

MiniSKiiP® 3

Single IGBT Switch

SKiiP 39GA12T7V1

Features*

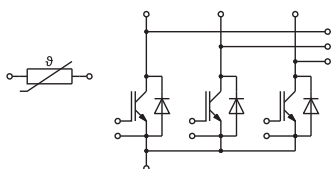
- 1200V Generation 7 IGBTs (T7)
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532

Remarks

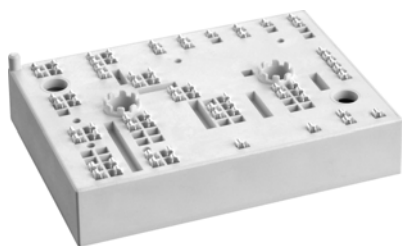
- Max. case temperature limited to $T_C = T_S = 125^\circ\text{C}$
- Product reliability results valid for $T_j \leq 150^\circ\text{C}$ (recommended $T_{j,op} = -40 \dots +150^\circ\text{C}$)
- MiniSKiiP "Technical Explanations" and "Mounting Instructions" are part of the data sheet. Please refer to both documents for further information.
- For storage and case temperature with TIM see document: "Technical Explanations Thermal Interface Materials"

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
Inverter - IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	λ _{paste} =0.8 W/(mK)	T _s = 70 °C	139	A
	T _j = 175 °C	T _s = 100 °C	112	A
I _C	λ _{paste} =2.5 W/(mK)	T _s = 70 °C	163	A
	T _j = 175 °C	T _s = 100 °C	131	A
I _{Cnom}			150	A
I _{CRM}			300	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 800 V V _{GE} ≤ 15 V V _{CES} ≤ 1200 V	T _j = 175 °C	7	µs
T _j			-40 ... 175	°C
Inverse - Diode				
I _F	λ _{paste} =0.8 W/(mK)	T _s = 70 °C	103	A
	T _j = 175 °C	T _s = 100 °C	82	A
I _F	λ _{paste} =2.5 W/(mK)	T _s = 70 °C	128	A
	T _j = 175 °C	T _s = 100 °C	102	A
I _{FRM}			300	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 150 °C		900	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}	T _{terminal} = 80 °C, 20 A per spring		160	A
T _{stg}	module without TIM		-40 ... 125	°C
V _{isol}	AC sinus 50 Hz, t = 1 min		2500	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverter - IGBT						
V _{CE(sat)}	I _C = 150 A	T _j = 25 °C		1.55	1.70	V
	V _{GE} = 15 V	T _j = 150 °C		1.73	1.88	V
	chiplevel	T _j = 175 °C		1.77	1.92	V
V _{CE0}	chiplevel	T _j = 25 °C		1.00	1.05	V
		T _j = 150 °C		0.80	0.85	V
		T _j = 175 °C		0.75	0.80	V
r _{CE}	V _{GE} = 15 V chiplevel	T _j = 25 °C		3.7	4.3	mΩ
		T _j = 150 °C		6.2	6.9	mΩ
		T _j = 175 °C		6.8	7.5	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 3.4 mA		5.15	5.8	6.45	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1200 V, T _j = 25 °C				1.5	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		30.20		nF
C _{oes}		f = 1 MHz		0.39		nF
C _{res}		f = 1 MHz		1.08		nF
Q _G	V _{GE} = - 8V ... + 15 V			2100		nC
R _{Gint}	T _j = 25 °C			1.0		Ω



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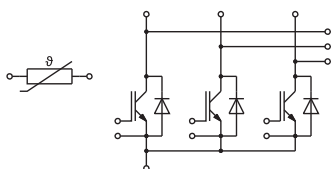
SKiiP 39GA12T7V1

Features*

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

Remarks

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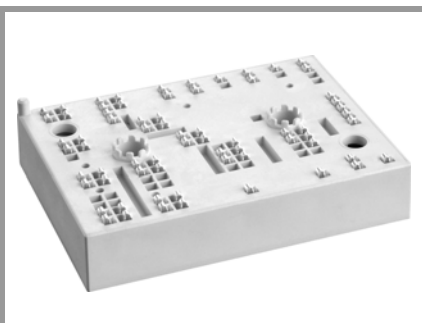


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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $I_C = 150\text{ A}$ $R_{G\ on} = 1.1\ \Omega$ $R_{G\ off} = 1.1\ \Omega$ $V_{GE} = +15/-15\text{ V}$	$T_J = 25\text{ °C}$	173		ns
		$T_J = 150\text{ °C}$	181		ns
		$T_J = 175\text{ °C}$	179		ns
t_r		$T_J = 25\text{ °C}$	32		ns
		$T_J = 150\text{ °C}$	37		ns
		$T_J = 175\text{ °C}$	39		ns
E_{on}	$T_J = 25\text{ °C}$ $T_J = 150\text{ °C}$ $T_J = 175\text{ °C}$		6.9		mJ
			12		mJ
			13		mJ
$t_{d(off)}$		$T_J = 25\text{ °C}$	347		ns
		$T_J = 150\text{ °C}$	437		ns
		$T_J = 175\text{ °C}$	462		ns
t_f	$@\ T_J = 150\text{ °C}:$ $di/dt_{on} = 3970\text{ A}/\mu\text{s}$ $di/dt_{off} = 1530\text{ A}/\mu\text{s}$ $dv/dt = 3730\text{ V}/\mu\text{s}$	$T_J = 25\text{ °C}$	67		ns
		$T_J = 150\text{ °C}$	103		ns
		$T_J = 175\text{ °C}$	130		ns
E_{off}		$T_J = 25\text{ °C}$	10		mJ
		$T_J = 150\text{ °C}$	17		mJ
		$T_J = 175\text{ °C}$	18		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8\text{ W}/(\text{mK})$		0.41		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5\text{ W}/(\text{mK})$		0.32		K/W

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverse - Diode					
$V_F = V_{EC}$	$I_F = 150\text{ A}$ $V_{GE} = 0\text{ V}$ chipelevel	$T_J = 25\text{ °C}$	2.14	2.46	V
		$T_J = 150\text{ °C}$	2.07	2.38	V
		$T_J = 175\text{ °C}$	1.93	2.24	V
V_{F0}	chipelevel	$T_J = 25\text{ °C}$	1.30	1.50	V
		$T_J = 150\text{ °C}$	0.90	1.10	V
		$T_J = 175\text{ °C}$	0.82	0.98	V
r_F	chipelevel	$T_J = 25\text{ °C}$	5.6	6.4	m Ω
		$T_J = 150\text{ °C}$	7.8	8.5	m Ω
		$T_J = 175\text{ °C}$	7.4	8.4	m Ω
I_{RRM}	$I_F = 150\text{ A}$ $V_{GE} = +15/-15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_J = 25\text{ °C}$	107		A
		$T_J = 150\text{ °C}$	145		A
		$T_J = 175\text{ °C}$	175		A
Q_{rr}		$T_J = 25\text{ °C}$	7.4		μC
		$T_J = 150\text{ °C}$	24		μC
		$T_J = 175\text{ °C}$	24.5		μC
E_{rr}	$@\ T_J = 150\text{ °C}:$ $di/dt_{off} = 3910\text{ A}/\mu\text{s}$	$T_J = 25\text{ °C}$	2.6		mJ
		$T_J = 150\text{ °C}$	8.6		mJ
		$T_J = 175\text{ °C}$	11		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8\text{ W}/(\text{mK})$		0.55		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=2.5\text{ W}/(\text{mK})$		0.4		K/W
Module					
L_{CE}			-		nH
M_s	to heat sink	2		2.5	Nm
w			82		g

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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Temperature Sensor					
R_{100}	$T_r=100^{\circ}\text{C}$ ($R_{25}=1000\Omega$)		$1670 \pm 3\%$		Ω
$R_{(T)}$	$R_{(T)}=1000\Omega[1+A(T-25^{\circ}\text{C})+B(T-25^{\circ}\text{C})^2]$, $A = 7.635 \cdot 10^{-3}^{\circ}\text{C}^{-1}$, $B = 1.731 \cdot 10^{-5}^{\circ}\text{C}^{-2}$				

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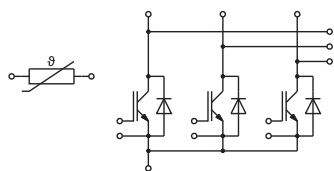
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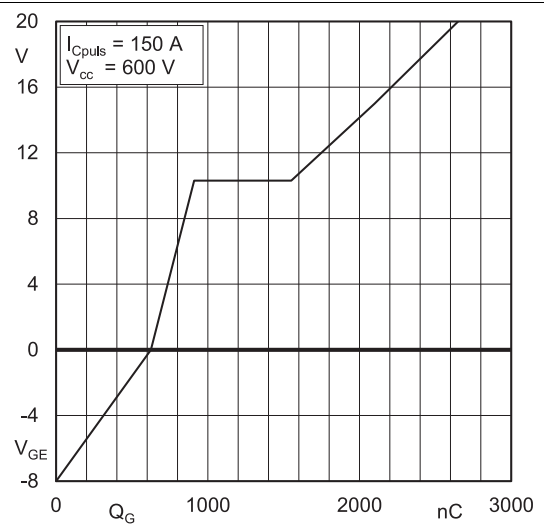
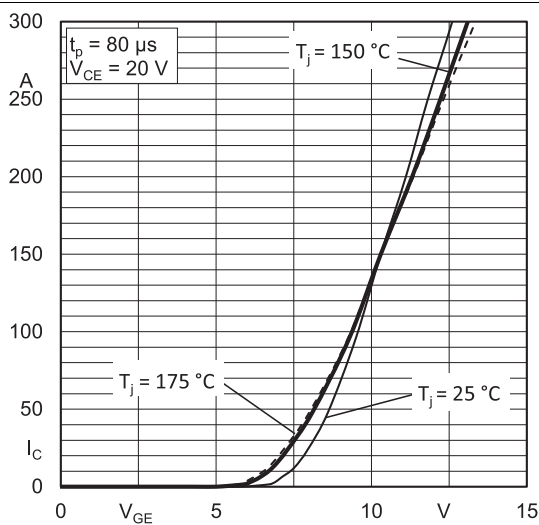
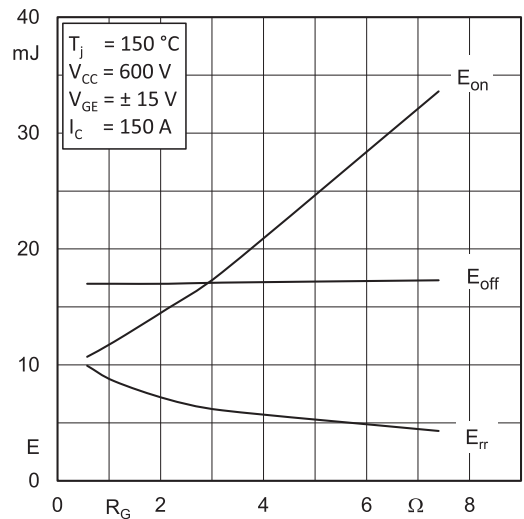
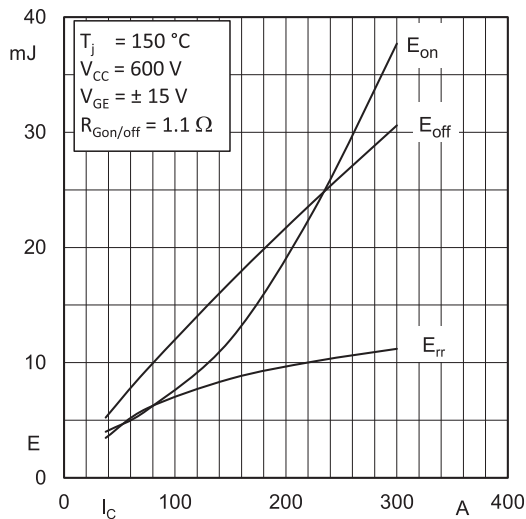
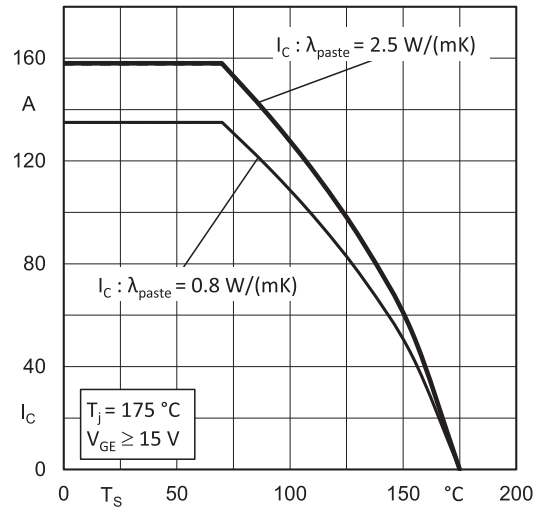
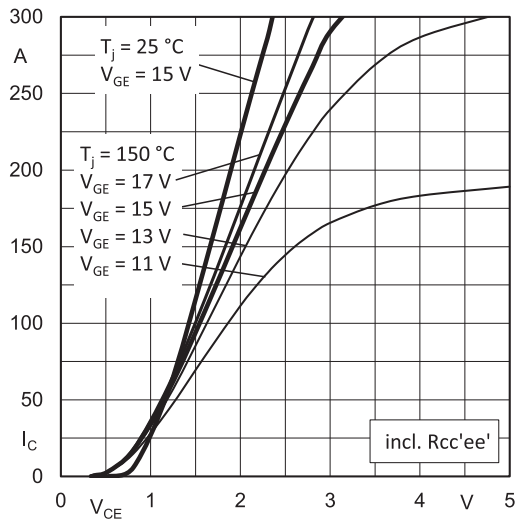
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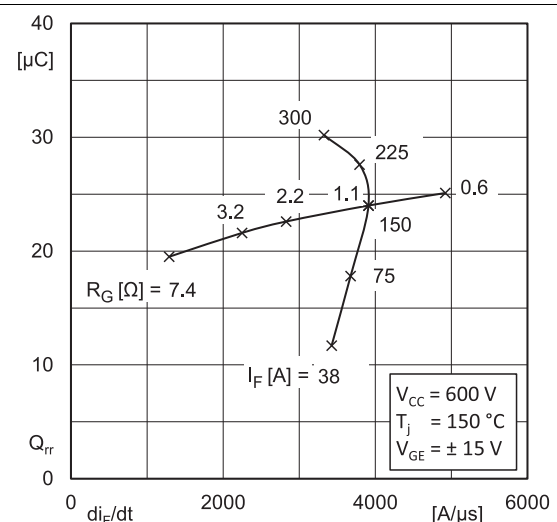
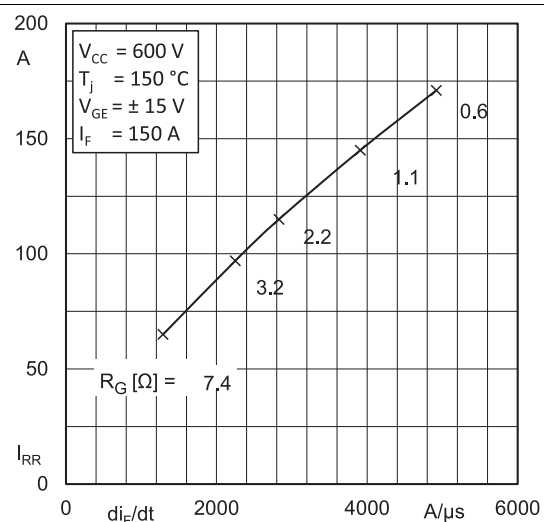
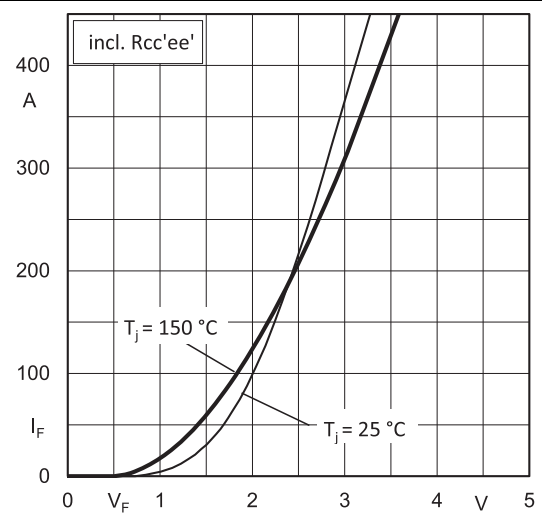
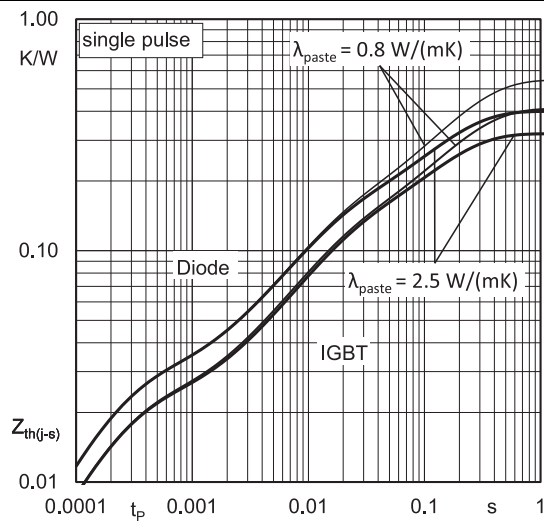
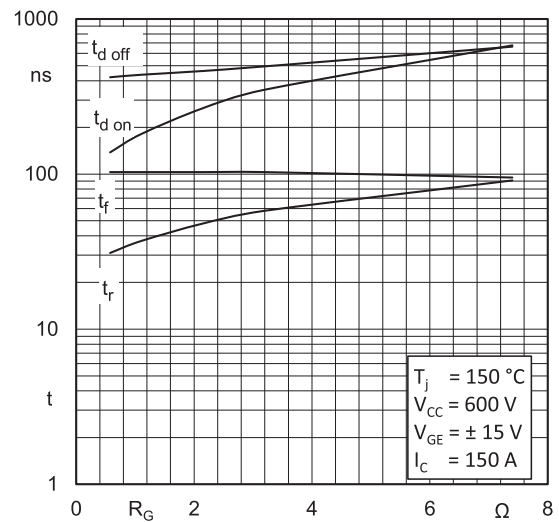
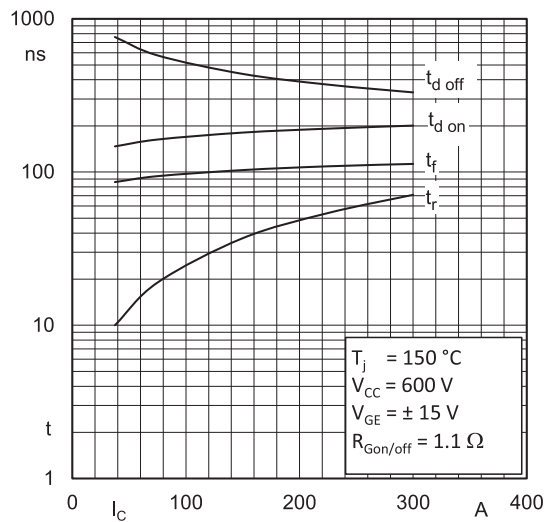
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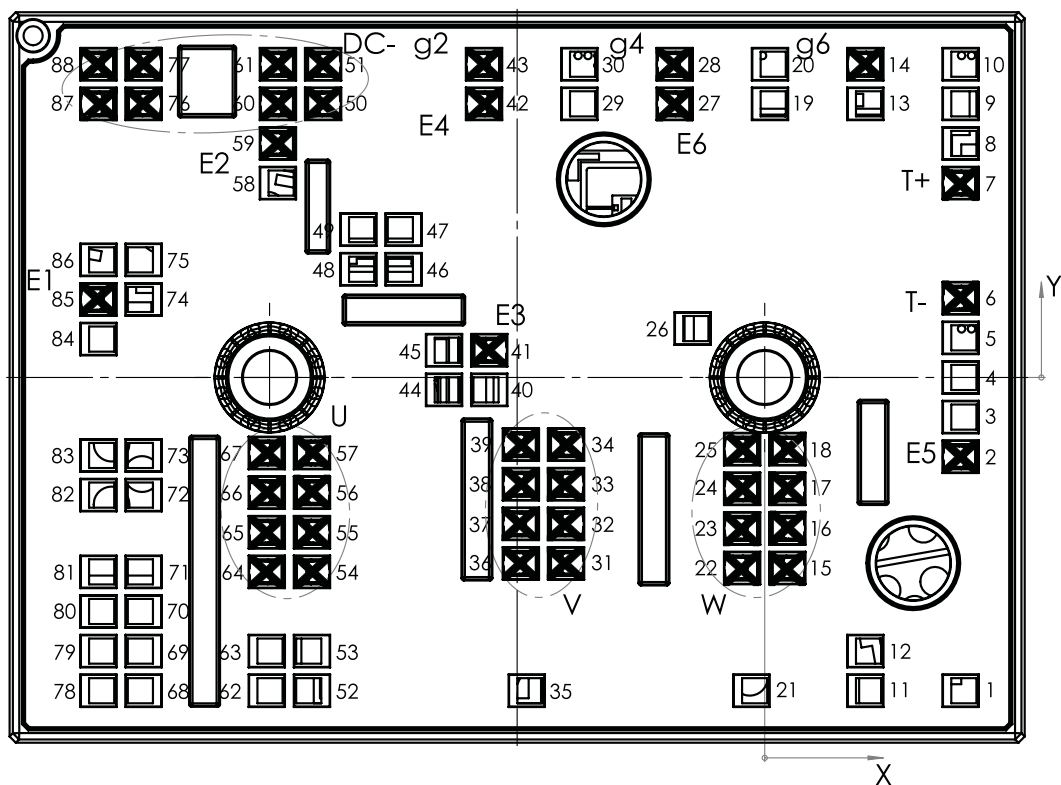
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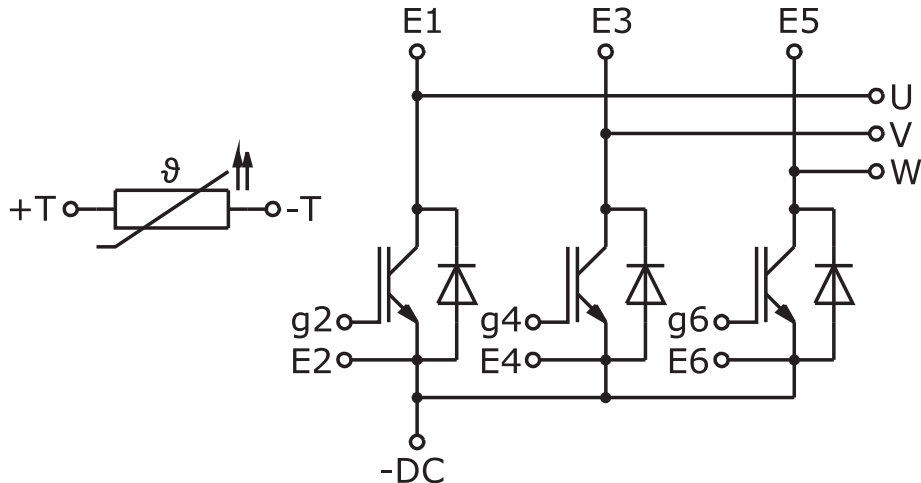


Pin out											
Pin	X	Y	Function	Pin	X	Y	Function	Pin	X	Y	Function
1	15,83	-25,3		31	-16,05	-15,02	V	61	-39,33	25,3	DC-
2	15,83	-6,4	E5	32	-16,05	-11,82	V	62	-40,23	-25,3	
3				33	-16,05	-8,62	V	63			
4				34	-16,05	-5,42	V	64	-40,23	-15,7	U
5				35				65	-40,23	-12,5	U
6	15,83	6,4	T-	36	-19,7	-15,02	V	66	-40,23	-9,3	U
7	15,83	15,7	T+	37	-19,7	-11,82	V	67	-40,23	-6,1	U
8				38	-19,7	-8,62	V	68	-50,18	-25,3	
9				39	-19,7	-5,42	V	69	-50,18	-22,1	
10				40	-22,26	-1		70	-50,18	-15,7	
11				41	-22,26	2	E3	71			
12				42	-22,68	22,1	E4	72			
13				43	-22,68	25,3	g2	73			
14	8,13	25,3	g6	44				74			
15	1,83	-15,39	W	45				75			
16	1,83	-12,19	W	46				76	-50,18	22,1	DC-
17	1,83	-8,99	W	47				77	-50,18	25,3	DC-
18	1,83	-5,79	W	48				78	-53,83	-25,3	
19				49				79	-53,83	-22,1	
20				50	-35,68	22,1	DC-	80	-53,83	-15,7	
21				51	-35,68	25,3	DC-	81			
22	-1,83	-15,39	W	52	-36,58	-25,3		82			
23	-1,83	-12,19	W	53				83			
24	-1,83	-8,99	W	54	-36,58	-15,7	U	84	-53,83	3,1	
25	-1,83	-5,79	W	55	-36,58	-12,5	U	85	-53,83	6,3	E1
26				56	-36,58	-9,3	U	86			
27	-7,28	22,1	E6	57	-36,58	-6,1	U	87	-53,83	22,1	DC-
28	-7,28	25,3	g4	58				88	-53,83	25,3	DC-
29				59	-39,33	18,9	E2				
30				60	-39,33	22,1	DC-				

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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