

**SEMITOP<sup>®</sup> 3**

## IGBT Module

**SK20GD123**

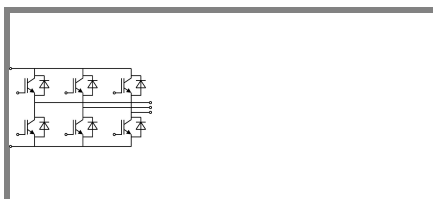
Preliminary Data

### Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- N-channel homogeneous silicon structure (NPT-Non punch-through IGBT)
- High short circuit capability
- Low tail current with low temperature dependence
- UL recognized, file no. E63532

### Typical Applications

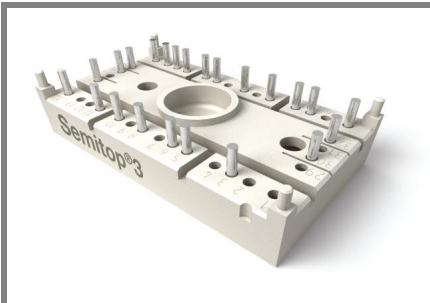
- Switching (not for linear use)
- Inverter
- Switched mode power supplies
- UPS



GD

Absolute Maximum Ratings		$T_s = 25\text{ }^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	Values			Units
<b>IGBT</b>					
$V_{CES}$	$T_j = 25\text{ }^\circ\text{C}$	1200			V
$I_C$	$T_j = 125\text{ }^\circ\text{C}$	$T_s = 25\text{ }^\circ\text{C}$	23		A
		$T_s = 80\text{ }^\circ\text{C}$	15		A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	30			A
$V_{GES}$		$\pm 20$			V
$t_{psc}$	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ }^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10			$\mu\text{s}$
<b>Inverse Diode</b>					
$I_F$	$T_j = 150\text{ }^\circ\text{C}$	$T_s = 25\text{ }^\circ\text{C}$	24		A
		$T_s = 80\text{ }^\circ\text{C}$	17		A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$				A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{half sine wave } T_j = 150\text{ }^\circ\text{C}$	180			A
<b>Module</b>					
$I_{t(RMS)}$					A
$T_{vj}$		-40 ... +150			$^\circ\text{C}$
$T_{stg}$		-40 ... +125			$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	2500			V

Characteristics		$T_s = 25\text{ }^\circ\text{C}$ , unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
<b>IGBT</b>						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 0,6\text{ mA}$	4,5	5,5	6,5	V	
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25\text{ }^\circ\text{C}$	0,1		mA	
		$T_j = 125\text{ }^\circ\text{C}$			mA	
$I_{GES}$	$V_{CE} = 0\text{ V}, V_{GE} = 30\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$	480		nA	
		$T_j = 125\text{ }^\circ\text{C}$			nA	
$V_{CE0}$		$T_j = 25\text{ }^\circ\text{C}$	1,2		V	
		$T_j = 125\text{ }^\circ\text{C}$	1,2		V	
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$	86		$\text{m}\Omega$	
		$T_j = 125\text{ }^\circ\text{C}$	126		$\text{m}\Omega$	
$V_{CE(sat)}$	$I_{Cnom} = 15\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}_{chiplev.}$	2	2,5	3	V
		$T_j = 125\text{ }^\circ\text{C}_{chiplev.}$		3,1	3,7	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	1		nF	
$C_{oes}$			0,15		nF	
$C_{res}$			0,07		nF	
$Q_G$	$V_{GE} = 0 \dots 20\text{ V}$	90			nC	
$t_{d(on)}$	$R_{Gon} = 40\ \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 15\text{ A}$	35		ns	
$t_r$			45		ns	
$E_{on}$	$R_{Goff} = 40\ \Omega$	$T_j = 125\text{ }^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	2		mJ	
$t_{d(off)}$			250		ns	
$t_f$			70		ns	
$E_{off}$			1,8		mJ	
$R_{th(j-s)}$	per IGBT	1,4			K/W	



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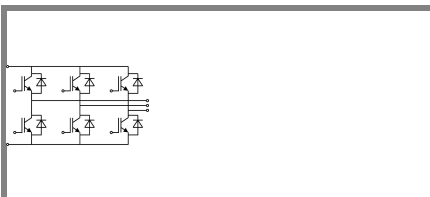
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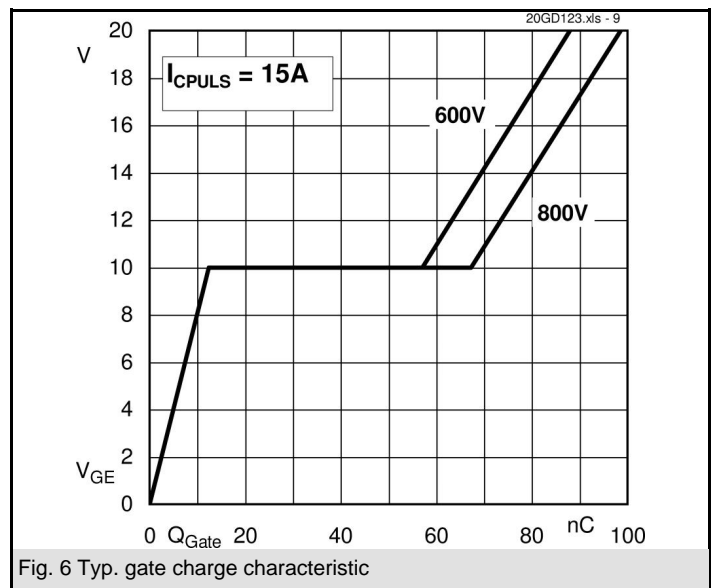
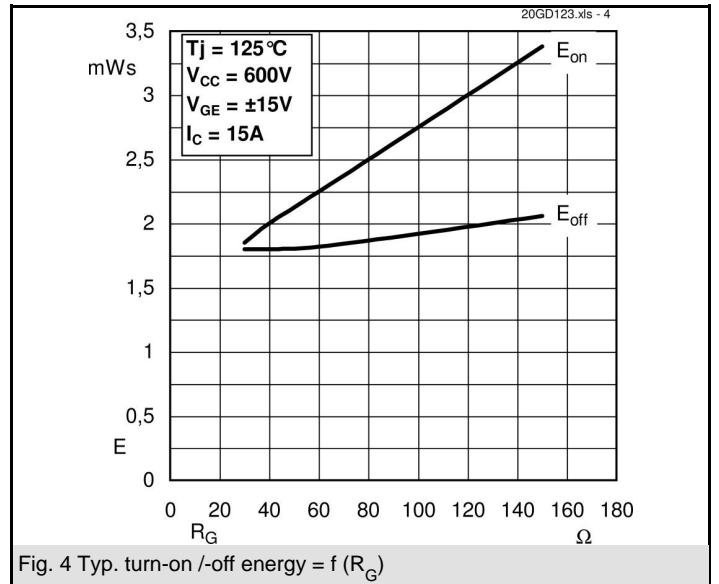
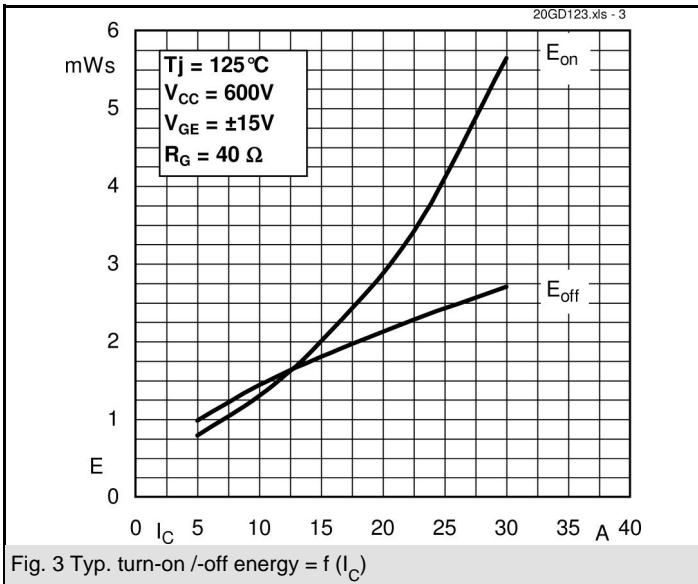
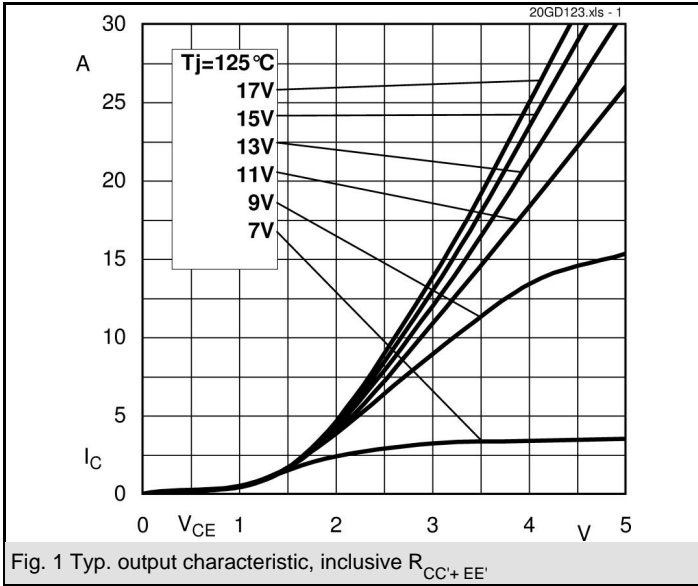


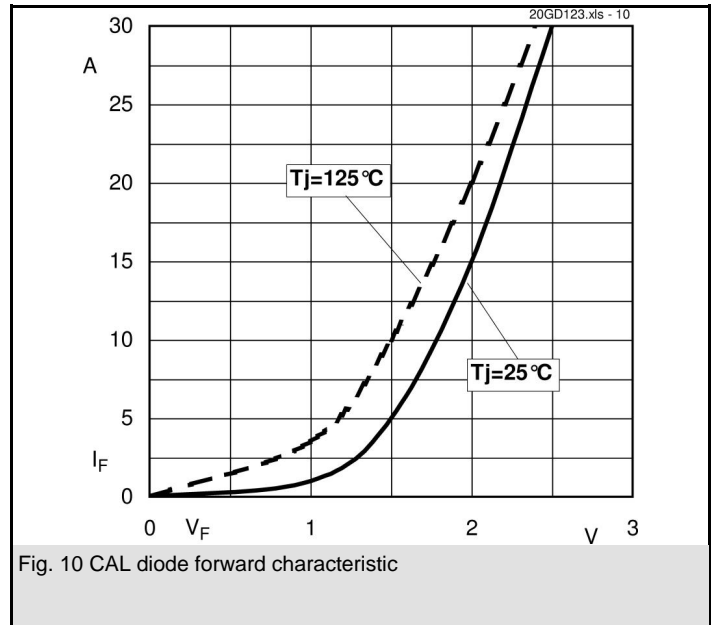
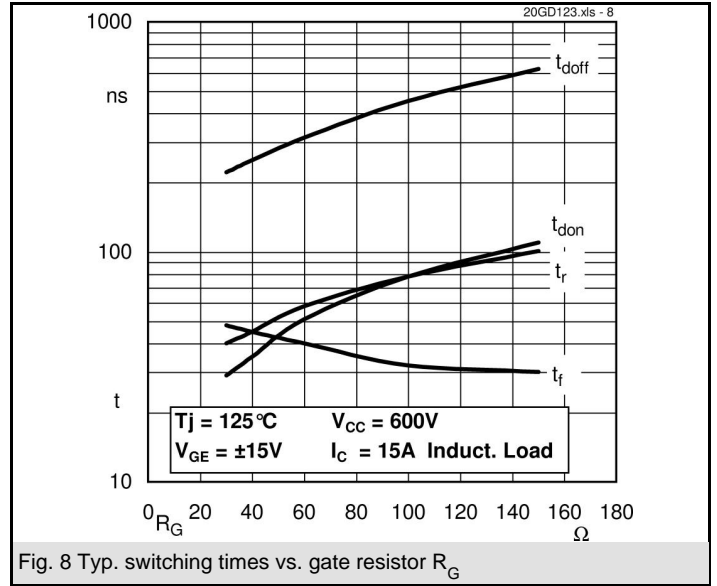
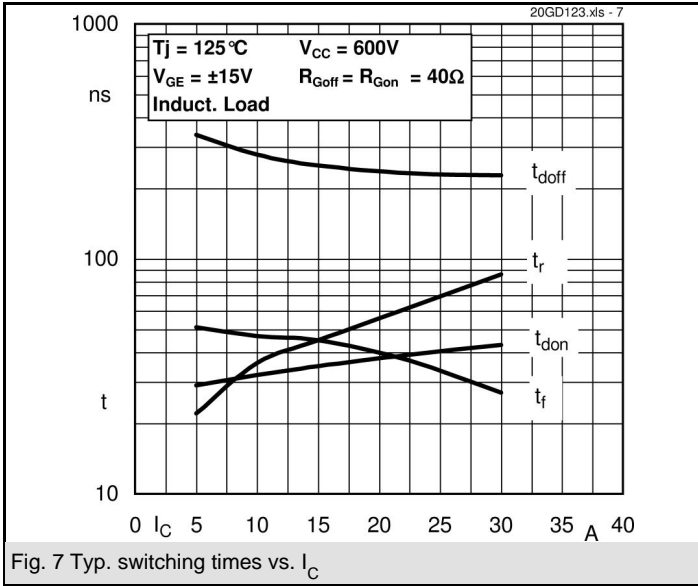
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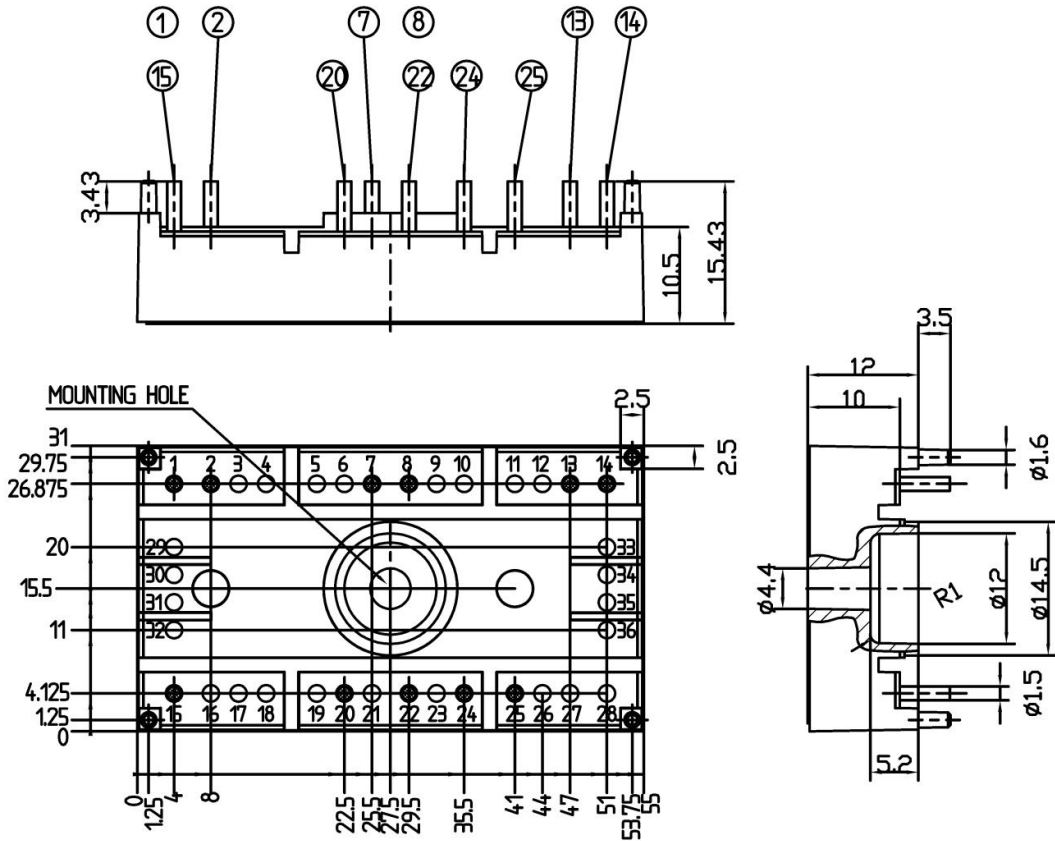
Characteristics				min.	typ.	max.	Units
Symbol	Conditions						
<b>Inverse Diode</b>							
$V_F = V_{EC}$	$I_{Fnom} = 15 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{\text{chiplev.}}$		2	2,5		V
		$T_j = 125 \text{ }^\circ\text{C}_{\text{chiplev.}}$		1,8	2,3		V
$V_{F0}$		$T_j = 125 \text{ }^\circ\text{C}$		1	1,2		V
$r_F$		$T_j = 125 \text{ }^\circ\text{C}$		53	73		mΩ
$I_{RRM}$	$I_{Fnom} = 15 \text{ A}$ $di/dt = -200 \text{ A}/\mu\text{s}$	$T_j = 125 \text{ }^\circ\text{C}$		16			A
$Q_{rr}$				2,7			μC
$E_{rr}$	$V_{CC} = 600 \text{ V}$			0,6			mJ
$R_{th(j-s)D}$	per diode				1,7		K/W
$M_s$	to heat sink M1			2,25		2,5	Nm
w				30			g

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

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Case T12 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)

