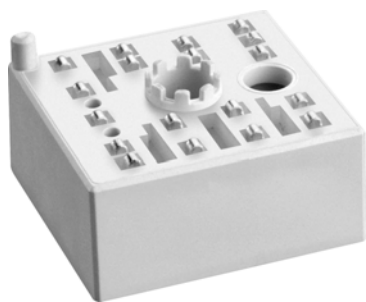


SKiiP 02NAC12T4V1



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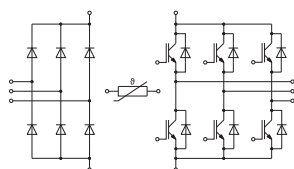
SKiiP 02NAC12T4V1

Features*

- Trench 4 IGBTs
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532

Remarks

- Max. case temperature limited to $T_C=T_S=125\text{ °C}$
- Product reliability results valid for $T_j \leq 150\text{ °C}$ (recommended $T_{j,op} = -40 \dots +150\text{ °C}$)
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- For storage and case temperature with TIM see document: "Technical Explanations Thermal Interface Materials"



NAC

Absolute Maximum Ratings					
Symbol	Conditions		Values	Unit	
Inverter - IGBT					
V_{CES}	$T_j = 25\text{ °C}$		1200	V	
I_C	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	6	A	
		$T_s = 70\text{ °C}$	6	A	
I_C	$T_j = 175\text{ °C}$	$T_s = 25\text{ °C}$	6	A	
		$T_s = 70\text{ °C}$	6	A	
I_{Chom}			4	A	
I_{CRM}			12	A	
V_{GES}			-20 ... 20	V	
t_{psc}	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 150\text{ °C}$	10	μs	
T_j			-40 ... 175	$^{\circ}\text{C}$	
Inverse - Diode					
V_{RRM}	$T_j = 25\text{ °C}$		1200	V	
I_F	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	7.5	A	
		$T_s = 70\text{ °C}$	7.5	A	
I_F	$T_j = 175\text{ °C}$	$T_s = 25\text{ °C}$	7.5	A	
		$T_s = 70\text{ °C}$	7.5	A	
I_{FRM}			12	A	
I_{FSM}	$t_p = 10\text{ ms, sin } 180^{\circ}, T_j = 150\text{ °C}$		36	A	
T_j			-40 ... 175	$^{\circ}\text{C}$	
Rectifier - Diode					
V_{RRM}	$T_j = 25\text{ °C}$		1600	V	
I_F	$T_s = 25\text{ °C}, T_j = 150\text{ °C}$		39	A	
I_{FSM}	$t_p = 10\text{ ms}$ $\text{sin } 180^{\circ}$	$T_j = 25\text{ °C}$	220	A	
		$T_j = 150\text{ °C}$	200	A	
i^2t	$t_p = 10\text{ ms}$ $\text{sin } 180^{\circ}$	$T_j = 25\text{ °C}$	242	A^2s	
		$T_j = 150\text{ °C}$	200	A^2s	
T_j			-40 ... 150	$^{\circ}\text{C}$	
Module					
$I_{t(RMS)}$	$T_{terminal} = 80\text{ °C}, 20\text{ A per spring}$			A	
T_{stg}	module without TIM		-40 ... 125	$^{\circ}\text{C}$	
V_{isol}	AC sinus 50 Hz, 1 min		2500	V	

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverter - IGBT						
$V_{CE(sat)}$	$I_C = 4\text{ A}$ $V_{GE} = 15\text{ V}$ chiplevel	$T_j = 25\text{ °C}$	1.85	2.10	V	
		$T_j = 150\text{ °C}$	2.25	2.45	V	
V_{CE0}	chiplevel	$T_j = 25\text{ °C}$	0.80	0.90	V	
		$T_j = 150\text{ °C}$	0.70	0.80	V	
r_{CE}	$V_{GE} = 15\text{ V}$ chiplevel	$T_j = 25\text{ °C}$	263	300	$\text{m}\Omega$	
		$T_j = 150\text{ °C}$	388	413	$\text{m}\Omega$	
$V_{GE(th)}$	$V_{GE} = V_{CE}\text{ V}, I_C = 1\text{ mA}$		5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$	$T_j = 25\text{ °C}$		1	mA	
				-	mA	
C_{ies}	$V_{CE} = 25\text{ V}$	$f = 1\text{ MHz}$		0.25	nF	
C_{oes}	$V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		0.03	nF	
C_{res}		$f = 1\text{ MHz}$		0.02	nF	

SKiiP 02NAC12T4V1



SKiiP 02NAC12T4V1

Features*

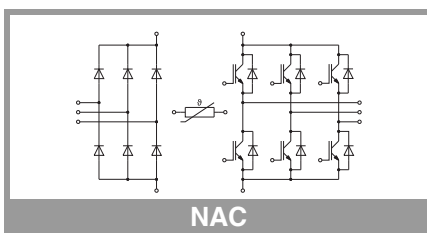
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
Q_G	$V_{GE} = -8\text{ V} \dots +15\text{ V}$		23		nC
R_{Gint}	$T_j = 25\text{ °C}$		0		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150\text{ °C}$	65		ns
t_r	$I_C = 4\text{ A}$	$T_j = 150\text{ °C}$	45		ns
E_{on}	$R_{G\ on} = 150\ \Omega$	$T_j = 150\text{ °C}$	0.66		mJ
$t_{d(off)}$	$R_{G\ off} = 150\ \Omega$	$T_j = 150\text{ °C}$	300		ns
t_f		$T_j = 150\text{ °C}$	110		ns
E_{off}	$V_{GE} = +15/-15\text{ V}$	$T_j = 150\text{ °C}$	0.37		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8\text{ W}/(\text{K}\cdot\text{m})$		2.49		K/W
Inverse - Diode					
$V_F = V_{EC}$	$I_F = 4\text{ A}$	$T_j = 25\text{ °C}$	1.82	2.08	V
	$V_{GE} = 0\text{ V}$	$T_j = 150\text{ °C}$	1.63	1.89	V
	chipelevel				
V_{F0}		$T_j = 25\text{ °C}$	1.30	1.50	V
	chipelevel	$T_j = 150\text{ °C}$	0.90	1.10	V
r_F		$T_j = 25\text{ °C}$	129	144	m Ω
	chipelevel	$T_j = 150\text{ °C}$	181	198	m Ω
I_{RRM}	$I_F = 4\text{ A}$	$T_j = 150\text{ °C}$	3.4		A
Q_{rr}	$V_{GE} = -15\text{ V}$	$T_j = 150\text{ °C}$	0.95		μC
	$V_{CC} = 600\text{ V}$				
E_{rr}	$di/dt_{off} = 110\text{ A}/\mu\text{s}$	$T_j = 150\text{ °C}$	0.34		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8\text{ W}/(\text{K}\cdot\text{m})$		2.53		K/W
Rectifier - Diode					
$V_F = V_{EC}$	$I_F = 8\text{ A}$	$T_j = 25\text{ °C}$	1.00	1.21	V
	chipelevel	$T_j = 125\text{ °C}$	0.90	1.10	V
V_{F0}		$T_j = 25\text{ °C}$	0.88	0.98	V
	chipelevel	$T_j = 125\text{ °C}$	0.73	0.83	V
r_F		$T_j = 25\text{ °C}$	15	29	m Ω
	chipelevel	$T_j = 125\text{ °C}$	21	34	m Ω
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8\text{ W}/(\text{K}\cdot\text{m})$		1.5		K/W
Module					
M_s	to heat sink		2	2.5	Nm
W			20		g
Temperature Sensor					
R_{100}	$T_r = 100\text{ °C}$, tolerance = 3 %		1670 \pm 3%		Ω
$R_{(T)}$	$R_{(T)} = 1000\ \Omega [1 + A(T - 25\text{ °C}) + B(T - 25\text{ °C})^2]$ $A = 7.635 \cdot 10^{-3}\text{ °C}^{-1}$, $B = 1.731 \cdot 10^{-5}\text{ °C}^{-2}$				

Creepage distance (spring to spring) between temperature sensor and DC- = 3.3 mm (CTI 600)



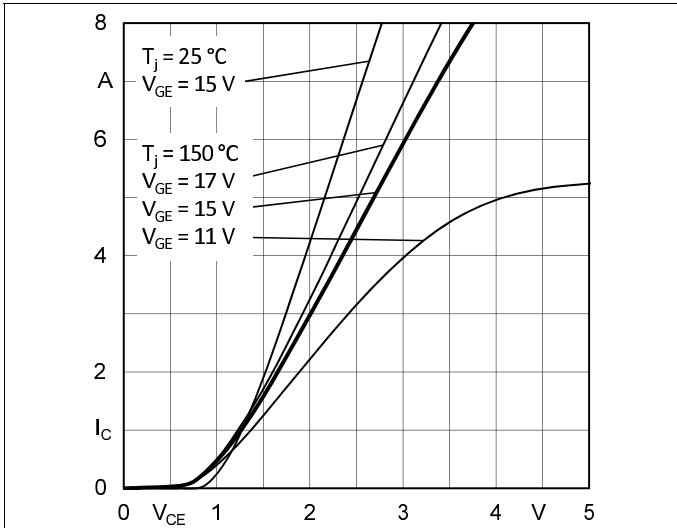


Fig. 1: Typ. output characteristic

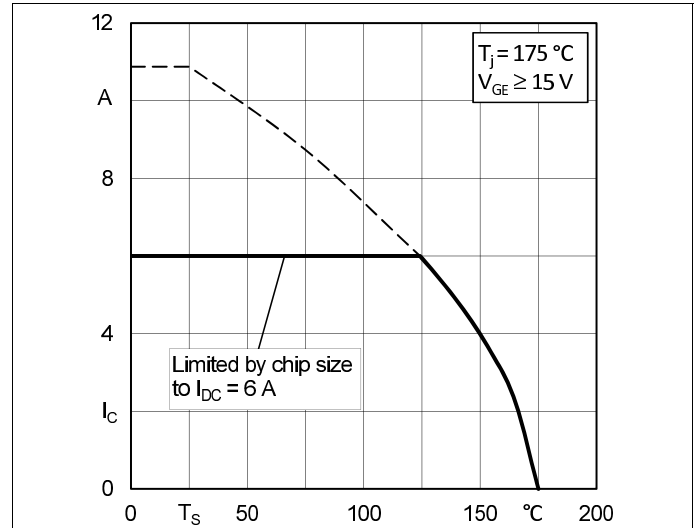


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_s)$

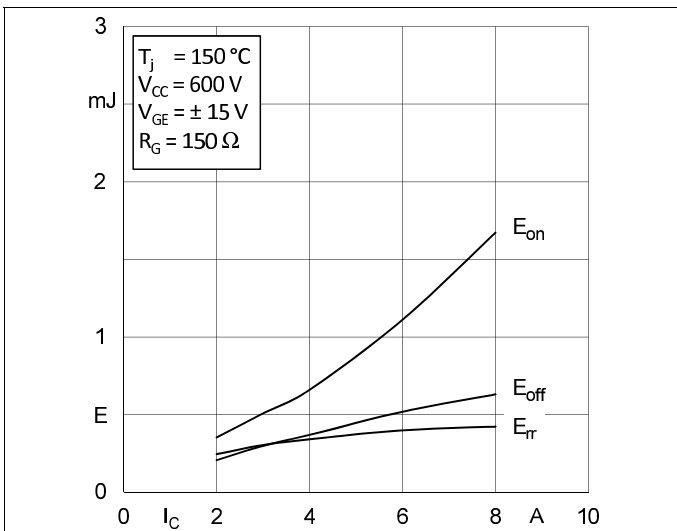


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

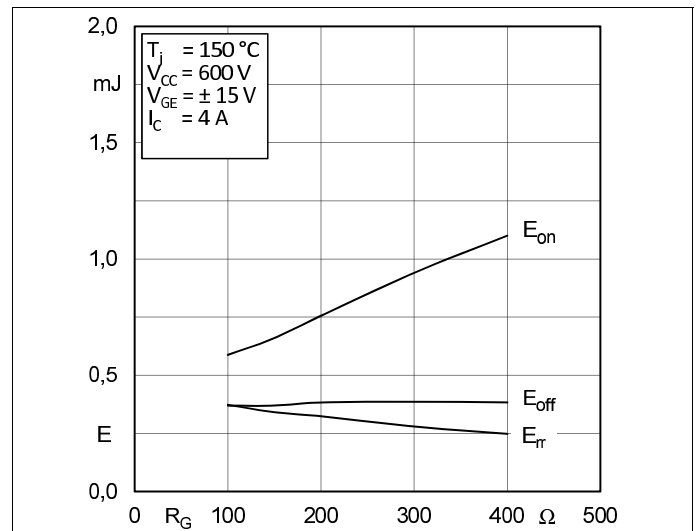


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

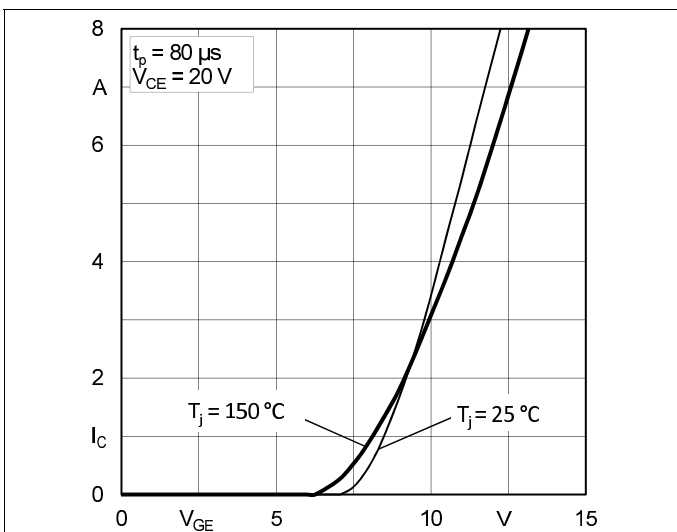


Fig. 5: Typ. transfer characteristic

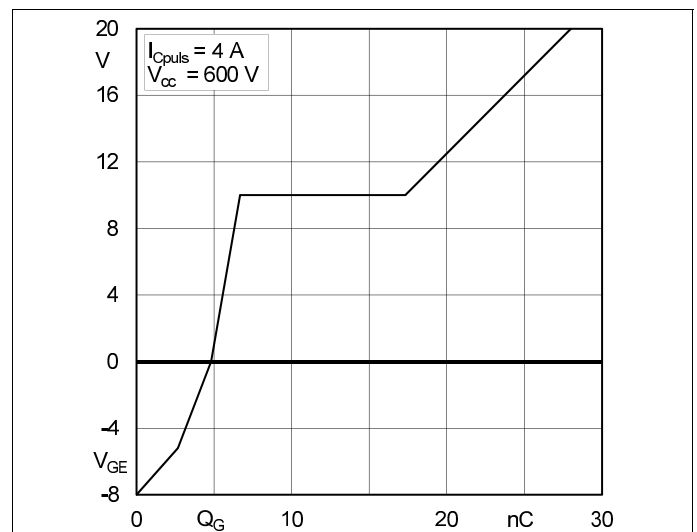


Fig. 6: Typ. gate charge characteristic

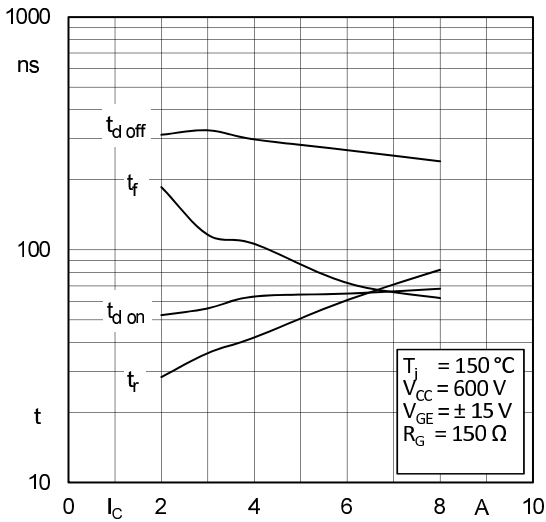


Fig. 7: Typ. switching times vs. I_c

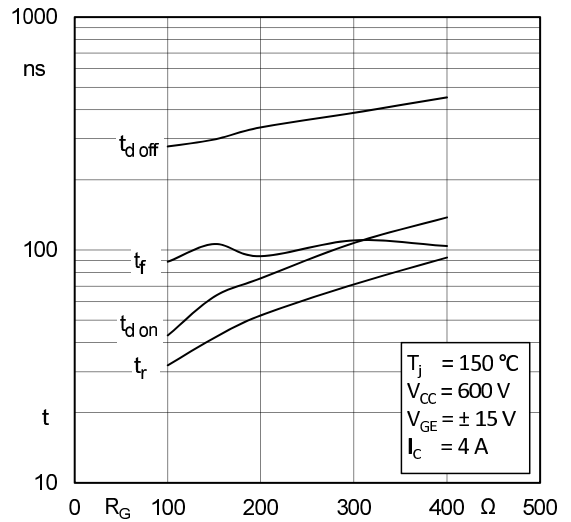


Fig. 8: Typ. switching times vs. gate resistor R_G

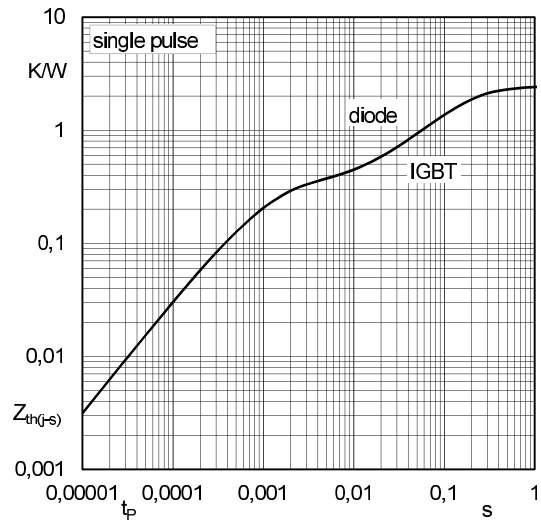


Fig. 9: Typ. transient thermal impedance

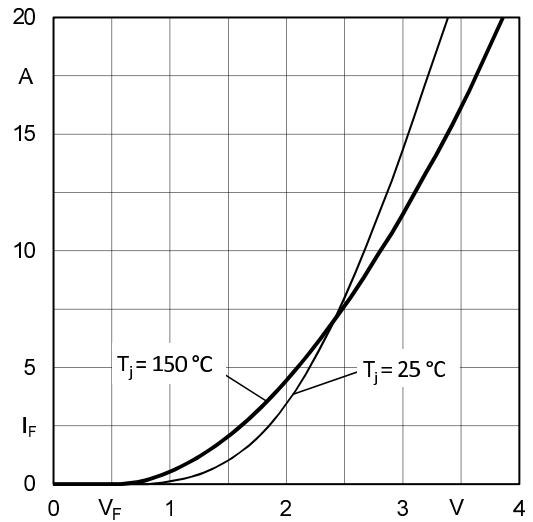


Fig. 10: Typ. CAL diode forward characteristic

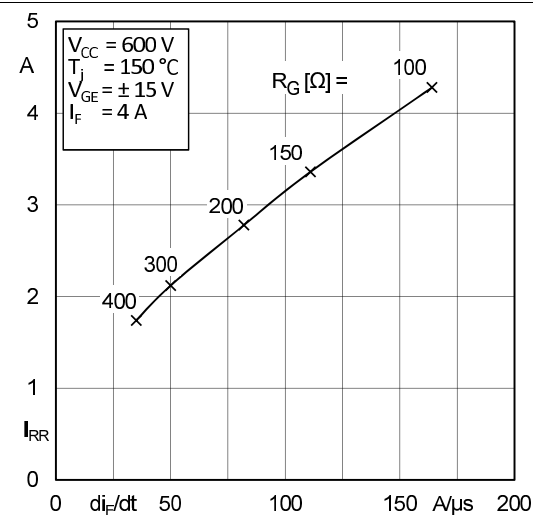


Fig. 11: Typ. CAL diode peak reverse recovery current

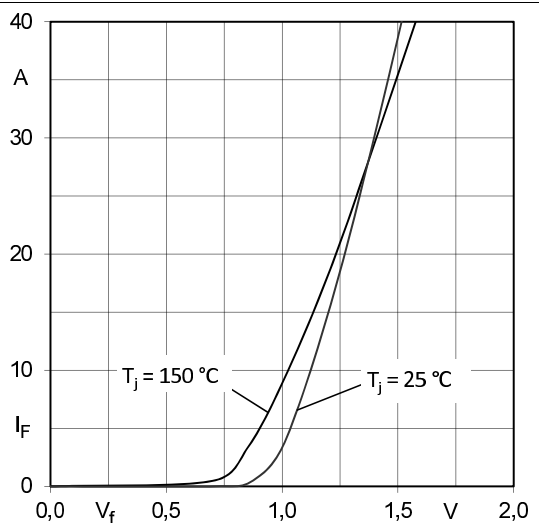
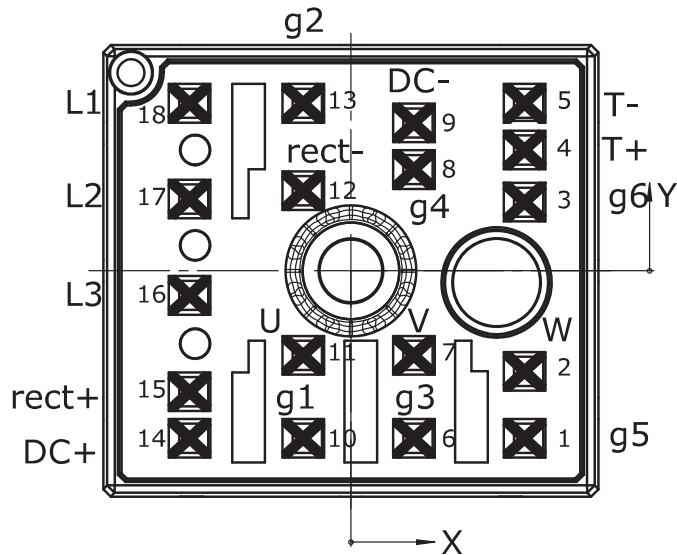


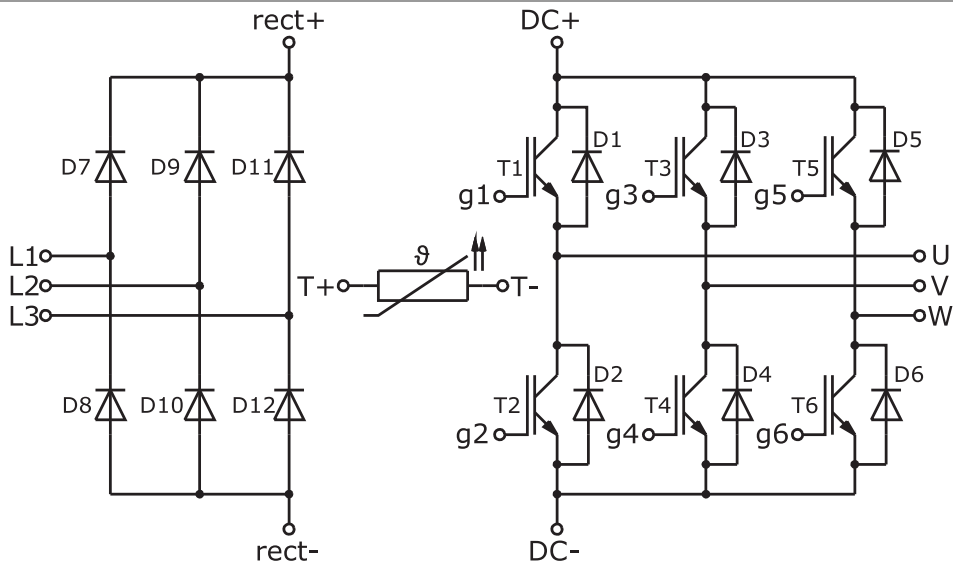
Fig. 12: Typ. input bridge forward characteristic

Pin out							
Pin	X	Y	Function	Pin	X	Y	Function
1	11,93	-11,50	g5	10	-3,28	-11,50	g1
2	11,93	-6,90	W	11	-3,28	-5,80	U
3	11,93	4,71	g6	12	-3,28	5,50	rect-
4	11,93	8,3	T+	13	-3,28	11,50	g2
5	11,93	11,50	T-	14	-11,08	-11,50	DC+
6	4,33	-11,50	g3	15	-11,08	-8,30	rect+
7	4,33	-5,80	V	16	-11,08	-1,68	L3
8	4,33	6,95	g4	17	-11,08	4,93	L2
9	4,33	10,15	DC-	18	-11,08	11,50	L1

all values in mm



Pinout and Dimensions



Pinout

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

***IMPORTANT INFORMATION AND WARNINGS**

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