Insulated Gate Bipolar Transistor Type SA45AO0160GA

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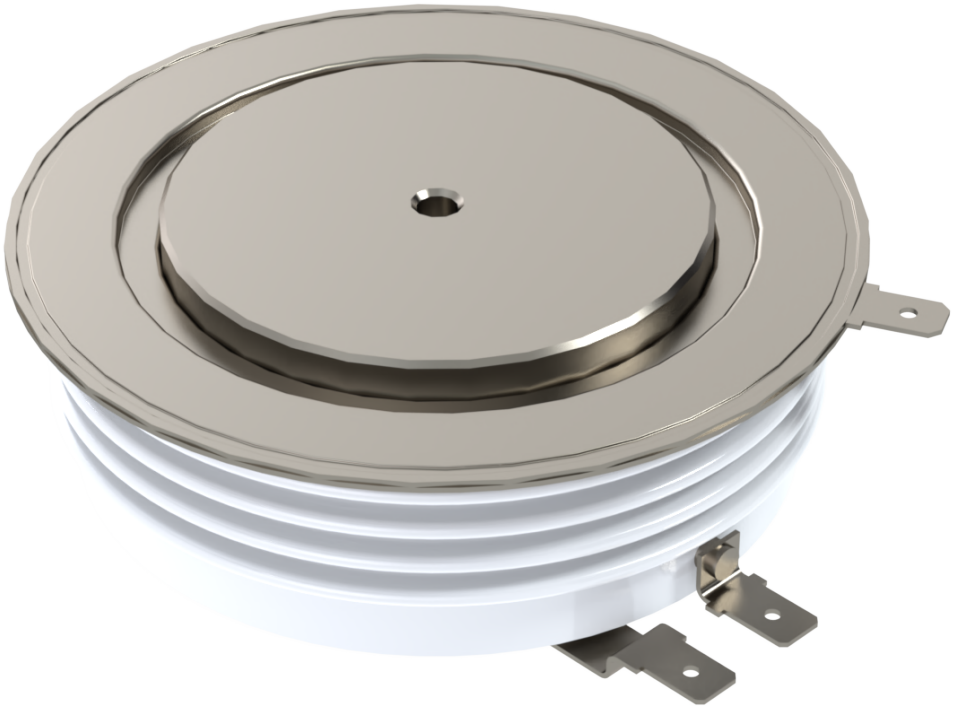

ORDERING INFORMATION						(Please quote 12 to 15 digit code as below)
SA	45	AO	0160	G	A	
-	Voltage Code	Outline Code	Current code	Type code	Special code	Optional code

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Absolute Maximum Ratings

	VOLTAGE RATINGS	MAXIMUM LIMITS	UNITS
V_{CES}	Collector-emitter voltage	4500	V
V_{DClink}	Permanent DC voltage for 100 FIT failure rate	2800	V
V_{GES}	Peak gate - emitter voltage	±20	V

	OTHER RATINGS	MAXIMUM LIMITS	UNITS
I_C	DC collector current, IGBT	160	A
I_{CRM}	Repetitive peak collector current, t_p = 1ms, IGBT	320	A
$I_{F(DC)}$	Continuous DC forward current, Diode	160	A
I_{FRM}	Repetitive peak forward current, t_p = 1ms, Diode	320	A
I_{FSM}	Peak non-repetitive surge t_p = 10ms, V_{RM} = 60%V_{RRM}, Diode (note 4)	690	A
I_{FSM2}	Peak non-repetitive surge t_p = 10ms, $V_{RM} \leq$ 10V, Diode (note 4)	760	A
P_{MAX}	Maximum power dissipation, IGBT (note 2)	1.47	kW
$(di/dt)_{cr}$	Critical diode di/dt (note 3)	300	A/µs
T_j	Operating temperature range	-40 to +125	°C
T_{stg}	Storage temperature range	-40 to +125	°C
note 1)	Unless otherwise indicated T_j = 125°C		
note 2)	T_{sink} = 25°C, doublesidecooled		
note 3)	Maximum commutation loop inductance 200 nH		
note 4)	Half-sinewave, 125°C T_j initial.		

IGBT Characteristics

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C = 160A, V_{GE} = 15V, T_j = 25°C	-	2.57	2.97	V
		I_C = 160A, V_{GE} = 15V	-	3.40	3.80	V
V_{T0}	Threshold voltage	Current range: 53.3A-160A	-	-	1.84	V
r_T	Slope resistance		-	-	1.97	mΩ
$V_{GE(TH)}$	Gate threshold voltage	V_{CE} = V_{GE}, I_C = 18mA	-	5.3	-	V
I_{CES}	Collector-emitter cut-off current	V_{CE} = V_{CES}, V_{GE} = 0V	-	10	25	mA
I_{GES}	Gate leakage current	V_{GE} = ±20V	-	-	±10	µA
C_{ies}	Input capacitance	V_{CE} = 25V, V_{GE} = 0V, f=1MHz	-	135	-	nF
$t_{d(on)}$	Turn-on delay time	I_C = 160A, V_{CE} = 2800V, di/dt = 300A/µs, V_{GE} = ±15V, L_S = 200nH, $R_{g(ON)}$ = 33Ω, $R_{g(OFF)}$ = 38Ω, C_{GE} = 22nF Integral diode used aus freewheel diode (notes 1 & 2)	-	1.7	-	µs
t_r(V)	Rise time		-	1.8	-	µs
$Q_{g(on)}$	Turn-on gate charge		-	21	-	µC
E_{on}	Turn-on energy		-	2.6	-	J
$t_{d(off)}$	Turn-off delay time		-	5.3	-	µs
t_f(I)	Fall time		-	1.5	-	µs
$Q_{g(off)}$	Turn-off gate charge		-	13	-	µC
E_{off}	Turn-off energy		-	2.7	-	J
I_{SC}	Short circuit current	V_{GE} = +15V, V_{CC} = 2800V, $V_{CEmax} \leq V_{CES}$, $t_p \leq 10µs$	-	3000	-	A
note 1)	C_{GE} is additional gate–emitter capacitance added to output of gate drive					
note 2)	Figures 6 to 9 are obtained using integral Diode aus freewheeling diode					

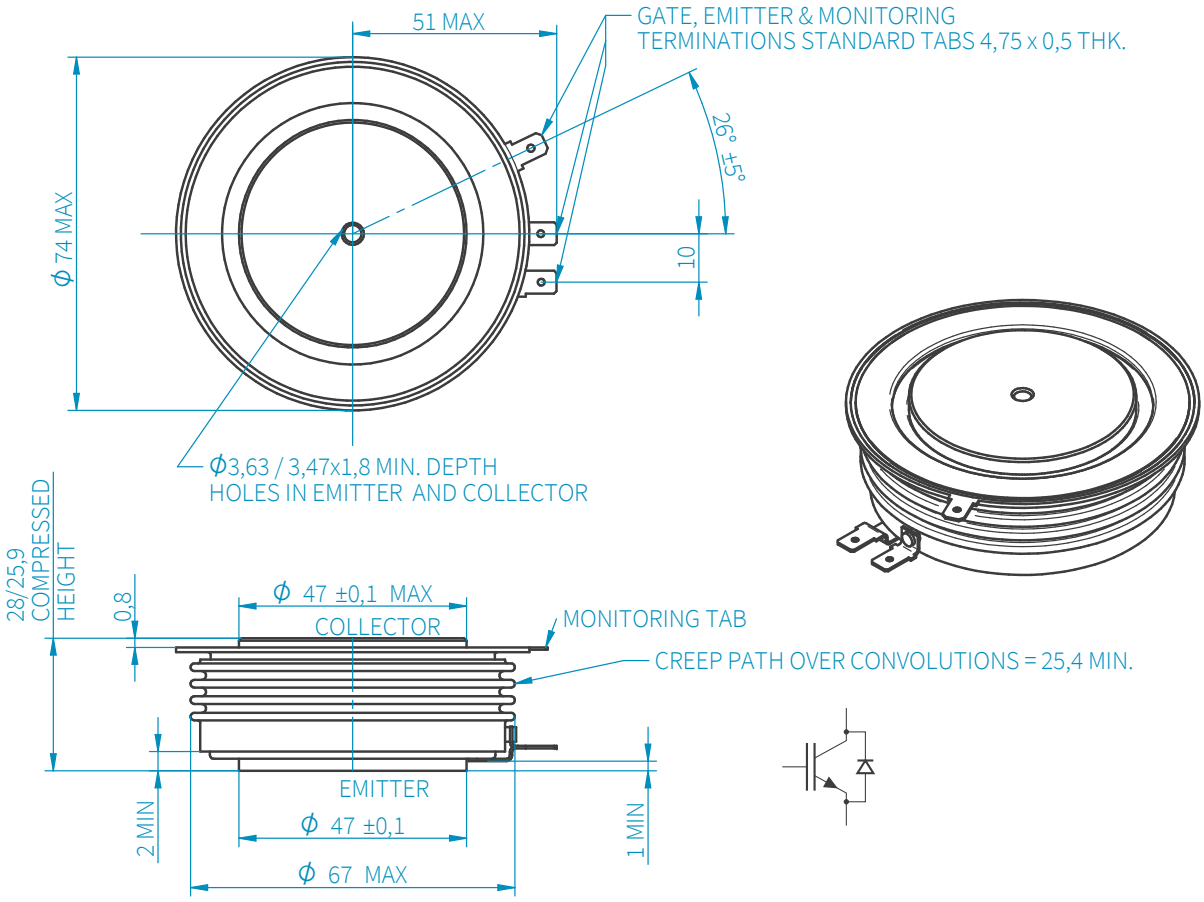
Diode Characteristics

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
V_{FM}	Forward voltage	I_F = 160A, T_j = 25°C	-	3.65	3.95	V
		I_F = 160A	-	3.90	4.20	V
V_{T0}	Threshold Voltage	Current range 47A-140A	-	-	2.28	V
r_T	Slope resistance		-	-	12	mΩ
I_{RRM}	Peak reverse recovery current	I_F = 140A, V_{GE} = ±15V, di/dt = 300A/µs	-	165	-	A
Q_{rr}	Recovered charge		-	270	-	µC
t_{rr}	Reverse recovery time, 50% Chord		-	1.8	-	µs
E_r	Reverse recovery energy		-	0.38	-	J

Thermal Characteristics

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
R_{thJK}	Thermal resistance, junction to sink, IGBT	Double side cooled	-	-	72	K/kW
		Collector side cooled	-	-	118	K/kW
		Emitter side cooled	-	-	186	K/kW
R_{thJK}	Thermal resistance, junction to sink, Diode	Double side cooled	-	-	172	K/kW
		Cathode side cooled	-	-	268	K/kW
		Anode side cooled	-	-	478	K/kW
F	Mounting force	Note 2	8	-	12	kN
W_t	Weight		-	500	-	g
note 1)	Unless otherwise indicated T_j = 125°C					
note 2)	Consult application note for detailed mounting requirements					

Outline Drawing



SANCONA®
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SANCONA GmbH
An der Hebemärchte 26
D-04316 Leipzig

// +49 341 652355-0
+49 341 652355-99
info@sancona.com
www.sancona.com

// Registry Court: Leipzig HRB 32946
VAT Reg No.: DE308741810
Tax number: 232/118/085686