Technische Information / technical information

IGBT-Module
IGBT-modules

FF300R17KE3

power electronics in motion
eupec

62mm C-Serien Modul mit Trench/Feldstop IGBT3 und EmCon3 Diode
62mm C-series module with trench/fieldstop IGBT3 and EmCon3 diode

IGBT-Wechselrichter / IGBT-inverter

Vorläufige Daten / preliminary data

Höchstzulässige Werte / maximum rated values

Kollektor-Emitter-Sperrspannung collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1700	V
Kollektor-Dauergleichstrom DC-collector current	T_C = 80°C, T_{vj} = 150°C T_C = 25°C, T_{vj} = 150°C	$I_{C\,nom}$ I_C	300 404	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	t_P = 1 ms	I_{CRM}	600	A
Gesamt-Verlustleistung total power dissipation	T_C = 25°C, T_{vj} = 150°C	P_{tot}	1450	W
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/-20	V

Charakteristische Werte / characteristic values

				min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	I_C = 300 A, V_{GE} = 15 V I_C = 300 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C	$V_{CE\,sat}$		2,00 2,40	2,45	V V
Gate-Schwellenspannung gate threshold voltage	I_C = 12,0 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	5,2	5,8	6,4	V
Gateladung gate charge	V_{GE} = -15 V ... +15 V		Q_G		3,50		µC
Interner Gatewiderstand internal gate resistor	T_{vj} = 25°C		R_{Gint}		2,5		Ω
Eingangskapazität input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		27,0		nF
Rückwirkungskapazität reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,90		nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	V_{CE} = 1700 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			3,0	mA
Gate-Emitter Reststrom gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			400	nA
Einschaltverzögerungszeit (ind. Last) turn-on delay time (inductive load)	I_C = 300 A, V_{CE} = 900 V V_{GE} = ±15 V R_{Gon} = 4,7 Ω	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,on}$		0,28 0,30		µs µs
Anstiegszeit (induktive Last) rise time (inductive load)	I_C = 300 A, V_{CE} = 900 V V_{GE} = ±15 V R_{Gon} = 4,7 Ω	T_{vj} = 25°C T_{vj} = 125°C	t_r		0,08 0,10		µs µs
Abschaltverzögerungszeit (ind. Last) turn-off delay time (inductive load)	I_C = 300 A, V_{CE} = 900 V V_{GE} = ±15 V R_{Goff} = 4,7 Ω	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,off}$		0,80 1,00		µs µs
Fallzeit (induktive Last) fall time (inductive load)	I_C = 300 A, V_{CE} = 900 V V_{GE} = ±15 V R_{Goff} = 4,7 Ω	T_{vj} = 25°C T_{vj} = 125°C	t_f		0,12 0,20		µs µs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	I_C = 300 A, V_{CE} = 900 V, L_S = 60 nH V_{GE} = ±15 V, di/dt = 3600 A/µs (T_{vj}=125°C) R_{Gon} = 4,7 Ω	T_{vj} = 25°C T_{vj} = 125°C	E_{on}		71,0 105		mJ mJ
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	I_C = 300 A, V_{CE} = 900 V, L_S = 60 nH V_{GE} = ±15 V, du/dt = 3500 V/µs (T_{vj}=125°C) R_{Goff} = 4,7 Ω	T_{vj} = 25°C T_{vj} = 125°C	E_{off}		64,0 94,0		mJ mJ
Kurzschlussverhalten SC data	V_{GE} ≤ 15 V, V_{CC} = 1000 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	t_P ≤ 10 µs, T_{vj} = 125°C	I_{SC}		1200		A
Innerer Wärmewiderstand thermal resistance, junction to case	pro IGBT per IGBT		R_{thJC}			0,085	K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro IGBT / per IGBT λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)		R_{thCH}		0,033		K/W

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Diode-Wechselrichter / diode-inverter

Höchstzulässige Werte / maximum rated values

Periodische Spitzensperrspannung repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1700	V
Dauergleichstrom DC forward current		I_F	300	A
Periodischer Spitzenstrom repetitive peak forward current	t_P = 1 ms	I_{FRM}	600	A
Grenzlastintegral I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I²t	14500	A²s

Charakteristische Werte / characteristic values

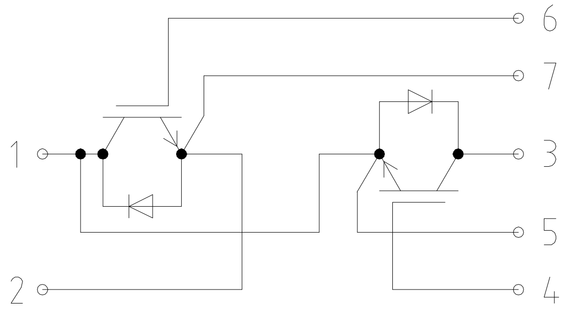
				min.	typ.	max.	
Durchlassspannung forward voltage	I_F = 300 A, V_{GE} = 0 V I_F = 300 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C	V_F		1,80 1,90	2,20	V V
Rückstromspitze peak reverse recovery current	I_F = 300 A, - di_F/dt = 3600 A/µs (T_{vj}=125°C) V_R = 900 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C	I_{RM}		350 380		A A
Sperrverzögerungsladung recovered charge	I_F = 300 A, - di_F/dt = 3600 A/µs (T_{vj}=125°C) V_R = 900 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C	Q_r		78,0 130		µC µC
Abschaltenergie pro Puls reverse recovery energy	I_F = 300 A, - di_F/dt = 3600 A/µs (T_{vj}=125°C) V_R = 900 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C	E_{rec}		40,0 72,0		mJ mJ
Innerer Wärmewiderstand thermal resistance, junction to case	pro Diode per diode		R_{thJC}			0,13	K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Diode / per diode λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)		R_{thCH}		0,051		K/W

Vorläufige Daten
preliminary data

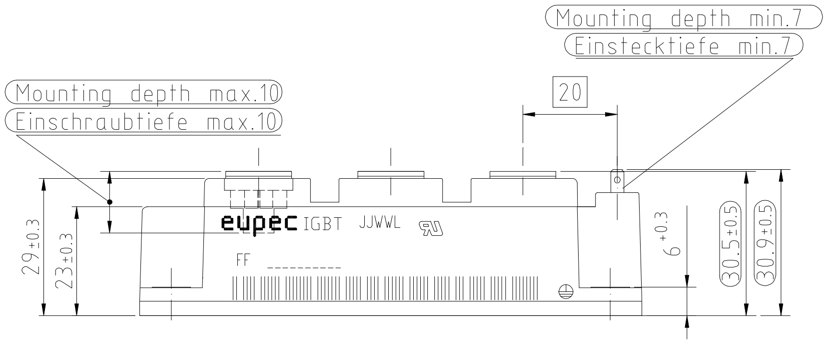
Modul / module

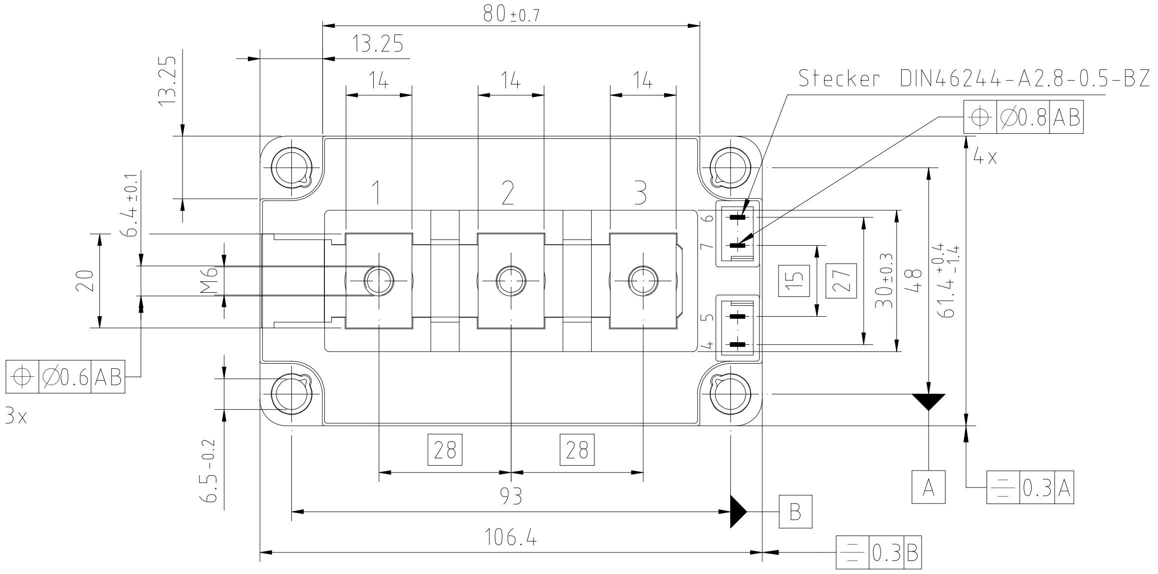
			min.	typ.	max.	
Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		3,4		kV
Material Modulgrundplatte material of module baseplate				Cu		
Material für innere Isolation material for internal insulation				Al_2O_3		
Kriechstrecke creepage distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			20,0		mm
Luftstrecke clearance distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			11,0		mm
Vergleichszahl der Kriechwegbildung comparative tracking index		CTI		> 400		
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,01		K/W
Modulinduktivität stray inductance module		L_{sCE}		20		nH
Modulleitungswiderstand, Anschlüsse - Chip module lead resistance, terminals - chip	T_C = 25°C, pro Schalter / per switch	$R_{CC'+EE'}$		0,60		mΩ
Höchstzulässige Sperrschichttemperatur maximum junction temperature	Wechselrichter, Brems-Chopper / Inverter, Brake-Chopper	$T_{vj\ max}$			150	°C
Temperatur im Schaltbetrieb temperature under switching conditions	Wechselrichter, Brems-Chopper / Inverter, Brake-Chopper	$T_{vj\ op}$	-40		125	°C
Lagertemperatur storage temperature		T_{stg}	-40		125	°C
Anzugsdrehmoment f. mech. Befestigung mounting torque	Schraube M6 - Montage gem. gültiger Applikation Note screw M6 - mounting according to valid application note	M	3,00	-	6,00	Nm
Anzugsdrehmoment f. elektr. Anschlüsse terminal connection torque	Schraube M6 - Montage gem. gültiger Applikation Note screw M6 - mounting according to valid application note	M	2,5	-	5,0	Nm
Gewicht weight		G		340		g

Schaltplan / circuit diagram



Gehäuseabmessungen / package outlines





Freimaßtoleranzen nach ISO2768 mH

General tolerance ISO2768 mH

Äz24