





Typenbezeichnungen und Abkürzungen

Short Form Catalog 2013

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Type designation

IGBT Modules

FF	400	R33	K	F	x	example for an IGBT module
FZ						single switch with one IGBT and FWD
FF						half bridge (two IGBTs an FWDs)
FP						Power Integrated Module
FM						Matrix Module
FD/DF						chopper module
FB						Integrated modules in B2 configuration with IGBT & NTC
DD						dual diode module
FR						Switched Reluctance Modul
F3L						3-level configuration
FS3L						3-level 3 phase bridge
FT						tripack
F4						fourpack
F5						fivepack
FS						sixpack
	400					max. DC-collector current (A)
		R				reverse conducting
		S				fast Diode
		33				collector-emitter-voltage in 100 V
			K/H/I/M/N/O/P			mechanical construction:
			W/V/X/Y			module
			F			fast switching type
			H			high speed IGBT
			J			SiC JFET
			L			type with low V_{CEsat}
			M			MOSFET Chip
			S			fast short tail IGBT Chip
			E			low sat and fast trench IGBT
			T			fast trench IGBT
			P			soft switching trench IGBT
				1 ... n		internal reference numbers
				C		Emitter Controlled
				D		higher Diode current
				F		very fast Diode
				G		module in big housing
				I		integrated cooling
				P		with pre applied TIM
				R		reduced number of pins
				T		low temperature type
				-K		design with common cathode
				B1 ... n		Construction variation
				S1 ... n		Electrical selection

MIPAQ

IFF	150	B	12	N3	T	4		
I								MIPAQ™ family
FF								dual switch
FZ								single switch
FT								tripack
FS								3 phase full bridge
FP								power integrated module
	150							max. DC-collector current in A
								integration level:
		B						with current sensors
		S						with full digital current measurement
		V						with gate driver and temperature measurement
			12					collector-emitter-voltage in 100V
								mechanical construction: module
				N1..3				EconoPACK™ 1..3
				P				EconoPACK™ 4
				U1..3				package: Smart1..3
								chip technology
					S			fast short tail IGBT chip
					E			low sat and fast IGBT chip
					T			fast trench IGBT
					P			soft switching trench IGBT
						1..n		internal reference
							B1..n	construction variation
							S1..n	electrical selection

Type designation

IGBT Modules

BSM	100	GB	120	DL	x	example for a IGBT module with an old designation
BSM						switch with IGBT and FWD
BYM						diode module
	100					max. DC-collector current (A)
		GA				single switch with one IGBT and FWD
		GB				half bridge (two IGBTs and FWDs)
		GD				3 phase full bridge (6-pack)
		GT				3 single switches with FWDs (tripack)
		GP				Power Intergrated Module B6/Break/Inverter
		GAL				chopper module (diode on collector side)
		GAR				chopper module (diode on emitter side)
		A				single diode
			120			collector-emitter-voltage in 10 V
				DL		Typ with low V_{CEsat}
				DN2		fast switching type
				DLC		low loss type with Emitter Controlled Diode
				S		with collector sense
				G		Design Variation
				Exxx		special type

Bridge Rectifiers and AC-Switches

TD	B6	H	K	135	N	16	L	OF	
DD									diode module
TT									thyristor module
TD									thyristor/diode
	B6								three phase bridge
	W3								three phase AC-switch
		C							fully controlled
		H							half controlled
		U							uncontrolled
			K						common cathode of thyristors
				135					output current (A) (W3C: RMS-current)
					N				phase control thyristor/diode
						16			repetitive peak off-state voltage in 100 V
							L		eupec™ IsoPACK™
							R		EconoBRIDGE™ without integr. brake chopper IGBT
							RR		EconoBRIDGE™ with integr. brake chopper IGBT
								O	no guaranteed turn-off time
								F	critical rate of rise of off-state voltage

Type designation

Presspacks

T640	N	18	T	O	F	
T						thyristor
D						diode
930						average on state current (A)
0						standard ceramic disc
1						high power ceramic disc
3						light triggered thyristor, ceramic disc
	N					phase control device
	K					phase control diode with cathode
						on case (only flatbase or stud)
	S					fast diode
	U					fast diode with cathode on case
						(only flatbase or metric)
	A					avalanche diode with anode on case
	B					avalanche diode with cathode
						on case (only flatbase or metric)
	NH					Diode: soft recovery for high current
						pulses
						Thyristor: high turn-on di/dt capability
	SH					softrecovery diode
		18				repetitive peak off-state and
						reverse voltage in 100 V
			B			metric thread with cable
			C			metric thread with solder pin
			E			flat base
			T			disc
				O		no guaranteed turn off time
						critical rate of off-state voltage
					C	500 V/µs
					F	1000 V/µs
					G	1500 V/µs
					H	2000 V/µs
					B01...n	contruction variation
					S01...n	electrical selection

PowerBLOCK Modules

TT	162	N	16	K	O	F	-K	
TT								with 2 thyristors
DD								with 2 diodes
ND, DZ, TZ								with 1 thyristor or 1 diode
TD, DT								with 1 thyristor and 1 diode
	162							average on state current (A)
		N						phase control device
		S						fast diode
			16					repetitive peak off-state and
								reverse voltage in 100 V
				K				mechanical construction: module
				A				mechanical construction: module
					O			no guaranteed turn off time
						F		critical rate of rise of off-state
								voltage (see disc devices)
							-K	design with common cathode
							-A	design with common anode
							B01...n	construction variation
							S01...n	electrical selection

Letter Symbols

B	DC current gain
FBSOA	forward biased safe operating area
f	frequency
f_o	repetition frequency
F	clamping force
G	weight
I_C	maximum permissible DC collector current
I_{CAVM}	maximum permiss. average collector current
I_{CES}	collector-emitter cut-off current
I_{GES}	gate-leakage current
I_{CRM}	permissible repetitive peak collector current
i_D	forward off-state current
i_G	gate current
I_{GD}	gate non trigger current
i_{GM}	peak gate current
I_{GT}	gate trigger current
I_H	holding current
I_L	latching current
i_R	reverse current
I_{RMS}	RMS current
I_{RM}	peak reverse recovery current
i_T/i_F	on-state current
I_{TAV}/I_{FAV}	on-state current (average value)
I_{TAVM}/I_{FAVM}	maximum average on-state current
I_{TINT}/I_{FINT}	on-state current at intermittent duty
I_{TM}/I_{FM}	on-state current (peak value)
$I_{T(OV)}/I_{F(OV)}$	on-state current at shorttime duty
$I_{T(OV)M}/I_{F(OV)M}$	maximum overload on-state current
$I_{T(RC)M}$	repetitive turn-on current (from snubber)
I_{TRMSM}/I_{FRMSM}	maximum RMS on-state current
I_{TSM}/I_{FSM}	surge non repetitive on-state current
I_F	DC forward current
I_{FRM}	repetitve peak forward current
$\int i^2\,dt$	I^2t value
di_G/dt	rate of rise of gate current
$di_T/dt/di_F/dt$	rate of rise of on-state current
$(di/dt)_{cr}$	critical rate of rise of on-state current
L	inductance
M	mounting torque
P_{ON}	turn-on dissipation
P_{OFF}	turn-off dissipation
P	power dissipation
P_D	forward off-state dissipation
P_G	gate dissipation
P_R	reverse power dissipation
P_{RQ}	turn-off dissipation
$P_{TT} + P_{RQ}$	switching dissipation
P_T/P_F	on-state power dissipation
P_{TAV}/P_{FAV}	on-state power dissipation (average value)
P_{TT}	turn-on dissipation
P_{tot}	total power dissipation
Q_r	recovered charge
Q_s	lag charge
R	resistance
r_T	slope resistance
R_{thCA}	thermal resistance, case to coolant
R_{thCK}	thermal resistance, case to heatsink
R_{thJA}	thermal resistance, junction to coolant
R_{thJC}	thermal resistance, junction to case
RBSOA	reverse biased safe operating area
t	time
T	period
T_A	coolant temperature
T_C	case temperature
T_{op}	operating temperature
t_g	trigger pulse duration
t_{gd}	gate controlled delay time
T_h	heatsink temperature
t_p	current pulse duration (sinusoidal)
t_q	circuit commutated turn-off time
t_{rr}	reverse recovery time
T_{vj}	junction temperature
$T_{vj\,max}$	maximum permissible junction temperature
t_w	current pulse duration (trapezoidal)
t_f	fall time
t_{off}	turn-off time
t_{on}	turn-on time
t_s	storage time
$T_{vj\,op}$	junction operating temperature
T_{stg}	storage temperature
v_D	forward off-state voltage
v_{DM}	forward off-state voltage (peak value)
V_{DRM}	repetitive peak forward off-state voltage
V_{DSM}	non-repetitive peak forward off-state voltage
v_G	gate voltage
V_{GD}	gate non trigger voltage
$V_{GE\,(th)}$	gate threshold voltage
V_{GT}	gate trigger voltage
V_{ISOL}	insulation test voltage
v_L	no-load voltage of trigger pulse generator
v_R	reverse voltage
V_R	direct reverse voltage
$V_{R(D)}$	continuous diode reverse voltage
V_{RG}	reverse gate voltage
V_{RGM}	peak reverse gatevoltage
v_{RM}	reverse voltage (peak value)
V_{RMS} V_{DC}	RMS or DC voltage value
V_{RRM}	repetitive reverse voltage
$V_{RRM(C)}$	repetitive peak reverse voltage after commutation
V_{RSM}	non-repetitive peak reverse voltage
v_T/v_F	on-state voltage
$V_{(TO)}$	threshold voltage
V_M	repetitive peak voltage
$V_{CE\,sat}$	collector-emitter saturation voltage
V_{CES}, V_{CE}	maximum permissible collector-emitter voltage
dv_D/dt	rate of rise of forward off-state voltage
dv_R/dt	rate of rise of reverse voltage
$(dv/dt)_{cr}$	critical rate of rise of off-state voltage
V_L	air quantity
V_W	water quantity
W	energy
W_{tot}	total energy
Z_{thCA}	transient thermal impedance, case to coolant
Z_{thJA}	transient thermal impedance, junction to coolant
Z_{thJC}	transient thermal impedance, junction to case
Q	current conduct. angle

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