V_{CE} = 2500 V
I_C = 2000 A

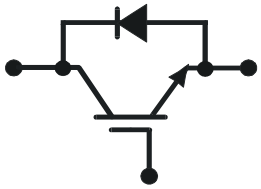


ABB StakPak™ H Series Press-pack IGBT

5SNR 20H2501

PRELIMINARY

Doc. No. 5SYA1582-03 May. 07

- **High SOA**
- **Fails into stable shorted state**
- **High tolerance to uneven mounting pressure**
- **Designed for series connection**
- **Explosion resistant package**
- **Modular design concept, available for a wide range of current ratings**
- **SPT chip set**

Maximum Rated Values[1)]

Parameter[2)]	Symbol	Conditions	min	max	Unit
Collector-emitter voltage	V_{CES}			2500	V
DC collector current	I_C	T_c = 75 °C		2000	A
Repetitive peak collector current	I_{CM}			4000	A
Gate-emitter voltage	V_{GES}			± 20	V
Total power dissipation	P_{tot}	T_c = 25 °C, (IGBT)		18000	W
DC forward current	I_F	T_c = 75 °C		2000	A
Repetitive peak forward current	I_{FM}			4000	A
Surge current	I_{FSM}	V_R = 0 V, t_p = 10 ms, T_{vj} = 125 °C, half-sinewave		23	kA
IGBT short circuit SOA	t_{psc}	V_{CC} = 1500 V, $V_{CEM} \leq$ 2500 V, $V_{GE} \leq$15V		10	µs
Junction temperature	T_{vj}		5	125	°C
Storage temperature	T_{stg}		-40	70	°C
Mounting force [2)]	F_M		65	95	kN

[1)]Maximum rated values indicate limits beyond which damage to the device may occur per IEC 60747-9

[2)]For detailed mounting instructions refer to ABB document no. 5SYA 2037-02

IGBT Characteristic Values[3)]

Parameter	Symbol	Conditions		min	typ	max	Unit
Collector-emitter saturation voltage	V_{CEsat}	I_C = 2000 A, V_{GE} = 15 V	T_{vj} = 25°C		2.20	2.60	V
			T_{vj} = 125°C		2.70	3.00	V
Collector cut-off current	I_{CES}	V_{CE} = 2500 V, V_{GE} = 0 V,	T_{vj} = 125 °C		35	100	mA
Gate leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V,	T_{vj} = 125 °C			±500	nA
Gate-emitter threshold voltage	$V_{GE(TO)}$	I_C = 360 mA, V_{CE} = V_{GE},	T_{vj} = 25 °C	5	7	8.5	V
Turn-on energy	E_{on}	V_{CC} = 1250 V, I_C = 2000 A, R_G = 3.9 Ω, V_{GE} = ±15 V, L_σ = 200 nH inductive load	T_{vj} = 25°C		3.0		J
			T_{vj} = 125°C		4.0		J
Turn-off energy	E_{off}	V_{CC} = 1250 V, I_C = 2000 A, R_G = 3.3 Ω, V_{GE} = ±15 V, L_σ = 200 nH inductive load	T_{vj} = 25°C		3.0		J
			T_{vj} = 125°C		3.6		J

[3)]Characteristic values according to IEC 60747-9

Diode Characteristic Values[4)]

Parameter	Symbol	Conditions		min	typ	max	Unit
Forward voltage	V_F	I_F = 2000 A	T_{vj} = 25°C		1.95	2.20	V
			T_{vj} = 125°C		1.90	2.20	V
Reverse recovery current	I_{rr}	V_{CC} = 1250 V, I_F = 2000 A, R_G = 3.9 Ω, V_{GE} = ±15 V, L_σ = 200 nH inductive load	T_{vj} = 25°C		1100		A
			T_{vj} = 125°C		1600		A
Reverse recovery charge	Q_{rr}		T_{vj} = 25°C		1000		µC
			T_{vj} = 125°C		1900		µC
Reverse recovery time	t_{rr}		T_{vj} = 25°C		1.7		µs
			T_{vj} = 125°C		1.8		µs
Reverse recovery energy	E_{rec}		T_{vj} = 25°C		0.9		J
			T_{vj} = 125°C		1.7		J

[4)]Characteristic values according to IEC 60747-2

Thermal Properties

Parameter	Symbol	Conditions	min	typ	max	Unit
IGBT thermal resistance junction to case	$R_{th(j-c)}$ IGBT				5.5	K/kW
Diode thermal resistance junction to case	$R_{th(j-c)}$ Diode				11	K/kW
IGBT thermal resistance case to heatsink	$R_{th(c-h)}$ IGBT	Heatsink flatness : Complete module area < 100 µm Each submodule area < 50 µm Roughness : < 6.3 µm			1	K/kW
Diode thermal resistance case to heatsink	$R_{th(c-h)}$ Diode				2	K/kW
Operating junction temperature	T_{vjop}		5		125	°C

Mechanical Properties

Parameter	Symbol	Conditions	min	typ	max	Unit
Dimensions	L* W* H	Typical , see outline drawing		236*150*26		mm
Clearance distance	D_C	acc. IEC 60664-1 and EN50124-1	10			mm
Surface creepage distance	D_{SC}	acc. IEC 60664-1 and EN50124-1	23			mm
Weight				2.2		kg

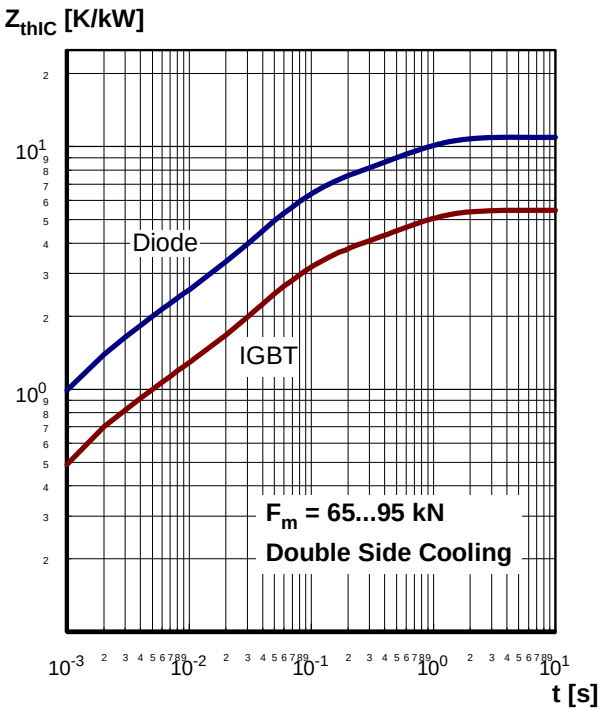


Fig.15 Maximum thermal impedance of IGBT and diode versus time

Analytical function for transient thermal impedance:

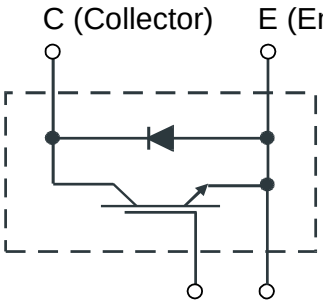
$$Z_{th\,(j-c)}(t) = \sum_{i=1}^{n} R_i\left(1 - e^{-t/\tau_i}\right)$$

	i	1	2	3	4
IGBT	Ri(K/kW)	2.284	2.306	0.472	0.402
	τ_i(ms)	580.8	53.11	3.286	0.609
DIODE	Ri(K/kW)	4.569	4.611	0.945	0.804
	τ_i(ms)	580.8	53.11	3.286	0.609

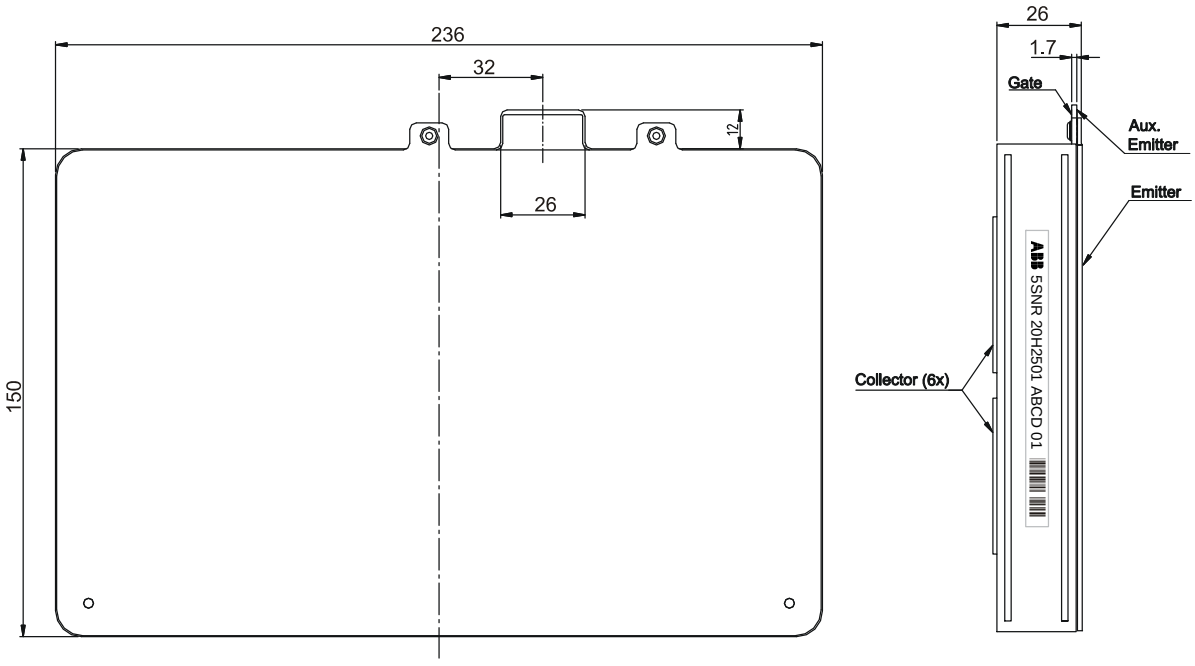
Environmental class according to IEC 60721

Mode	Class	Document - no.
Storage	IE 11	5 SZK 9101-01
Transportation	IE 23	5 SZK 9102-01
Operation	IE 33	5 SZK 9103-01

Electrical configuration



Outline drawing



StakPak H6

This is an electrostatic sensitive device.
Please observe the international standard IEC 60747-1, chapter IX.
This product has been designed and qualified for Industrial Level

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