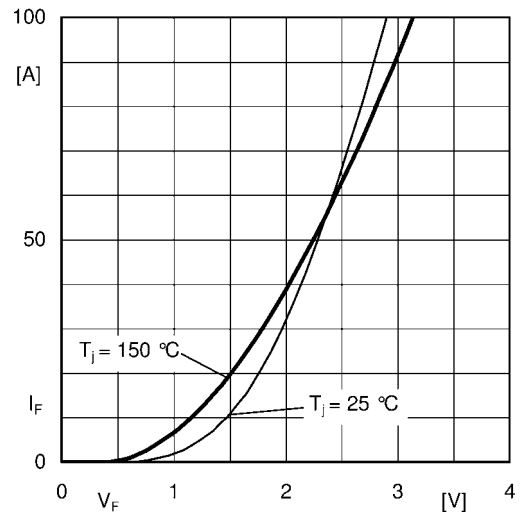


Fig. 10: Typ. FRD diode forward charact., incl. $R_{CC} + EE'$

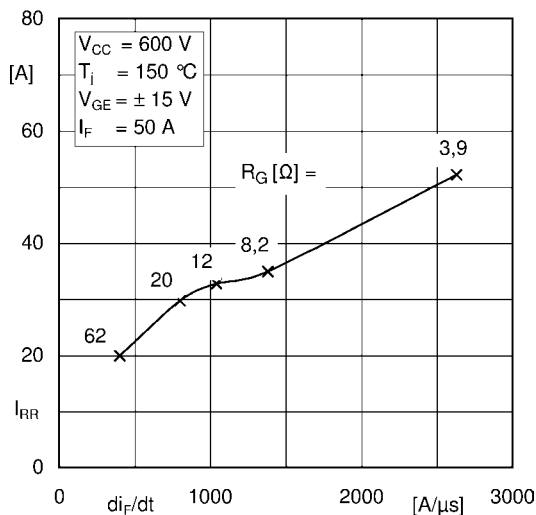


Fig. 11: FRD diode peak reverse recovery current

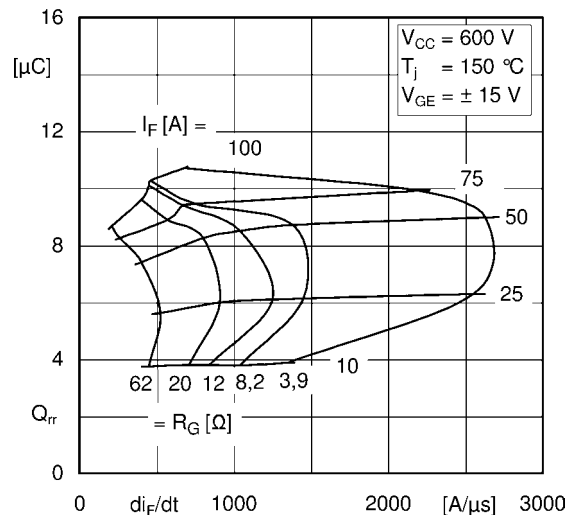


Fig. 12: Typ. FRD diode peak reverse recovery charge

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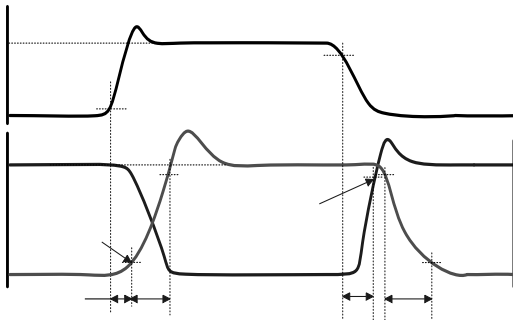


Figure A. Definition of switching times

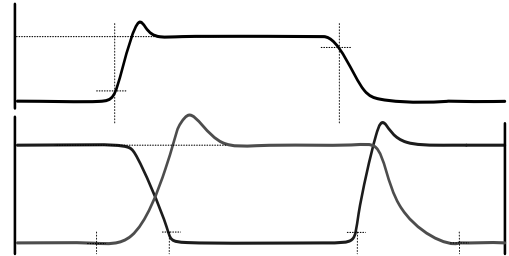


Figure B. Definition of switching losses

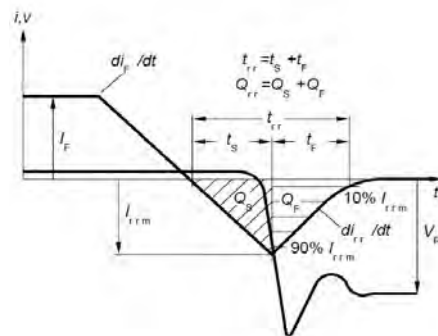


Figure C. Definition of diodes switching characteristics

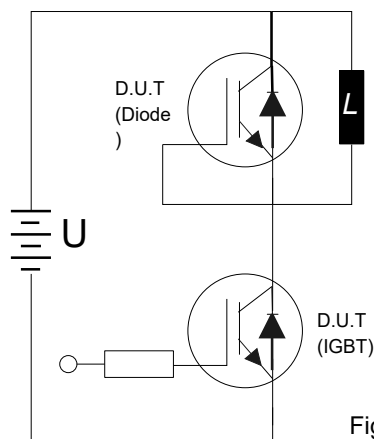


Figure D. Dynamic test circuit