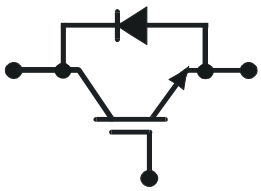
V_{CE} = 1700 V

I_C = 2400 A



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- **Low-loss, rugged SPT chip-set**
- **Smooth switching SPT chip-set for good EMC**
- **Industry standard package**
- **High power density**
- **AlSiC base-plate for high power cycling capability**
- **AlN substrate for low thermal resistance**

Maximum rated values [1)]

Parameter	Symbol	Conditions	min	max	Unit
Collector-emitter voltage	V_{CES}	V_{GE} = 0 V, $T_{vj} \geq$ 25 °C		1700	V
DC collector current	I_C	T_c = 80 °C		2400	A
Peak collector current	I_{CM}	t_p = 1 ms, T_c = 80 °C		4800	A
Gate-emitter voltage	V_{GES}		-20	20	V
Total power dissipation	P_{tot}	T_c = 25 °C, per switch (IGBT)		14300	W
DC forward current	I_F			2400	A
Peak forward current	I_{FRM}			4800	A
Surge current	I_{FSM}	V_R = 0 V, T_{vj} = 125 °C, t_p = 10 ms, half-sinewave		20000	A
IGBT short circuit SOA	t_{psc}	V_{CC} = 1200 V, $V_{CEM\,CHIP} \leq$ 1700 V $V_{GE} \leq$ 15 V, $T_{vj} \leq$ 125 °C		10	µs
Isolation voltage	V_{isol}	1 min, f = 50 Hz		4000	V

Diode characteristic values [5]

Parameter	Symbol	Conditions		min	typ	max	Unit
Forward voltage [6]	V_F	I_F = 2400 A	T_{vj} = 25 °C		1.65	2.0	V
			T_{vj} = 125 °C		1.7	2.0	
Reverse recovery current	I_{rr}	V_{CC} = 900 V, I_F = 2400 A, V_{GE} = ±15 V, R_G = 0.56 Ω L_σ = 60 nH inductive load	T_{vj} = 25 °C		1520		A
			T_{vj} = 125 °C		1880		
Recovered charge	Q_{rr}		T_{vj} = 25 °C		590		µC
			T_{vj} = 125 °C		1025		
Reverse recovery time	t_{rr}		T_{vj} = 25 °C		580		ns
			T_{vj} = 125 °C		870		
Reverse recovery energy	E_{rec}		T_{vj} = 25 °C		420		mJ
			T_{vj} = 125 °C		720		

[5] Characteristic values according to IEC 60747 – 2
[6] Forward voltage is given at chip level

Thermal properties [7]

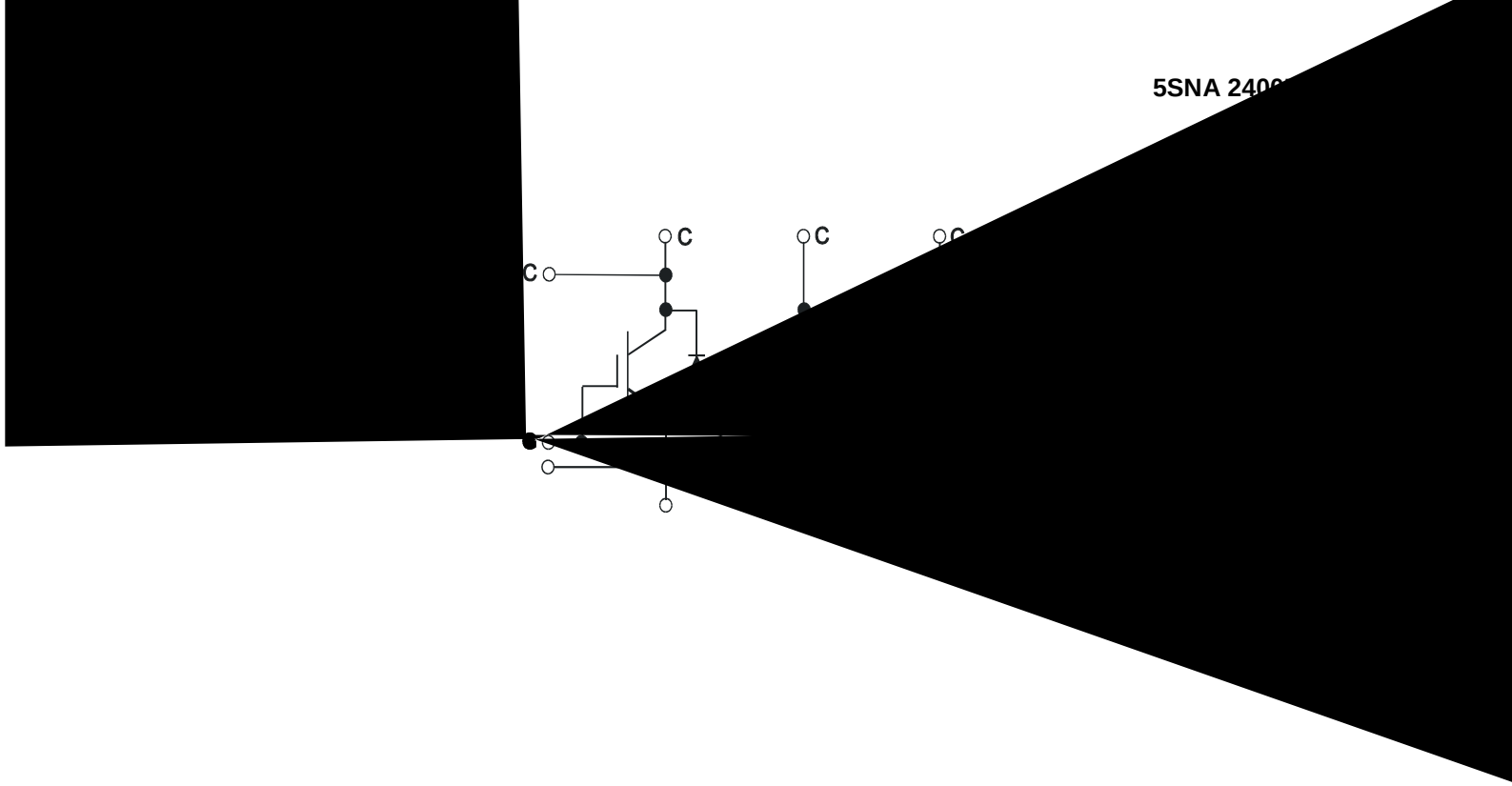
Parameter	Symbol	Conditions	min	typ	max	Unit
IGBT thermal resistance junction to case	$R_{th(j-c)IGBT}$				0.007	K/W
Diode thermal resistance junction to case	$R_{th(j-c)DIODE}$				0.012	K/W
IGBT thermal resistance case to heatsink [2]	$R_{th(c-s)IGBT}$	IGBT per switch, λ grease = 1W/m x K		0.009		K/W
Diode thermal resistance case to heatsink [7]	$R_{th(c-s)DIODE}$	Diode per switch, λ grease = 1W/m x K		0.018		K/W

[2] For detailed mounting instructions refer to ABB Document No. 5SYA2039

Mechanical properties [7]

Parameter	Symbol	Conditions		min	typ	max	Unit
Dimensions	L x W x H	Typical , see outline drawing		190 x 140 x 38			mm
Clearance distance in air	d_a	according to IEC 60664-1 and EN 50124-1	Term. to base:	23			mm
			Term. to term:	19			
Surface creepage distance	d_s	according to IEC 60664-1 and EN 50124-1	Term. to base:	33			mm
			Term. to term:	32			
Mass	m				1500		g

[7] Thermal and mechanical properties according to IEC 60747 – 15



2) For detailed mounting instructions refer to ABB Document No. 5SYA2039. Thin greases or non-uniform

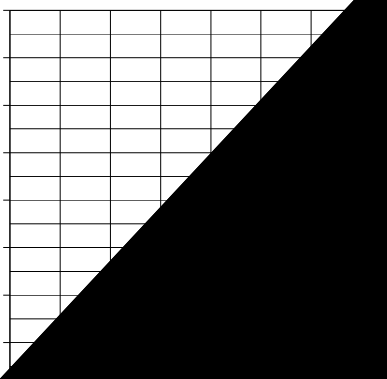


Fig 4.3 Typical [redacted] chip level

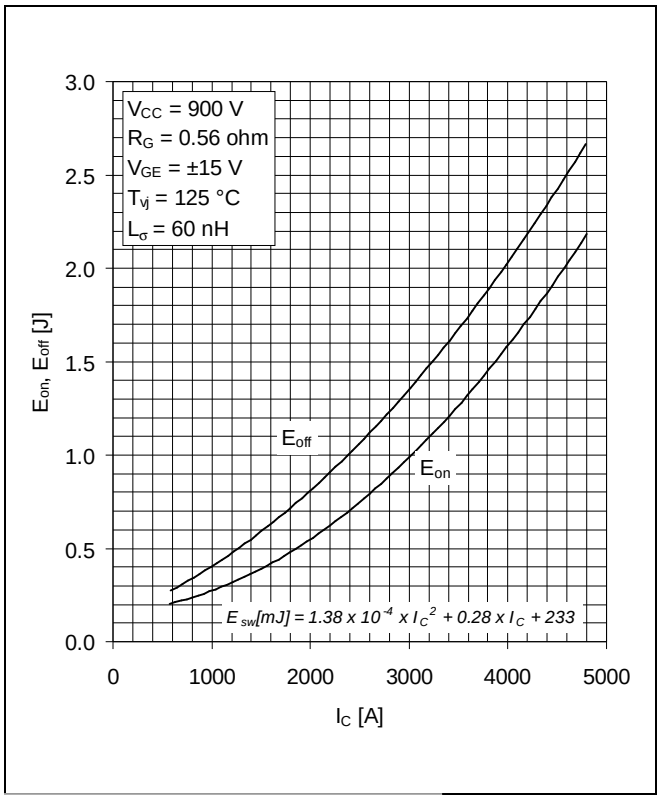


Fig. 5 Typical switching energies per pulse vs collector current

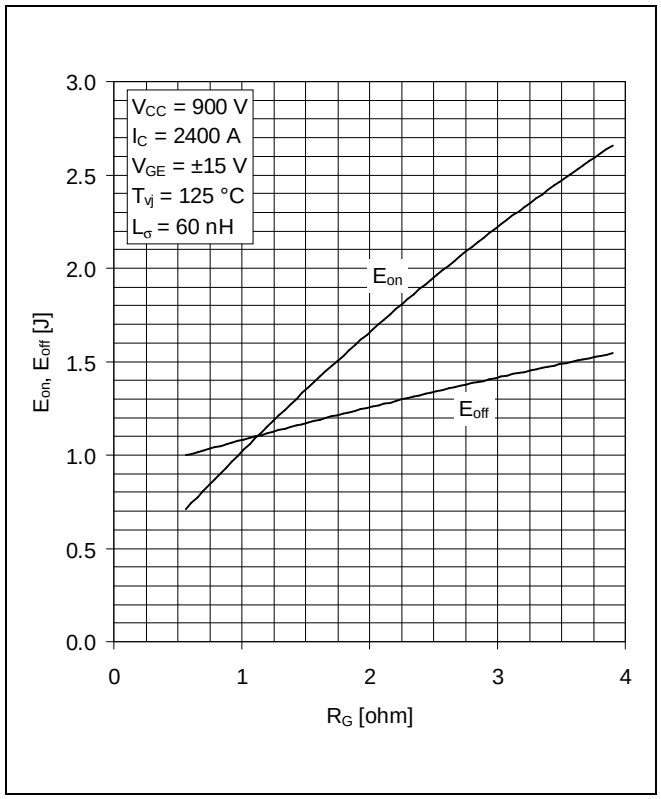
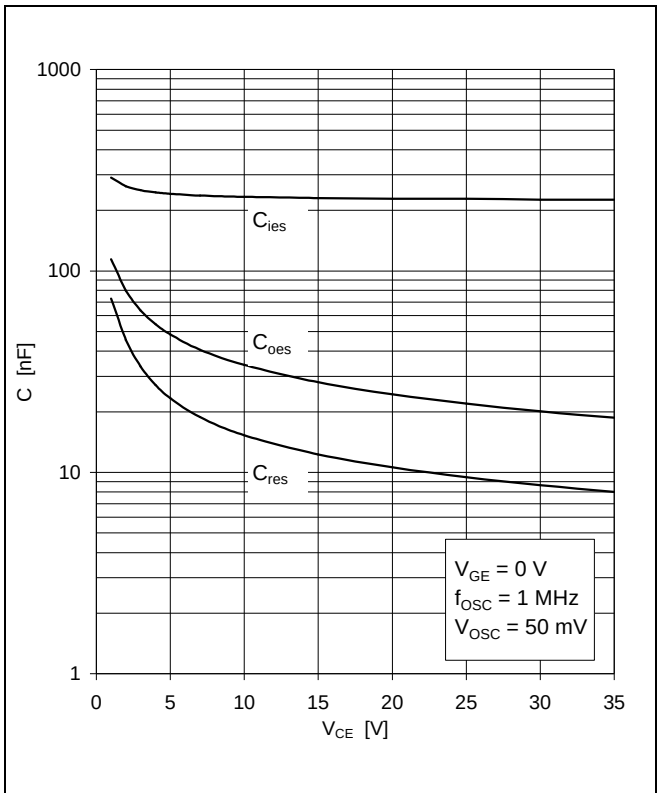


Fig. 6 Typical switching energies per pulse vs gate resistor



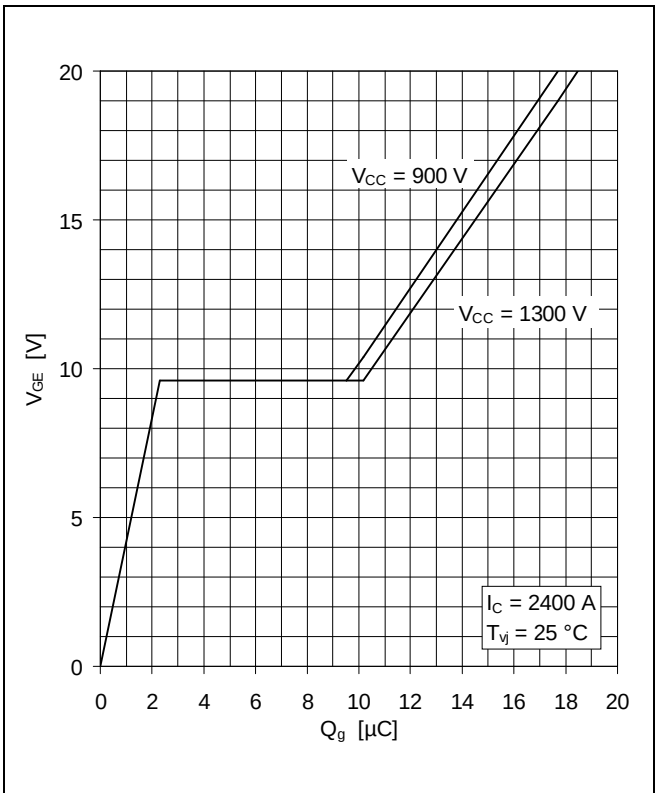
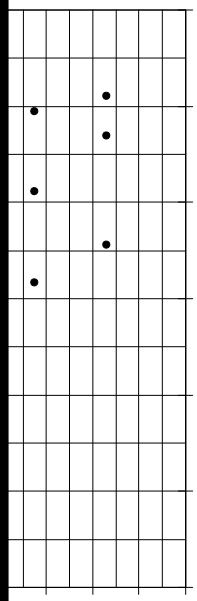


Fig. 9 Typical cat15



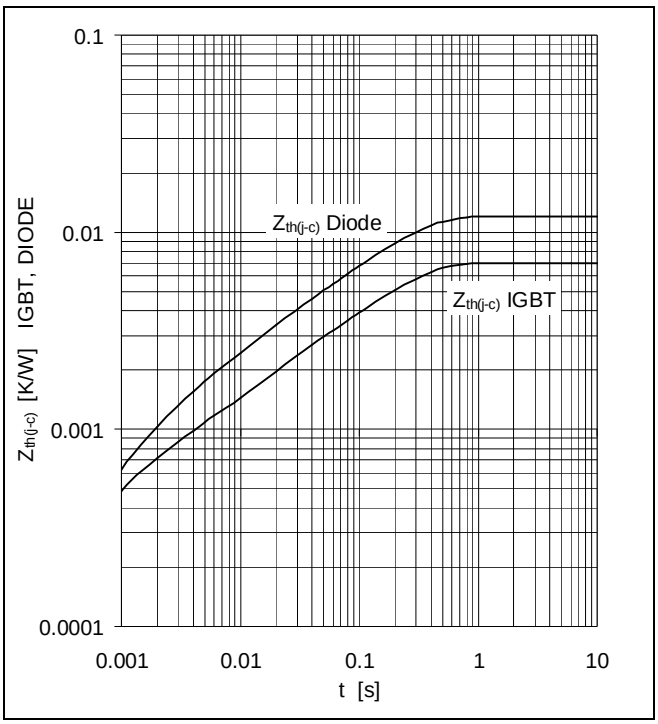


Fig. 16 Thermal impedance vs time

Analytical function for transient thermal impedance:

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

	i	1	2	3	4	
IGBT	R_i(K/kW)	5.059	1.201	0.495	0.246	
	τ_i(ms)	202.9	20.3	2.01	0.52	
DIODE	R_i(K/kW)	8.432	1.928	0.866	0.839	
	τ_i(ms)	210	29.6	7.01	1.49	

For detailed information refer to:

- 5SYA 2042-02 Failure rates of HiPak modules due to cosmic rays
- 5SYA 2043-01 Load – cycle capability of HiPaks
- 5SZK 9120-00 Specification of environmental class for HiPak (available upon request)

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