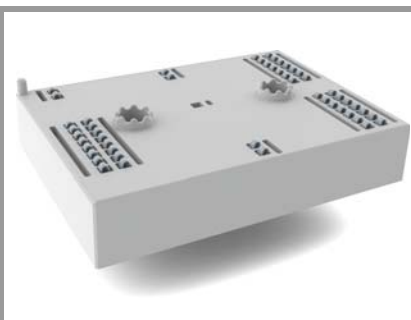


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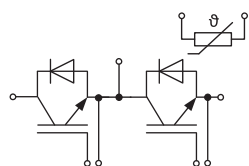
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Features

- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Remarks

- V_{CEsat} , V_F = chip level value
- Case temp. limited to $T_C = 125^\circ\text{C}$ max. (for baseplateless modules $T_C = T_S$)
- Product reliability results valid for $T_J \leq 150^\circ\text{C}$ (recomm. Top = $-40 \dots +150^\circ\text{C}$)



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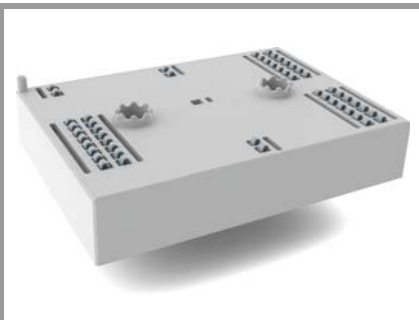
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Inverter - IGBT			
V_{CES}	$T_J = 25^\circ\text{C}$	1200	V
I_C	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	A
	$T_J = 175^\circ\text{C}$	$T_s = 70^\circ\text{C}$	A
I_C	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	A
	$T_J = 175^\circ\text{C}$	$T_s = 70^\circ\text{C}$	A
I_{Cnom}		400	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	1200	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 720 \text{ V}$ $V_{GE} \leq 15 \text{ V}$ $V_{CES} \leq 1200 \text{ V}$	$T_J = 125^\circ\text{C}$	μs
T_J		-40 ... 175	$^\circ\text{C}$
Inverse - Diode			
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	A
	$T_J = 175^\circ\text{C}$	$T_s = 70^\circ\text{C}$	A
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	A
	$T_J = 175^\circ\text{C}$	$T_s = 70^\circ\text{C}$	A
I_{Fnom}		400	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	800	A
I_{FSM}	10 ms, sin 180° , $T_J = 150^\circ\text{C}$	1980	A
T_J		-40 ... 175	$^\circ\text{C}$
Module			
$I_t(\text{RMS})$	$T_{terminal} = 80^\circ\text{C}$, 20 A per spring	280	A
T_{stg}		-40 ... 125	$^\circ\text{C}$
V_{isol}	AC sinus 50 Hz, $t = 1 \text{ min}$	2500	V

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 400 \text{ A}$ $V_{GE} = 15 \text{ V}$ chipelevel	$T_J = 25^\circ\text{C}$	1.75	2.20	V
		$T_J = 150^\circ\text{C}$	2.20	2.50	V
V_{CE0}	chipelevel	$T_J = 25^\circ\text{C}$	0.94	1.04	V
		$T_J = 150^\circ\text{C}$	0.88	0.98	V
r_{CE}	$V_{GE} = 15 \text{ V}$ chipelevel	$T_J = 25^\circ\text{C}$	2.0	2.9	m Ω
		$T_J = 150^\circ\text{C}$	3.3	3.8	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 16 \text{ mA}$	5.5	6	6.5	V
I_{CES}	$V_{GE} = 0 \text{ V}$, $V_{CE} = 1200 \text{ V}$, $T_J = 25^\circ\text{C}$		0.1	0.3	mA
C_{ies}	$V_{CE} = 25 \text{ V}$		24.04		nF
C_{oes}	$V_{GE} = 0 \text{ V}$		2.36		nF
C_{res}			2.36		nF
Q_G	- 8 V...+ 15 V		4400		nC
R_{Gint}			1.9		Ω
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$		410		ns
t_r	$I_C = 400 \text{ A}$		68		ns
	$R_{G on} = 1.8 \Omega$				
E_{on}	$R_{G off} = 1.8 \Omega$		17.8		mJ
$t_{d(off)}$	$di/dt_{on} = 7451 \text{ A}/\mu\text{s}$		667		ns
t_f	$di/dt_{off} = 3870 \text{ A}/\mu\text{s}$		107		ns
E_{off}	$V_{GE} = +15/-15 \text{ V}$		47.5		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8 \text{ W/(mK)}$		0.16		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5 \text{ W/(mK)}$		0.08		K/W

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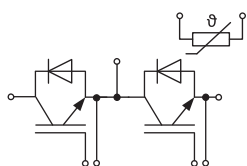
Features

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- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Remarks

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- Product reliability results valid for $T_J \leq 150^\circ\text{C}$ (recomm. Top = $-40 \dots +150^\circ\text{C}$)

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
V _F = V _{EC}	I _F = 400 A	T _j = 25 °C		2.20	2.52	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.15	2.47	V
V _{F0}	chiplevel	T _j = 25 °C		1.30	1.50	V
		T _j = 150 °C		0.90	1.10	V
r _F	chiplevel	T _j = 25 °C		2.3	2.6	mΩ
		T _j = 150 °C		3.1	3.4	mΩ
I _{RRM}	I _F = 400 A			427		A
Q _{rr}	di/dt _{off} = 7310 A/μs			62.5		μC
E _{rr}	V _{GE} = -15 V			31.5		mJ
	V _{CC} = 600 V					
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			0.19		K/W
R _{th(j-s)}	per Diode, λ _{paste} =2.5 W/(mK)			0.15		K/W
Module						
L _{CE}				15		nH
M _s	to heat sink		2		2.5	Nm
w				76		g
Temperature Sensor						
R ₁₀₀	T _c =100°C (R ₂₅ =5 kΩ)			493 ± 5%		Ω
B _{25/85}	R(T)=R ₂₅ *exp[B _{25/85} *(1/T-1/298)], [T]=K			3420		K



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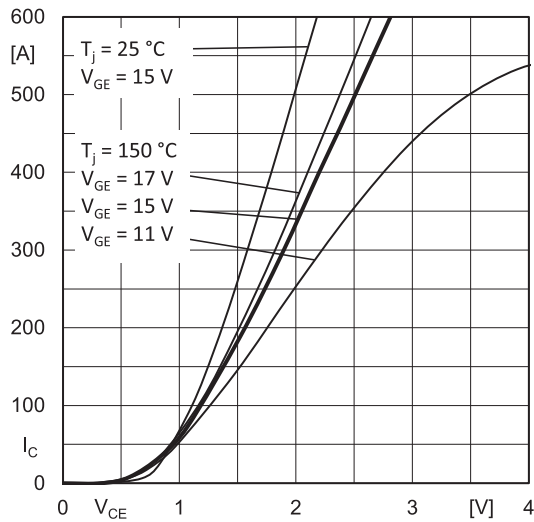


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

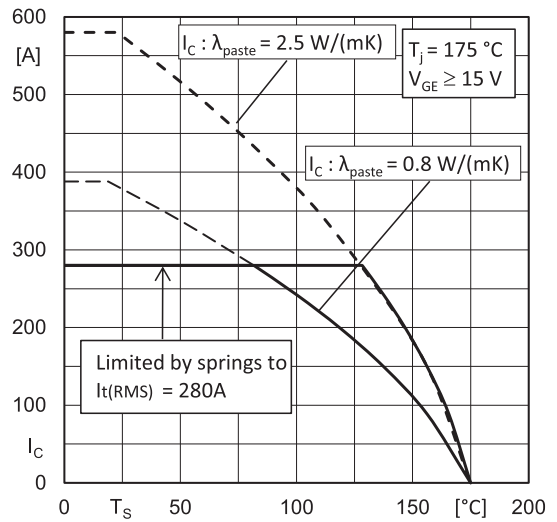


Fig. 2: Rated current vs. temperature $I_C = f(T_s)$

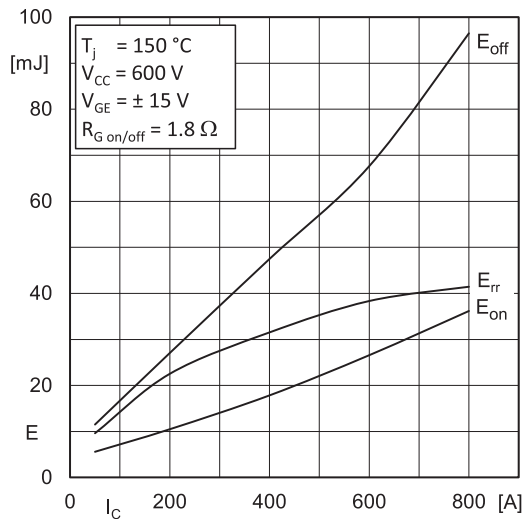


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

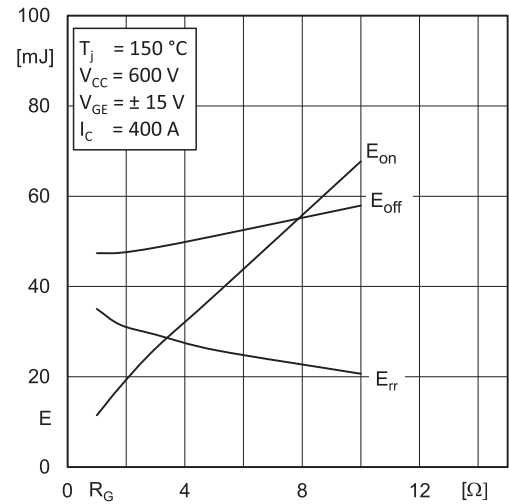


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

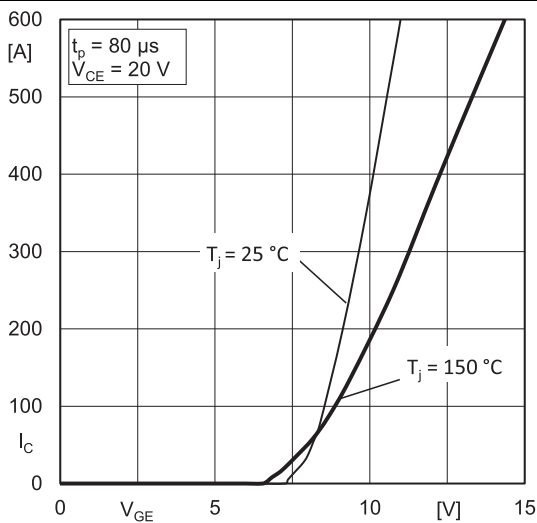


Fig. 5: Typ. transfer characteristic

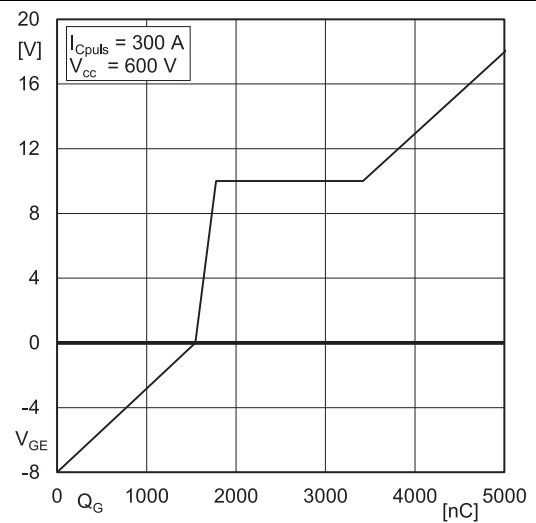


Fig. 6: Typ. gate charge characteristic

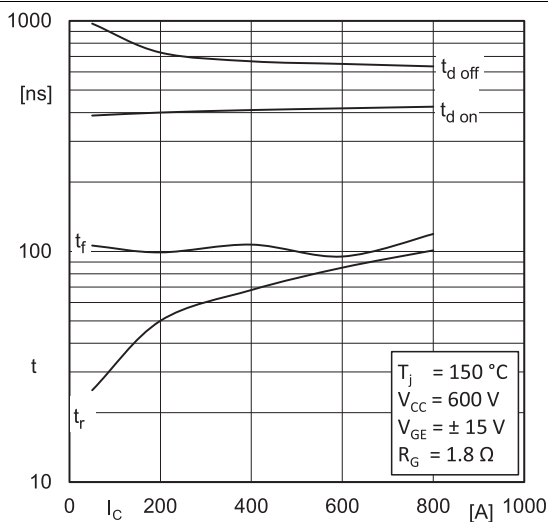


Fig. 7: Typ. switching times vs. I_C

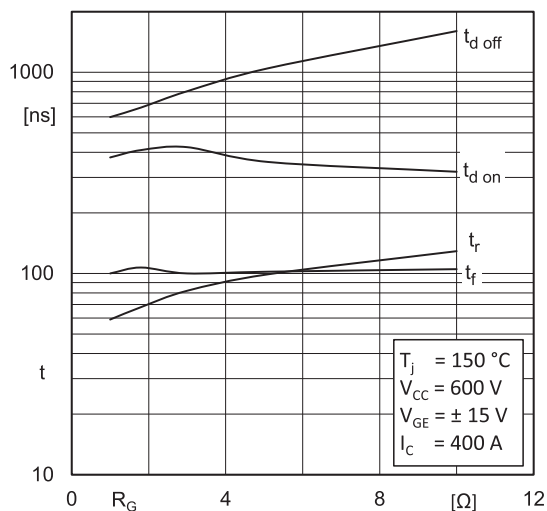


Fig. 8: Typ. switching times vs. gate resistor R_G

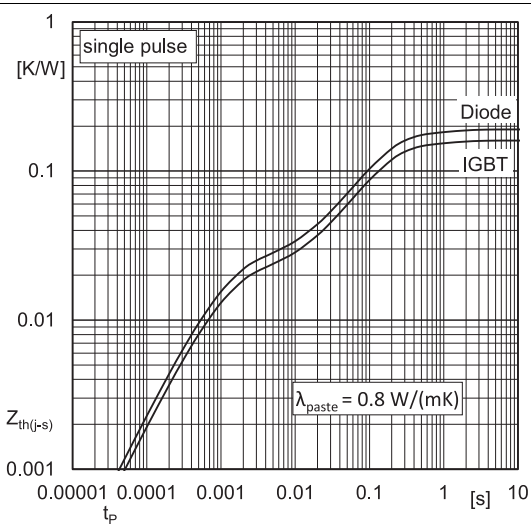


Fig. 9: Transient thermal impedance of IGBT and Diode

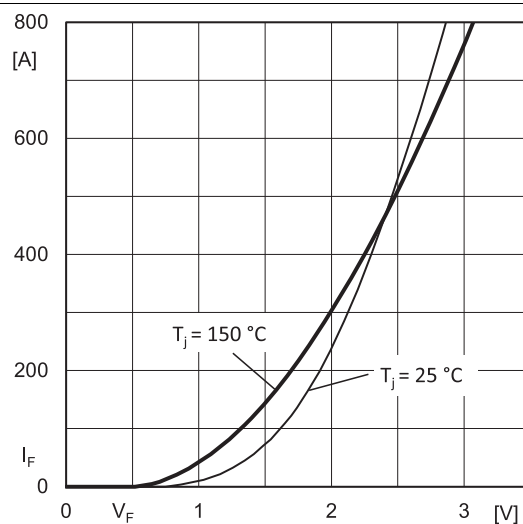


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

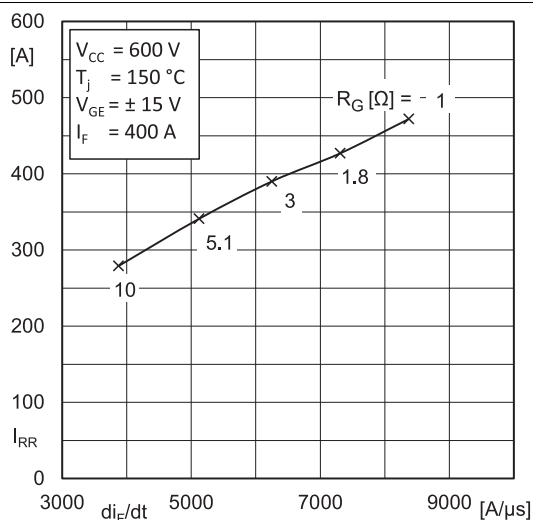


Fig. 11: Typ. CAL diode peak reverse recovery current

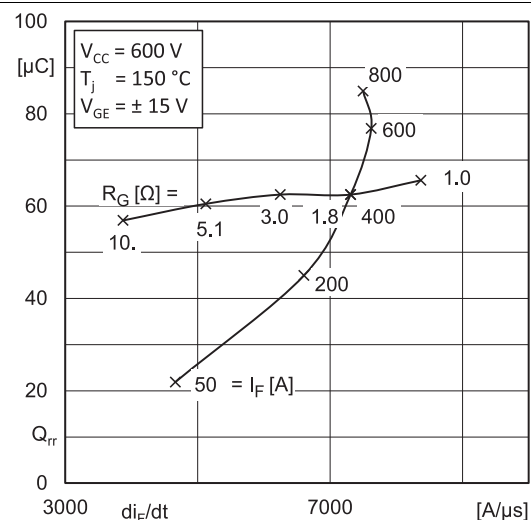
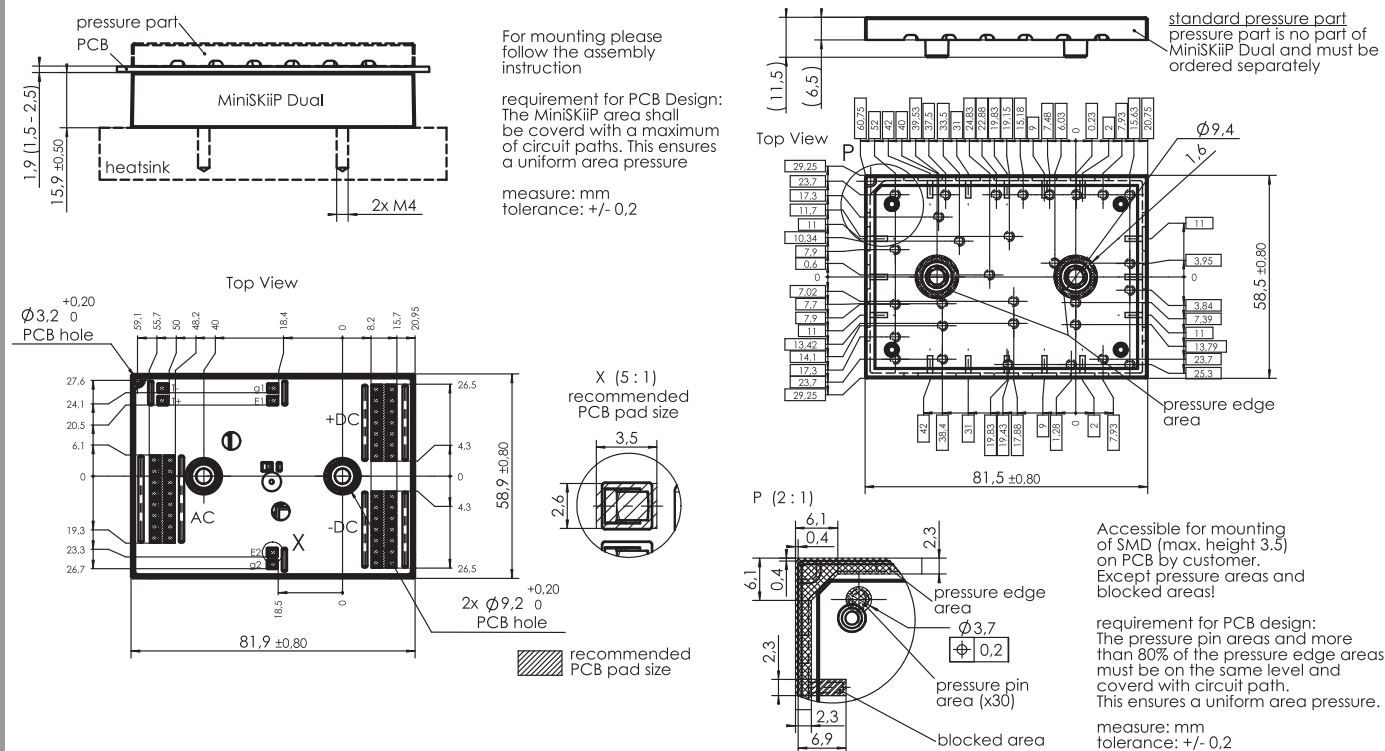
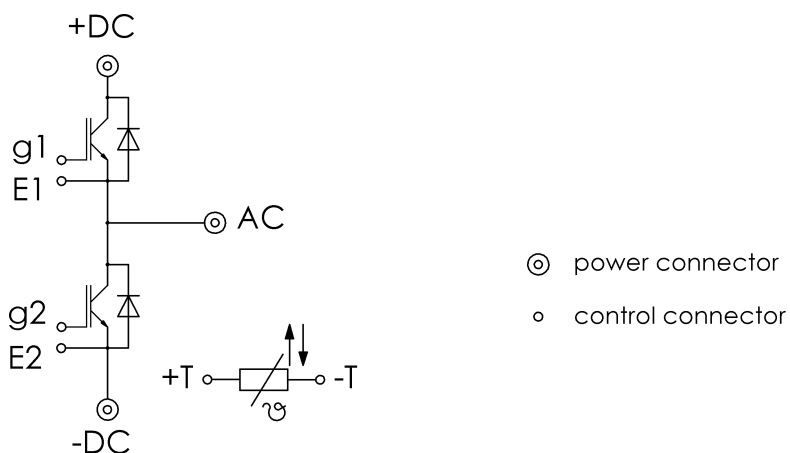


Fig. 12: Typ. CAL diode recovery charge



pinout, dimensions



pinout

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

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