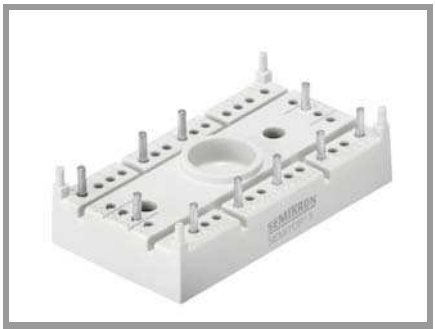
SK 40 BHL 066T



SEMITOP® 3

Half controlled bridge rectifier + IGBT braking chopper

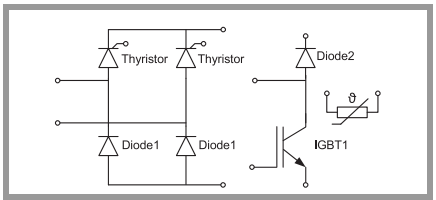
SK 40 BHL 066T

Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminum oxide ceramic (DBC)
- 600V Trench3 IGBT technology
- Free-wheeling chopper diode CAL technology
- UL file recognized, file no E63-532

Typical Applications*

- Rectifier



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Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
IGBT 1				
V_{CES}	T_j = 25 °C		600	V
I_C	T_j = 150 °C	T_s = 25 °C	33	A
		T_s = 70 °C	25	A
I_C	T_j = 175 °C	T_s = 25 °C	37	A
		T_s = 70 °C	30	A
I_{Cnom}			30	A
I_{CRM}	I_{CRM} = 2 x I_{Cnom}		60	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 360 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 600 V	T_j = 150 °C	6	µs
T_j			-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	**Conditions**	**Values**	**Unit**
Thyristor 1			
V_{RRM}		1600	V
$I_{T(AV)}$	T_j = 130 °C, T_s = 80 °C	19	A
I_{TSM}	tp = 10 ms, sin 180°, T_j = 25 °C	370	A
i^2t	tp = 10 ms, sin 180°, T_j = 25 °C	685	A^2s
T_j		-40 ... 130	°C

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Diode 1				
V_{RRM}	T_j = 25 °C		1600	V
I_F	T_j = 125 °C	T_s = 25 °C	36	A
		T_s = 70 °C	24	A
I_F	T_j = 150 °C	T_s = 25 °C	41	A
		T_s = 70 °C	31	A
I_{Fnom}			13	A
I_{FRM}				A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		270	A
T_j			-40 ... 150	°C

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Diode 2				
V_{RRM}	T_j = 25 °C		600	V
I_F	T_j = 175 °C	T_s = 25 °C	34	A
		T_s = 70 °C	27	A
I_{Fnom}			25	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		50	A
I_{FSM}	10 ms sin 180°	T_j = 25 °C	185	A
		T_j = 150 °C	160	A
T_j			-40 ... 175	°C

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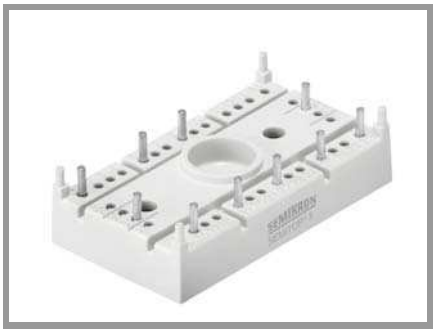

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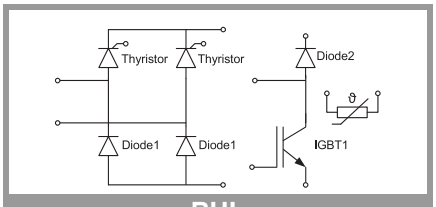
- Free-wheeling chopper diode CAL technology
- UL file recognized, file no E63-532

Typical Applications*

- Rectifier



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Absolute Maximum Ratings			
Symbol	**Conditions**	**Values**	**Unit**
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**
IGBT 1						
$V_{CE(sat)}$	I_C = 30 A, V_{GE} = 15 V, chiplevel	T_j = 25 °C		1.50	1.90	V
		T_j = 150 °C		1.65	2.10	V
V_{CE0}	chiplevel	T_j = 25 °C		0.90	1.00	V
		T_j = 150 °C		0.85	0.90	V
r_{CE}	V_{GE} = 15 V, chiplevel	T_j = 25 °C		20	30	mΩ
		T_j = 150 °C		27	40	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE} V, I_C = 0.43 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 600 V	T_j = 25 °C			0.01	mA
				-		mA
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V	f = 1 MHz		1.63		nF
C_{oes}		f = 1 MHz		0.108		nF
C_{res}		f = 1 MHz		0.05		nF
Q_G	- 7 V...+ 15 V			240		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 300 V, I_C = 30 A, $R_{G\,on}$ = 25 Ω, $R_{G\,off}$ = 25 Ω, di/dt_{on} = 2335 A/µs, di/dt_{off} = 2335 A/µs, $V_{GE\,neg}$ = -7 V, $V_{GE\,pos}$ = 15 V	T_j = 150 °C		24		ns
t_r		T_j = 150 °C		27		ns
E_{on}		T_j = 150 °C		0.97		mJ
$t_{d(off)}$		T_j = 150 °C		328		ns
t_f		T_j = 150 °C		54		ns
E_{off}		T_j = 150 °C		1.77		mJ
$R_{th(j-s)}$	per IGBT			1.65		K/W

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Thyristor 1						
V_T	I_T = 25 A, chip	T_j = 25 °C			1.22	V
		T_j = 130 °C			1.19	V
$V_{T(TO)}$	T_j = 130 °C				0.85	V
r_T	T_j = 130 °C				13.9	mΩ
V_{GT}	T_j = 25 °C		1.65			V
I_{GT}	T_j = 25 °C		100			mA
I_H	T_j = 25 °C				165	mA
I_L	T_j = 25 °C				330	mA
dv/dt_{cr}	T_j = 130 °C				1000	V/µs
di/dt_{cr}	T_j = 130 °C				50	A/µs
$Rth_{(j-s)}$				1.7		K/W

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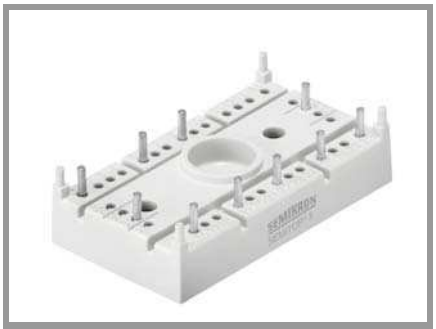


SEMITOP® 3

Half controlled bridge rectifier + IGBT braking chopper

SK 40 BHL 066T

Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminum oxide ceramic (DBC)
- 600V Trench3 IGBT technology
- Free-wheeling chopper diode CAL technology
- UL file recognized, file no E63-532

Typical Applications*

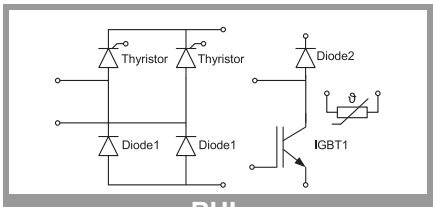
- Rectifier

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode 1						
V_F	I_F = 13 A	T_j = 25 °C		1.00	1.21	V
	chiplevel	T_j = 150 °C		0.90	1.10	V
V_{F0}	chiplevel	T_j = 25 °C		0.88	0.98	V
		T_j = 125 °C		0.73	0.83	V
r_F	chiplevel	T_j = 25 °C		9.2	18	mΩ
		T_j = 125 °C		13	21	mΩ
I_{RRM}	I_F = 13 A			-		A
Q_{rr}				-		µC
E_{rr}				-		mJ
$R_{th(j-s)}$	per Diode			1.7		K/W

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode 2						
V_F	I_F = 25 A	T_j = 25 °C		1.45	1.84	V
	chiplevel	T_j = 150 °C		1.47	1.75	V
V_{F0}	chiplevel	T_j = 25 °C		0.99	1.10	V
		T_j = 150 °C		0.80	0.89	V
r_F	chiplevel	T_j = 25 °C		18	30	mΩ
		T_j = 150 °C		27	34	mΩ
I_{RRM}	I_F = 30 A	T_j = 150 °C		7.5		A
Q_{rr}	di/dt_{off} = 920 A/µs	T_j = 150 °C		1.8		µC
E_{rr}	V_{GE} = -7 V V_{CC} = 600 V	T_j = 150 °C		0.26		mJ
$R_{th(j-s)}$	per Diode			2.3		K/W

Characteristics					
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
Module					
M_s	to heatsink	2.25		2.5	Nm
w	weight		29		g

Characteristics					
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
Temperature Sensor					
R_{100}	T_r = 100 °C		493 ± 5%		Ω
$B_{100/125}$	$R_{(T)}=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; T[K];		3550 ±2%		K



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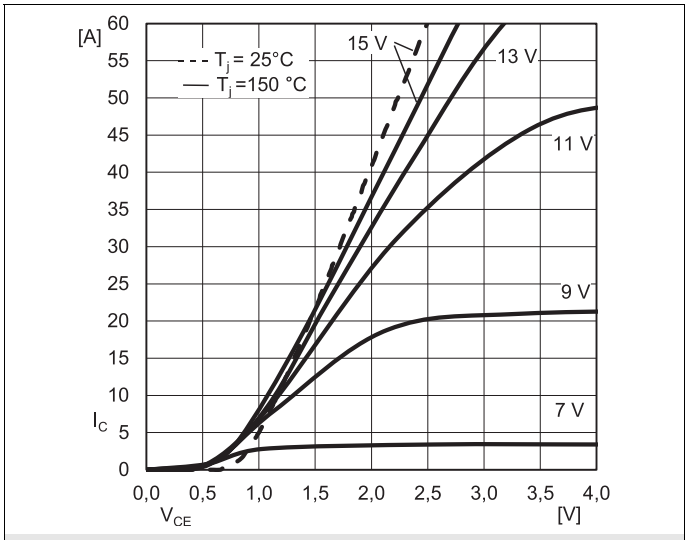


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

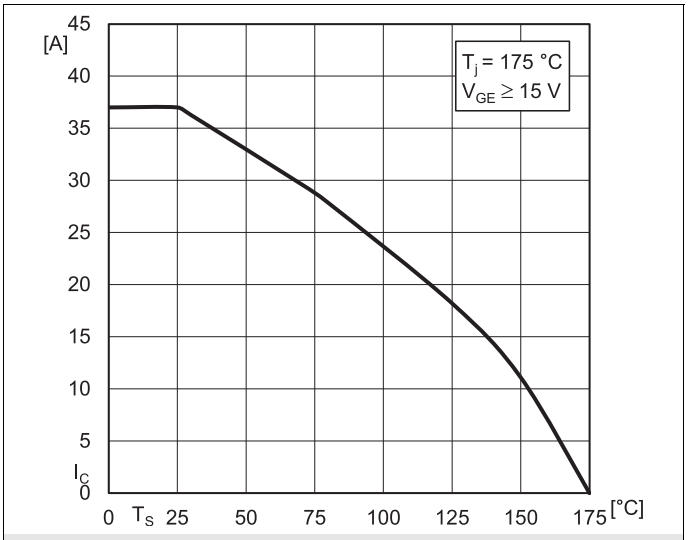


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_S)$

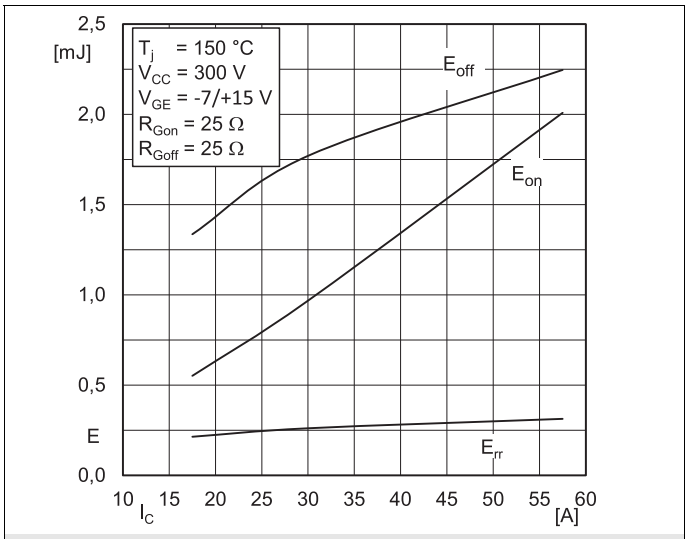


Fig. 3: Typ. turn-on /-off energy = f (I_C)

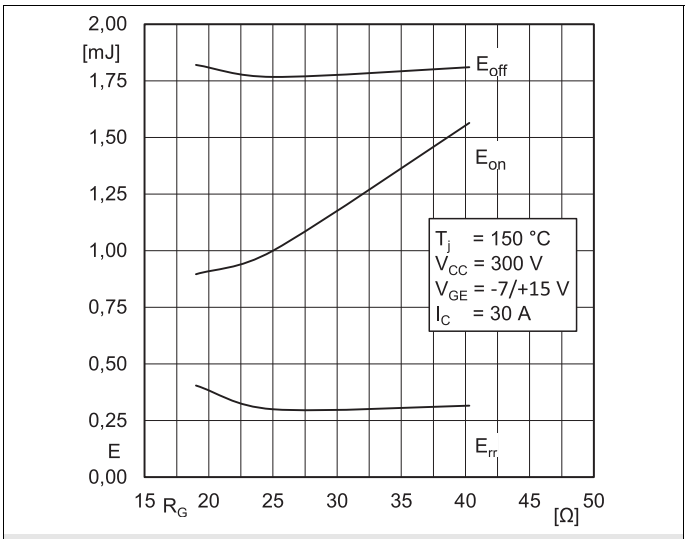


Fig. 4: Typ. turn-on /-off energy = f (R_G)

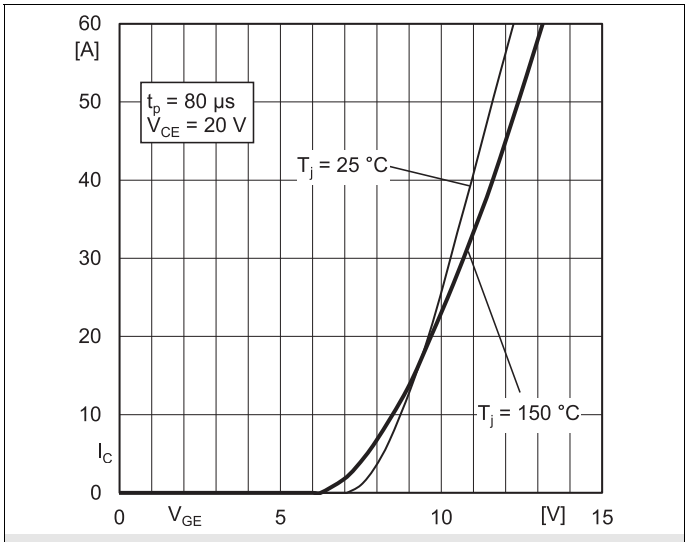


Fig. 5: Typ. transfer characteristic

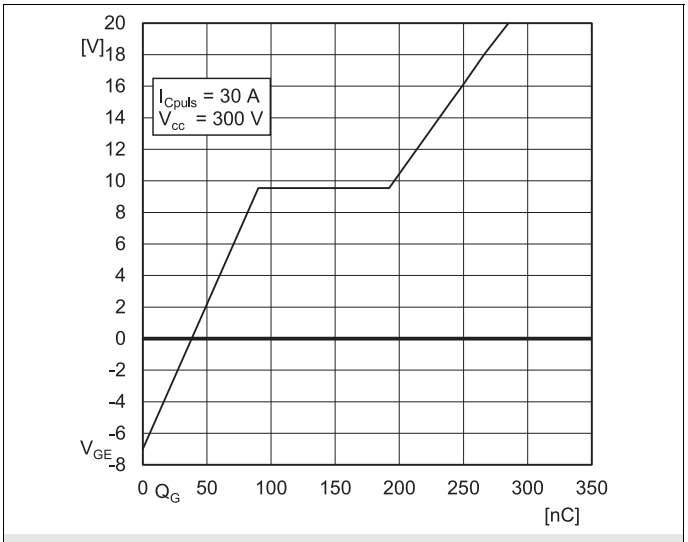


Fig. 6: Typ. gate charge characteristic

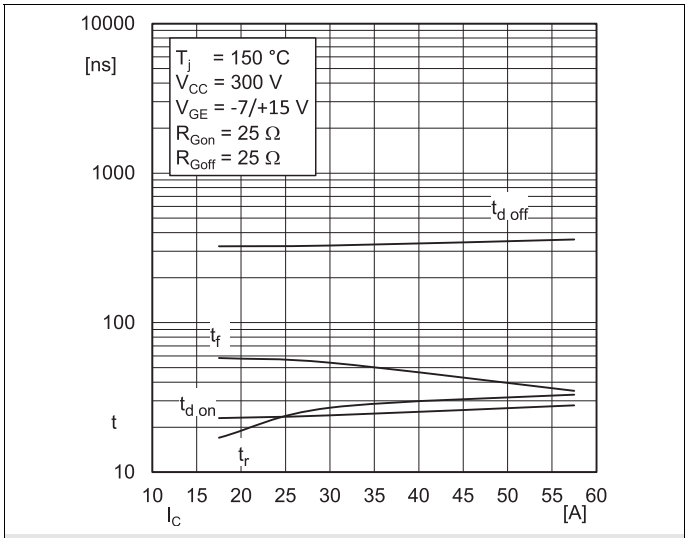


Fig. 7: Typ. switching times vs. I_C

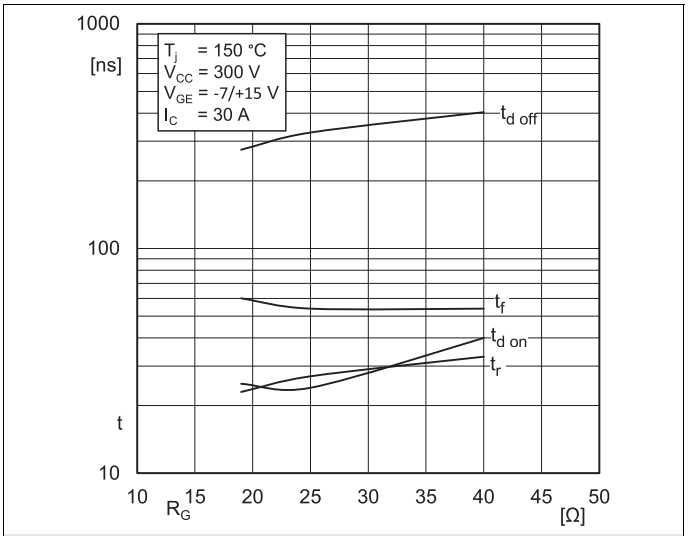


Fig. 8: Typ. switching times vs. gate resistor R_G

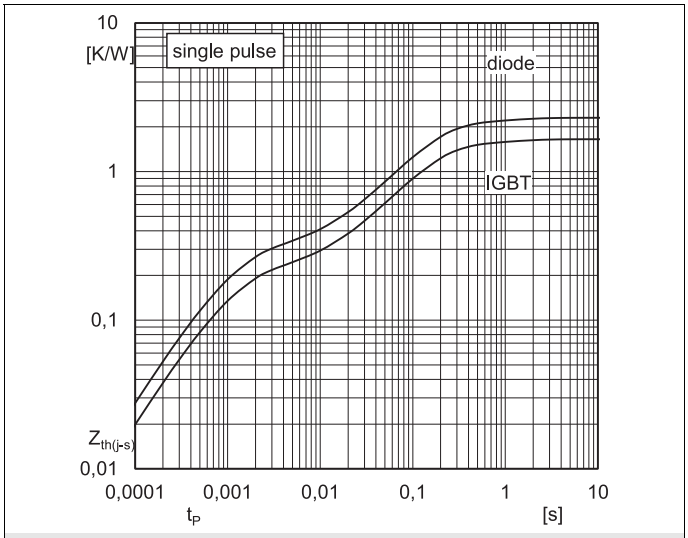


Fig. 9: Transient thermal impedance of IGBT and Diode

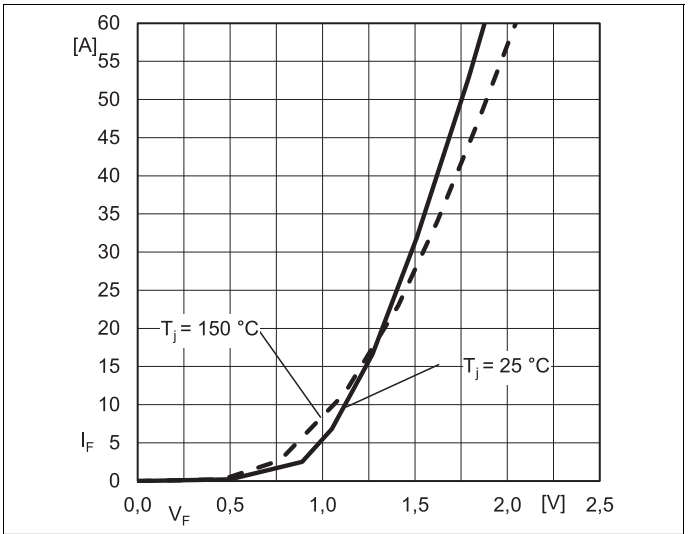


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

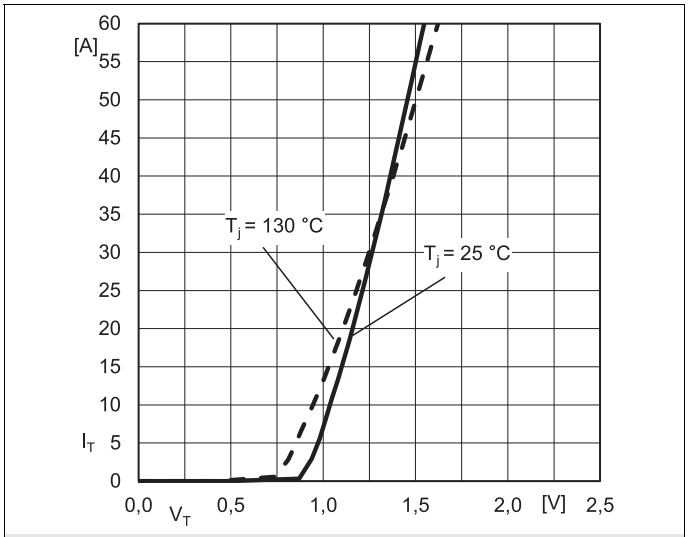


FIg 11: Forward characteristic of single thyristor

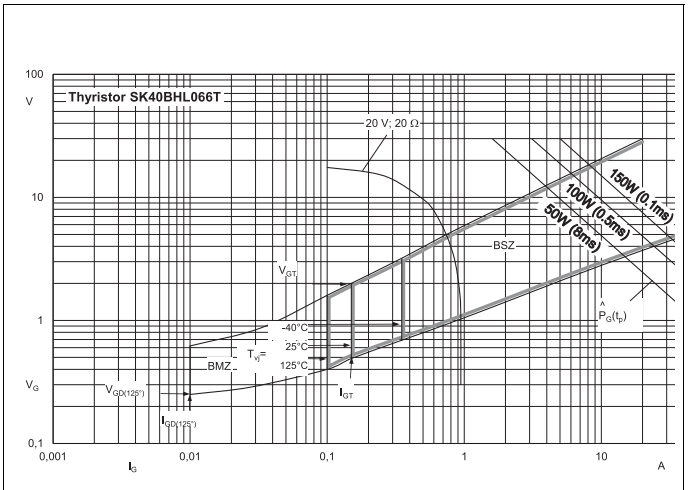
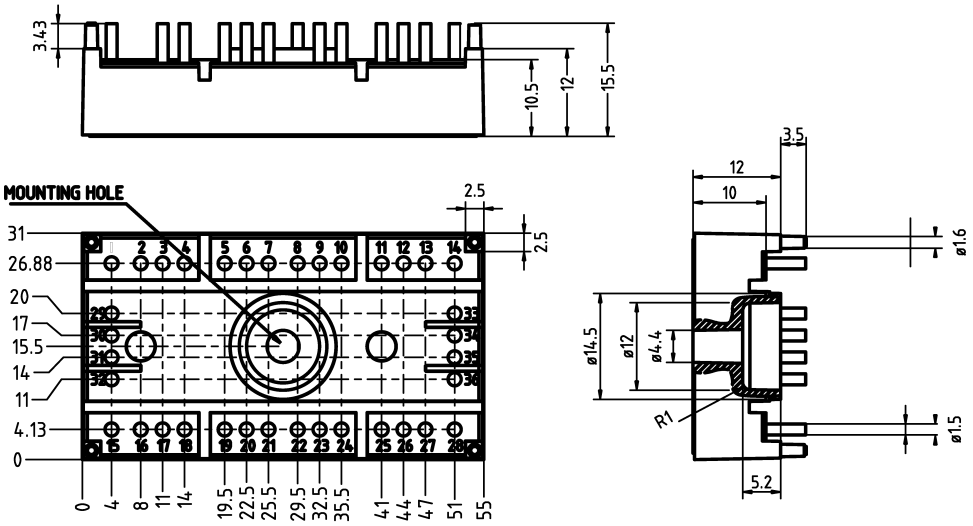


Fig.12: Gate trigger characteristic

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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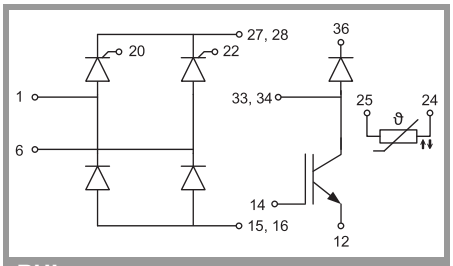

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

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