

SK 35 GAL 12T4



SEMITOP® 2

IGBT module

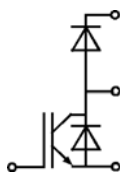
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Features

- 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 °C		1200	V
I _C	T _j = 175 °C	T _s = 25 °C	43	A
		T _s = 70 °C	35	A
I _{Cnom}			35	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		105	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 800 V V _{GE} ≤ 15 V V _{CES} ≤ 1200 V	T _j = 150 °C	10	µs
T _j			-40 ... 175	°C
Chopper Diode				
I _F	T _j = 175 °C	T _s = 25 °C	38	A
		T _s = 70 °C	30	A
I _{Fnom}			35	A
I _{FRM}	I _{FRM} = 3 x I _{Fnom}		105	A
I _{FSM}	10 ms, sin 180°, T _j = 150 °C		170	A
T _j			-40 ... 175	°C
Freewheeling Diode				
I _F	T _j = 175 °C	T _s = 25 °C	38	A
		T _s = 70 °C	30	A
I _{Fnom}			35	A
I _{FRM}	I _{FRM} = 3xI _{Fnom}		105	A
I _{FSM}	10 ms, sin 180°, T _j = 150 °C		170	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}				A
T _{stg}			-40 ... 125	°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 A	T _J = 25 °C		1.85	2.1	V
	V _{GE} = 15 V	T _J = 150 °C		2.25	2.45	V
	chiplevel					
V _{CE0}		T _J = 25 °C		0.8	0.9	V
	chiplevel	T _J = 150 °C		0.7	0.8	V
r _{CE}	V _{GE} = 15 V	T _J = 25 °C		30.0	34.3	mΩ
	chiplevel	T _J = 150 °C		44.3	47.1	mΩ
V _{GE(th)}	V _{GE} = V _{CE} V, I _C = 1.2 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _J = 25 °C		0.062	0.186	mA
	V _{CE} = 1200 V	T _J = 150 °C				mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 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 °C			-		Ω



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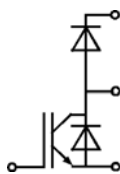
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Typical Applications*

- 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
	$V_{GE} = 15\text{ V}$	$T_j = 150\text{ °C}$		2.29	2.62 V
	chiplevel				
V_{F0}		$T_j = 25\text{ °C}$		1.3	1.5 V
	chiplevel	$T_j = 150\text{ °C}$		0.9	1.1 V
r_F		$T_j = 25\text{ °C}$		28.6	32.0 mΩ
	chiplevel	$T_j = 150\text{ °C}$		39.7	43.4 mΩ
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
	$V_R = 600\text{ V}$				
$R_{th(j-s)}$	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
	$V_{GE} = 15\text{ V}$	$T_j = 150\text{ °C}$		2.29	2.62 V
	chiplevel				
V_{F0}		$T_j = 25\text{ °C}$		1.3	1.5 V
	chiplevel	$T_j = 150\text{ °C}$		0.9	1.1 V
r_F		$T_j = 25\text{ °C}$		28.6	32.0 mΩ
	chiplevel	$T_j = 150\text{ °C}$		39.7	43.4 mΩ
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
	$V_R = 600\text{ V}$				
$R_{th(j-s)}$	per Diode			1.55	K/W
Module					
L_{CE}					nH
$R_{CC'+EE'}$		$T_s = 25\text{ °C}$			mΩ
					mΩ
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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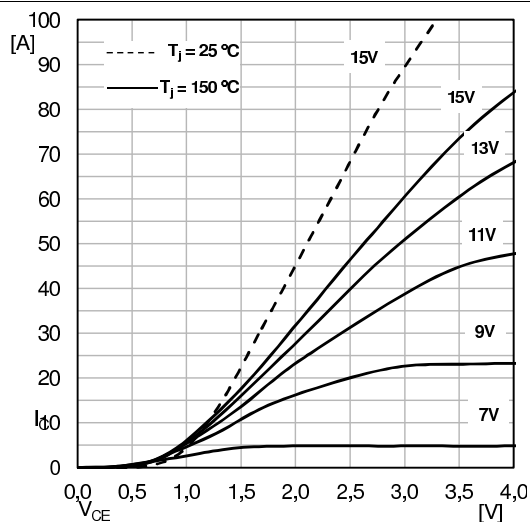


Fig. 1: Typical IGBT output characteristics

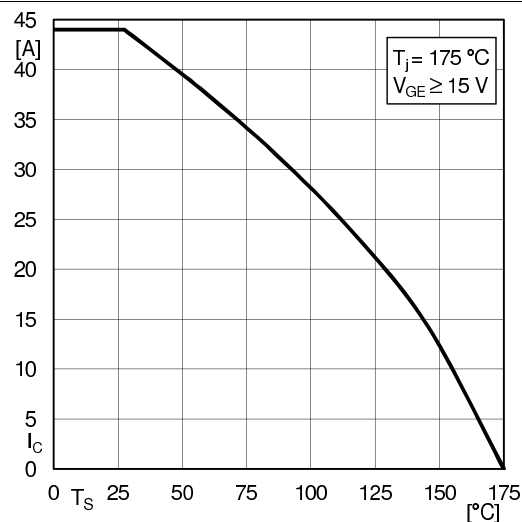


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

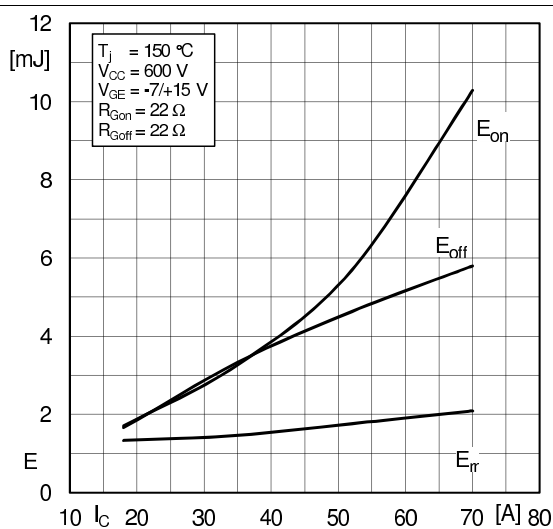


Fig. 3: Typ. turn-on /-off energy $= f(I_C)$

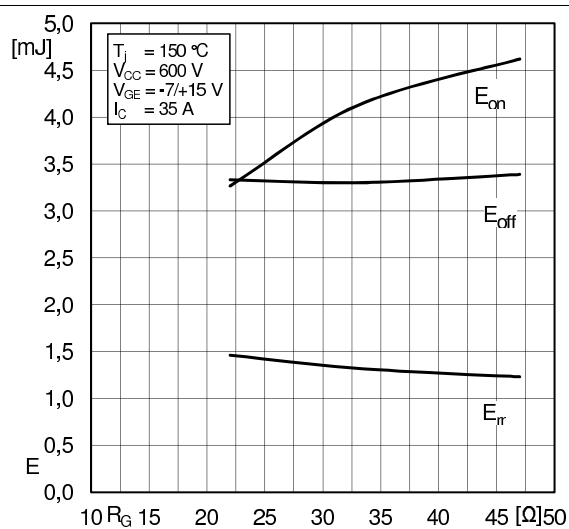


Fig. 4: Typ. turn-on /-off energy $= f(R_G)$

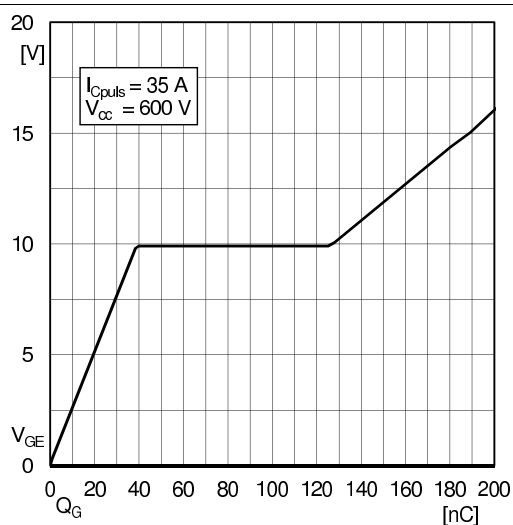


Fig. 6: Typ. gate charge characteristic

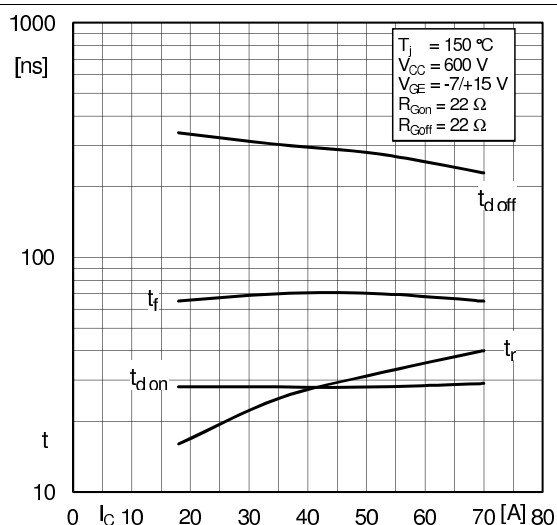


Fig. 7: Typ. switching times vs. I_C

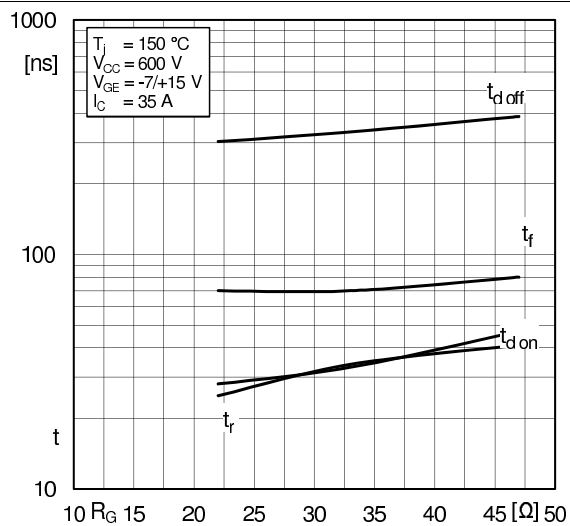


Fig. 8: Typ. switching times vs. gate resistor R_G

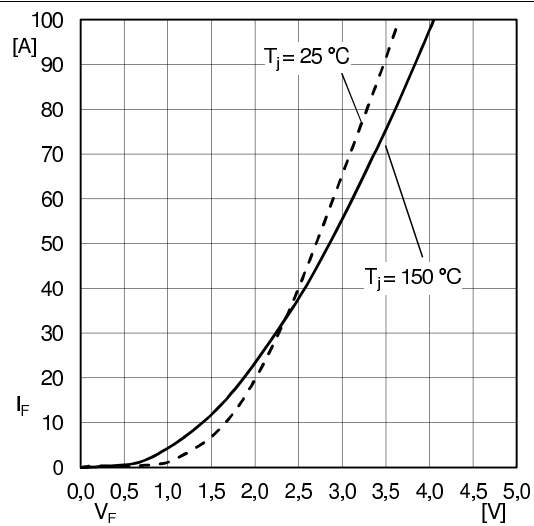
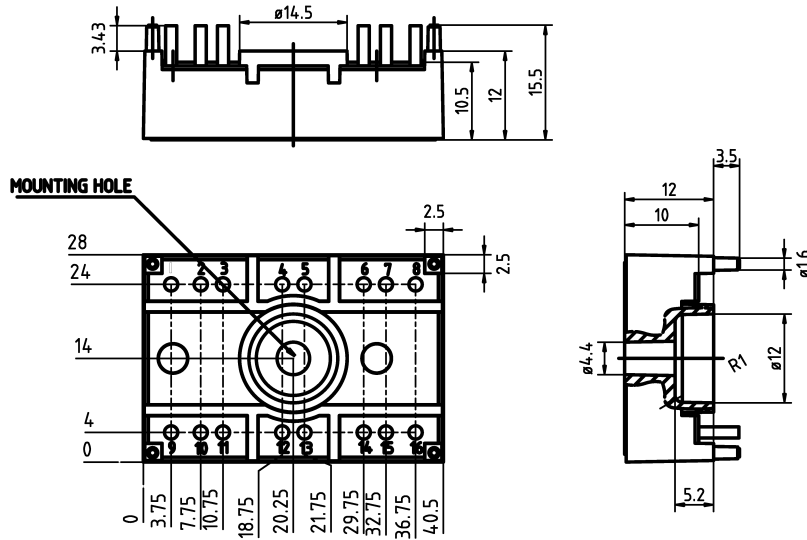


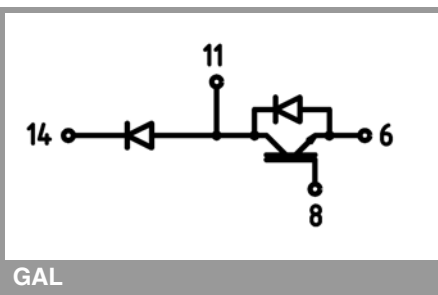
Fig. 10: Typ. FWD diode forward characteristic

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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