Technische Information / Technical Information

IGBT-Modul
IGBT-Module

FF200R33KF2C

Vorläufige Daten
Preliminary Data

IGBT,Wechselrichter / IGBT,Inverter

Höchstzulässige Werte / Maximum Rated Values

Kollektor-Emitter-Sperrspannung Collector-emitter voltage	T_{vj} = 25°C T_{vj} = -25°C	V_{CES}		3300 3300	V
Kollektor-Dauergleichstrom Continuous DC collector current	T_C = 80°C, $T_{vj\,max}$ = 150°C T_C = 25°C, $T_{vj\,max}$ = 150°C	$I_{C\,nom}$ I_C		200 330	A A
Periodischer Kollektor-Spitzenstrom Repetitive peak collector current	t_P = 1 ms	I_{CRM}		400	A
Gesamt-Verlustleistung Total power dissipation	T_C = 25°C, $T_{vj\,max}$ = 150°C	P_{tot}		2,20	kW
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 = 200 A, V_{GE} = 15 V I_C = 200 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C	$V_{CE\,sat}$		3,40 4,30	4,25 5,00	V V
Gate-Schwellenspannung Gate threshold voltage	I_C = 20,0 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	4,20	5,10	6,00	V
Gateladung Gate charge	V_{GE} = -15 V ... +15 V, V_{CE} = 1800V		Q_G		4,00		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}		25,0		nF
Rückwirkungskapazität Reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		1,40		nF
Kollektor-Emitter-Reststrom Collector-emitter cut-off current	V_{CE} = 3300 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			5,0	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, induktive Last Turn-on delay time, inductive load	I_C = 200 A, V_{CE} = 1800 V V_{GE} = ±15 V R_{Gon} = 5,6 Ω, C_{GE} = 33,0 nF	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,on}$		0,28 0,28		µs µs
Anstiegszeit, induktive Last Rise time, inductive load	I_C = 200 A, V_{CE} = 1800 V V_{GE} = ±15 V R_{Gon} = 5,6 Ω, C_{GE} = 33,0 nF	T_{vj} = 25°C T_{vj} = 125°C	t_r		0,18 0,20		µs µs
Abschaltverzögerungszeit, induktive Last Turn-off delay time, inductive load	I_C = 200 A, V_{CE} = 1800 V V_{GE} = ±15 V R_{Goff} = 7,5 Ω, C_{GE} = 33,0 nF	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,off}$		1,55 1,70		µs µs
Fallzeit, induktive Last Fall time, inductive load	I_C = 200 A, V_{CE} = 1800 V V_{GE} = ±15 V R_{Goff} = 7,5 Ω, C_{GE} = 33,0 nF	T_{vj} = 25°C T_{vj} = 125°C	t_f		0,20 0,20		µs µs
Einschaltverlustenergie pro Puls Turn-on energy loss per pulse	I_C = 200 A, V_{CE} = 1800 V, L_S = 70 nH V_{GE} = ±15 V R_{Gon} = 5,6 Ω, C_{GE} = 33,0 nF	T_{vj} = 25°C T_{vj} = 125°C	E_{on}		235 365		mJ mJ
Abschaltverlustenergie pro Puls Turn-off energy loss per pulse	I_C = 200 A, V_{CE} = 1800 V, L_S = 70 nH V_{GE} = ±15 V R_{Goff} = 7,5 Ω, C_{GE} = 33,0 nF	T_{vj} = 25°C T_{vj} = 125°C	E_{off}		215 255		mJ mJ
Kurzschlußverhalten SC data	V_{GE} ≤ 15 V, V_{CC} = 2500 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	t_P ≤ 10 µs, T_{vj} = 125°C	I_{SC}		1000		A
Wärmewiderstand, Chip bis Gehäuse Thermal resistance, junction to case	pro IGBT / per IGBT		R_{thJC}			57,0	K/kW
Wärmewiderstand, Gehäuse bis Kühlkörper Thermal resistance, case to heatsink	pro IGBT / per IGBT λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)		R_{thCH}		49,0		K/kW
Temperatur im Schaltbetrieb Temperature under switching conditions			$T_{vj\,op}$	-40		125	°C

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Vorläufige Daten
Preliminary Data

Diode, Wechselrichter / Diode, Inverter

Höchstzulässige Werte / Maximum Rated Values

Periodische Spitzensperrspannung Repetitive peak reverse voltage	T_{vj} = 25°C T_{vj} = -25°C	V_{RRM}		3300 3300	V
Dauergleichstrom Continuous DC forward current		I_F		200	A
Periodischer Spitzenstrom Repetitive peak forward current	t_P = 1 ms	I_{FRM}		400	A
Grenzlastintegral I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I²t		14,0	kA²s
Spitzenverlustleistung Maximum power dissipation	T_{vj} = 125°C	P_{RQM}		400	kW
Mindesteinschaltdauer Minimum turn-on time		$t_{on\ min}$		10,0	µs

Charakteristische Werte / Characteristic Values

			min.	typ.	max.	
Durchlassspannung Forward voltage	I_F = 200 A, V_{GE} = 0 V I_F = 200 A, V_{GE} = 0 V	V_F		2,80 2,80	3,50 3,50	V V
Rückstromspitze Peak reverse recovery current	I_F = 200 A, - di_F/dt = 1100 A/µs (T_{vj}=125°C) V_R = 1800 V V_{GE} = -15 V	I_{RM}		275 325		A A
Sperrverzögerungsladung Recovered charge	I_F = 200 A, - di_F/dt = 1100 A/µs (T_{vj}=125°C) V_R = 1800 V V_{GE} = -15 V	Q_r		120 220		µC µC
Abschaltenergie pro Puls Reverse recovery energy	I_F = 200 A, - di_F/dt = 1100 A/µs (T_{vj}=125°C) V_R = 1800 V V_{GE} = -15 V	E_{rec}		125 255		mJ mJ
Wärmewiderstand, Chip bis Gehäuse Thermal resistance, junction to case	pro Diode / per diode	R_{thJC}			108	K/kW
Wärmewiderstand, Gehäuse bis Kühlkörper Thermal resistance, case to heatsink	pro Diode / per diode λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		93,0		K/kW
Temperatur im Schaltbetrieb Temperature under switching conditions		$T_{vj\ op}$	-40		125	°C