

SK 35 GAL 12T4



SEMITOP® 2

IGBT module

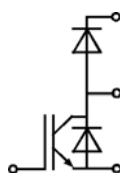
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Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- High short circuit capability
- Trench4 IGBT technology
- CAL4F diode technology
- $V_{CE,sat}$ with positive coefficient
- UL recognized, file no. E 63 532

Typical Applications*

- Inverter
- Motor drive



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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
Chopper IGBT				
V_{CES}	$T_j = 25\text{ °C}$		1200	V
I_C	$T_j = 175\text{ °C}$	$T_s = 25\text{ °C}$	43	A
		$T_s = 70\text{ °C}$	35	A
I_{Cnom}			35	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$		105	A
V_{GES}			-20 ... 20	V
t_{psc}	$V_{CC} = 800\text{ V}$	$T_j = 150\text{ °C}$	10	μs
	$V_{GE} \leq 15\text{ V}$			
	$V_{CES} \leq 1200\text{ V}$			
T_j			-40 ... 175	$^{\circ}\text{C}$
Chopper Diode				
I_F	$T_j = 175\text{ °C}$	$T_s = 25\text{ °C}$	38	A
		$T_s = 70\text{ °C}$	30	A
I_{Fnom}			35	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$		105	A
I_{FSM}	10 ms, sin 180°, $T_j = 150\text{ °C}$		170	A
T_j			-40 ... 175	$^{\circ}\text{C}$
Freewheeling Diode				
I_F	$T_j = 175\text{ °C}$	$T_s = 25\text{ °C}$	38	A
		$T_s = 70\text{ °C}$	30	A
I_{Fnom}			35	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$		105	A
I_{FSM}	10 ms, sin 180°, $T_j = 150\text{ °C}$		170	A
T_j			-40 ... 175	$^{\circ}\text{C}$
Module				
$I_{t(RMS)}$				A
T_{stg}			-40 ... 125	$^{\circ}\text{C}$
V_{isol}	AC, sinusoidal, t = 1 min		2500	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Chopper IGBT						
$V_{CE(sat)}$	$I_C = 35\text{ A}$ $V_{GE} = 15\text{ V}$ chiplevel	$T_j = 25\text{ °C}$	1.85	2.1		V
		$T_j = 150\text{ °C}$	2.25	2.45		V
V_{CE0}	chiplevel	$T_j = 25\text{ °C}$	0.8	0.9		V
		$T_j = 150\text{ °C}$	0.7	0.8		V
r_{CE}	$V_{GE} = 15\text{ V}$ chiplevel	$T_j = 25\text{ °C}$	30.0	34.3		m Ω
		$T_j = 150\text{ °C}$	44.3	47.1		m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}\text{ V}, I_C = 1.2\text{ mA}$		5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$	$T_j = 25\text{ °C}$	0.062	0.186		mA
		$T_j = 150\text{ °C}$				mA
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	f = 1 MHz	1.95			nF
C_{oes}		f = 1 MHz	0.155			nF
C_{res}		f = 1 MHz	0.115			nF
Q_G	- 8 V...+ 15 V		189			nC
R_{Gint}	$T_j = 25\text{ °C}$		-			Ω

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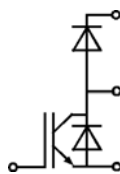
Features

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Typical Applications*

- Inverter
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Chopper IGBT					
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150\text{ °C}$	28		ns
t_r	$I_C = 35\text{ A}$	$T_j = 150\text{ °C}$	25		ns
E_{on}	$R_{G\ on} = 22\ \Omega$	$T_j = 150\text{ °C}$	3.27		mJ
$t_{d(off)}$	$R_{G\ off} = 22\ \Omega$	$T_j = 150\text{ °C}$	303		ns
t_f	$di/dt_{on} = 2900\text{ A}/\mu\text{s}$	$T_j = 150\text{ °C}$	70		ns
E_{off}	$di/dt_{off} = 2900\text{ A}/\mu\text{s}$	$T_j = 150\text{ °C}$	3.3		mJ
$R_{th(j-s)}$	$V_{GE} = +15/-7\text{ V}$	$T_j = 150\text{ °C}$	1.21		K/W
	per IGBT				
Chopper Diode					
$V_F = V_{EC}$	$I_F = 35\text{ A}$	$T_j = 25\text{ °C}$	2.3	2.62	V
	$V_{GE} = 15\text{ V}$ chipllevel	$T_j = 150\text{ °C}$	2.29	2.62	V
V_{F0}	chipllevel	$T_j = 25\text{ °C}$	1.3	1.5	V
		$T_j = 150\text{ °C}$	0.9	1.1	V
r_F	chipllevel	$T_j = 25\text{ °C}$	28.6	32.0	m Ω
		$T_j = 150\text{ °C}$	39.7	43.4	m Ω
I_{RRM}	$I_F = 35\text{ A}$	$T_j = 150\text{ °C}$	30		A
Q_{rr}	$di/dt_{off} = 2900\text{ A}/\mu\text{s}$	$T_j = 150\text{ °C}$	2		μC
E_{rr}	$V_{GE} = -7\text{ V}$	$T_j = 150\text{ °C}$	1.46		mJ
	$V_R = 600\text{ V}$	$T_j = 150\text{ °C}$			
$R_{th(j-s)}$	per Diode		1.55		K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_F = 35\text{ A}$	$T_j = 25\text{ °C}$	2.3	2.60	V
	$V_{GE} = 15\text{ V}$ chipllevel	$T_j = 150\text{ °C}$	2.29	2.62	V
V_{F0}	chipllevel	$T_j = 25\text{ °C}$	1.3	1.5	V
		$T_j = 150\text{ °C}$	0.9	1.1	V
r_F	chipllevel	$T_j = 25\text{ °C}$	28.6	32.0	m Ω
		$T_j = 150\text{ °C}$	39.7	43.4	m Ω
I_{RRM}	$I_F = 35\text{ A}$	$T_j = 150\text{ °C}$	30		A
Q_{rr}	$di/dt_{off} = 2900\text{ A}/\mu\text{s}$	$T_j = 150\text{ °C}$	2		μC
E_{rr}	$V_{GE} = -7\text{ V}$	$T_j = 150\text{ °C}$	1.46		mJ
	$V_R = 600\text{ V}$	$T_j = 150\text{ °C}$			
$R_{th(j-s)}$	per Diode		1.55		K/W
Module					
L_{CE}					nH
$R_{CC'+EE'}$		$T_s = 25\text{ °C}$			m Ω
					m Ω
M_s	Mounting torque to heatsink		1.8	2	Nm
M_t					Nm
					Nm
w			19		g
Temperature Sensor					
R_{100}					Ω
$B_{100/125}$					K



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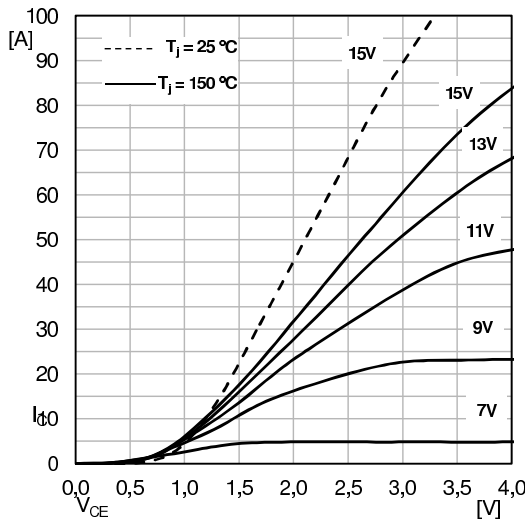


Fig. 1: Typical IGBT output characteristics

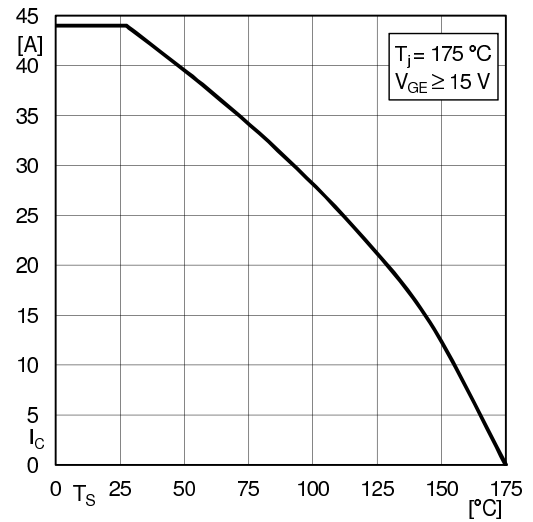


Fig. 2: Rated current vs. temperature $I_C = f(T_j)$

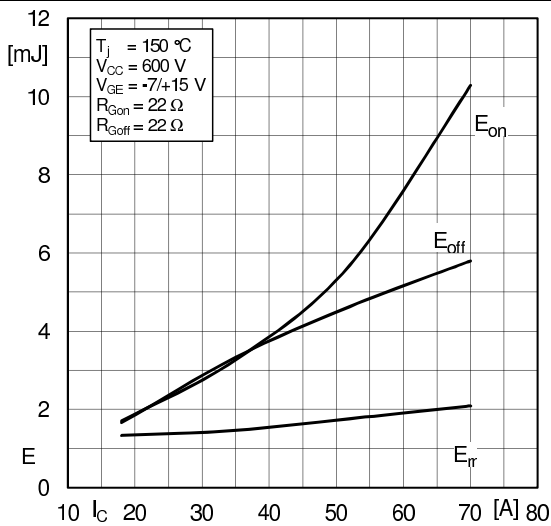


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

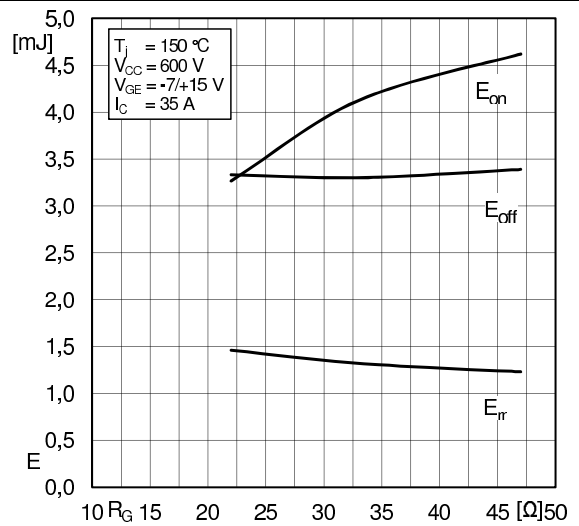


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

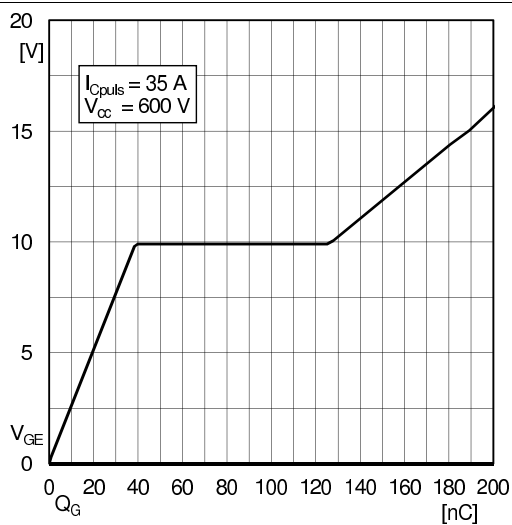


Fig. 6: Typ. gate charge characteristic

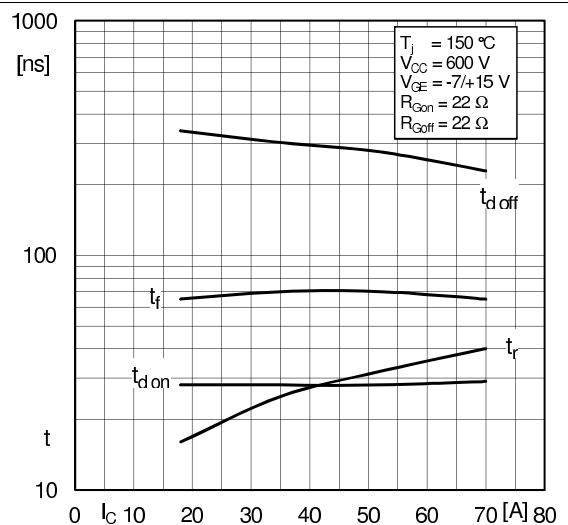


Fig. 7: Typ. switching times vs. I_C

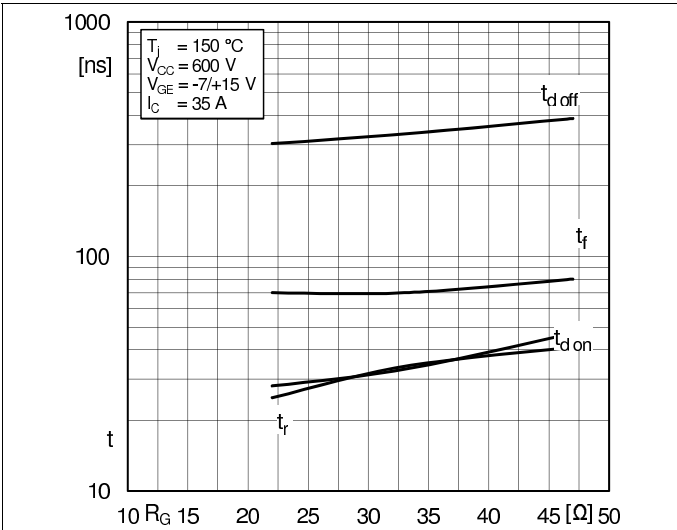


Fig. 8: Typ. switching times vs. gate resistor R_G

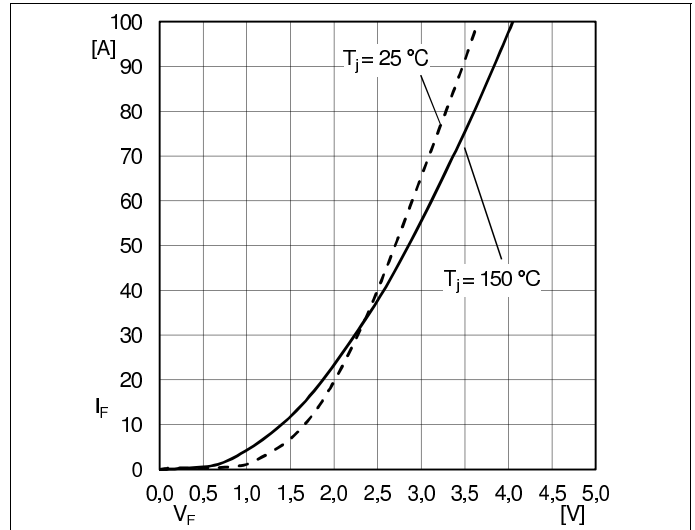
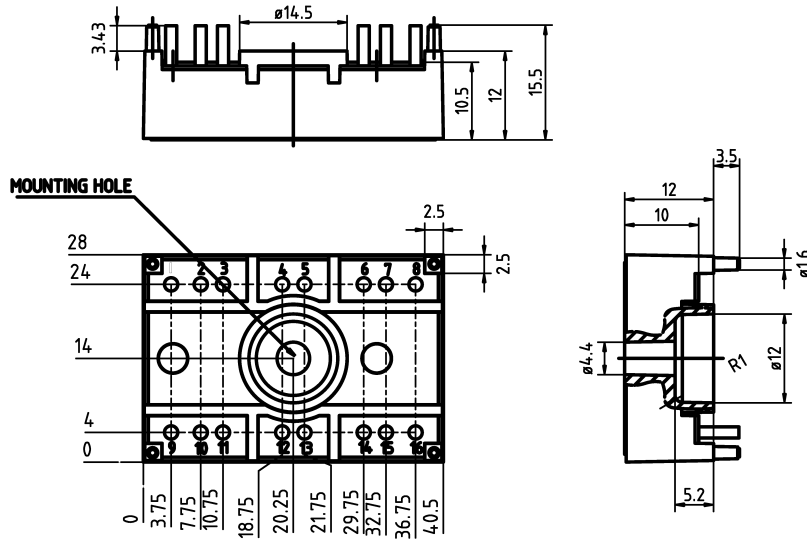


Fig. 10: Typ. FWD diode forward characteristic

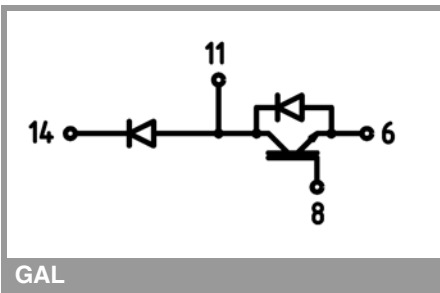
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dimensions in mm
tolerance system: ISO 2768-m



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

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

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