

Target Specification

5SNG 0900R120590

1200V 900A LoPak1 Phase Leg IGBT Module

$V_{CE} = 1200\text{ V}$

$I_C = 900\text{ A X 2}$

Press-fit pins for reliable auxiliary contacts

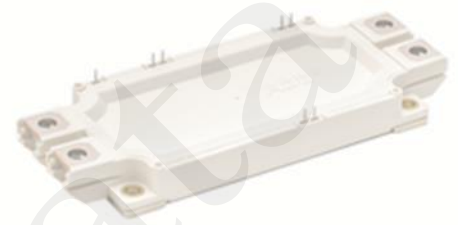
Ultra low-loss rugged Trench IGBT chipset

NTC thermistor for temperature sensing

Cu baseplate for low thermal resistance

Pre-Applied Thermal Interface Material (TIM) to
improve thermal conductivity between module
and heat sink

Industry standard package



Maximum rated values

Parameter	Symbol	Conditions	min	max	units
Collector-emitter voltage	V_{ces}	$V_{GE} = 0\text{ V}$, $T_{vj} \geq 25\text{ °C}$		1200	V
DC collector current	I_C	$T_C = 115\text{ °C}$, $T_{vj} = 150\text{ °C}$		900	A
Peak collector current	I_{cm}	$t_p = 1\text{ ms}$		1800	A
Gate-emitter voltage	V_{ges}		-20	20	V
DC forward current	I_f			900	A
Peak forward current	I_{frm}	$t_p = 1\text{ ms}$		1800	A
Surge current	I_{fsm}			2400	A
IGBT short circuit SOA	t_{psc}	$t_p \leq 8\text{ }\mu\text{s}$, $V_{GE} \leq 15\text{ V}$, $V_{CC} = 800\text{ V}$ $V_{CE,max} = V_{CES} - L_{s,CE} \cdot di/dt$, $T_{vj} = 150\text{ °C}$		≥ 10	us
Isolation voltage	V_{isol}	1 min, $f = 50\text{ Hz}$		4000	V
Max Junction temperature	T_{vj}		-40	175	C
Junction operating temperature	$T_{vj(op)}$		-40	150	C
Case temperature	T_C		-40	125/150	C
Storage temperature	T_{stg}		-40	125	C
Mounting torques	M_s , M_{t1}	Base-heatsink, M5 screws or Main terminals, M6 screws	3	6	Nm

IGBT characteristic values

Parameter	Symbol	Conditions		min	typ	max	units
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE} = 0 \text{ V}$, $I_C = 10 \text{ mA}$, $T_{vj} = 25 \text{ }^{\circ}\text{C}$		1300			V
Collector-emitter saturation voltage	V_{CEsat}	$I_C = 600\text{A}$, $V_{GE} = 15 \text{ V}$	$T_{vj}=25\text{C}$		1.6		V
			$T_{vj}=125\text{C}$		1.75		V
			$T_{vj}=150\text{C}$		1.9		V
Collector cut-off current	I_{CES}	$V_{CE} = 1200 \text{ V}$, $V_{GE} = -15 \text{ V}$	$T_{vj}=25\text{C}$			0.1	mA
			$T_{vj}=125\text{C}$		4.5		mA
			$T_{vj}=150\text{C}$		6		mA
Gate leakage current	I_{GES}	$V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$				5	nA
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C = 18 \text{ mA}$, $V_{CE} = V_{GE}$, $T_{vj} = 25 \text{ }^{\circ}\text{C}$			5		V
Gate charge	Q_G				TBD		uC
Input capacitance	C_{ies}				TBD		nF
Internal gate resistance	R_{Gint}				1		Ohms
Turn-on delay time	$t_{d(on)}$	$I_C = 900\text{A}$, $V_{CE} = 600\text{V}$, $V_{GE} = \pm 15 \text{ V}$, $R_{G,on} = \text{TBD}$	$T_{vj}=25\text{C}$		300		ns
			$T_{vj}=125\text{C}$		350		ns
			$T_{vj}=150\text{C}$		350		ns
Rise time	t_r		$T_{vj}=25\text{C}$	70		200	ns
			$T_{vj}=125\text{C}$	90		275	ns
			$T_{vj}=150\text{C}$	100		300	ns
Turn-off delay time	$t_{d(off)}$		$T_{vj}=25\text{C}$		400		ns
			$T_{vj}=125\text{C}$		475		ns
			$T_{vj}=150\text{C}$		500		ns
Fall time	t_f		$T_{vj}=25\text{C}$		190		ns
			$T_{vj}=125\text{C}$		200		ns
			$T_{vj}=150\text{C}$		200		ns
Turn-on switching energy	E_{on}	$I_C = 900\text{A}$, $V_{CE} = 600\text{V}$, $V_{GE} = \pm 15 \text{ V}$, $L_s = 25 \text{ nH}$, $R_{g,on} = \text{TBD}$	$T_{vj}=25\text{C}$	105			mJ
			$T_{vj}=125\text{C}$	150			mJ
			$T_{vj}=150\text{C}$	168		240	mJ
Turn-off switching energy	E_{off}	$I_C = 900\text{A}$, $V_{CE} = 600\text{V}$, $V_{GE} = \pm 15 \text{ V}$, $L_s = 25 \text{ nH}$	$T_{vj}=25\text{C}$		132		mJ
			$T_{vj}=125\text{C}$		170		mJ
			$T_{vj}=150\text{C}$		192		mJ
Short circuit current	I_{SC}	$t_{psc} \leq 8 \text{ }\mu\text{s}$, $V_{GE} = 15 \text{ V}$, $V_{CC} = 1300 \text{ V}$, $V_{CEM \text{ CHIP}} \leq 1700 \text{ V}$	$T_{vj}=150\text{C}$		4500		A

Diode characteristic values

Parameter	Symbol	Conditions	min	typ	max	units
Forward voltage	V_f	$I_F = 450 \text{ A}$	$T_{vj}=25^\circ\text{C}$	1.6		V
			$T_{vj}=125^\circ\text{C}$			V
			$T_{vj}=150^\circ\text{C}$	1.7		V
Peak reverse recovery current	I_{rm}	$R_g = 8.2 \text{ Ohm}$	$T_{vj}=25^\circ\text{C}$	966		A
			$T_{vj}=125^\circ\text{C}$			A
			$T_{vj}=150^\circ\text{C}$	1041		A
Recovered charge	Q_r	$R_g = 8.2 \text{ Ohm}$	$T_{vj}=25^\circ\text{C}$	104		uC
			$T_{vj}=125^\circ\text{C}$			uC
			$T_{vj}=150^\circ\text{C}$	180		uC
Reverse recovery time	t_{rr}	$R_g = 8.2 \text{ Ohm}$	$T_{vj}=25^\circ\text{C}$			ns
			$T_{vj}=125^\circ\text{C}$			ns
			$T_{vj}=150^\circ\text{C}$		800	ns
Reverse recovery energy	E_{rec}	$I_F = 900\text{A},$ $T_{vj}=150^\circ\text{C}, V_R = 600\text{V},$ $V_{GE} = -15 \text{ V}$	$T_{vj}=25^\circ\text{C}$	54		mJ
			$T_{vj}=125^\circ\text{C}$			mJ
			$T_{vj}=150^\circ\text{C}$	84		mJ

NTC Thermistor

Parameter	Symbol	Conditions	min	typ	max	units
Rated resistance	R_{25}	$T_c=25^\circ\text{C}$		5		K-ohms
R100	R_{100}	$T_c=100^\circ\text{C}$	468		517	ohms
B-value	$B_{25/50}$	$R_{25} = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298.15\text{K}))]$		3375		K
B-value	$B_{25/100}$	$R_{25} = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298.15\text{K}))]$		3433		K

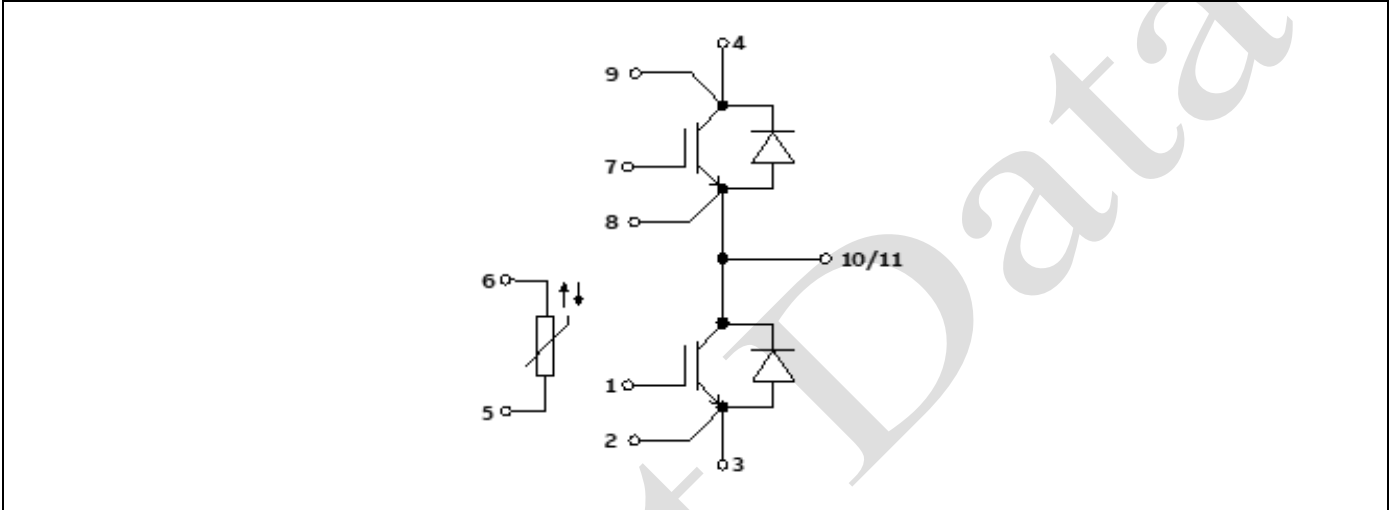
Package properties

Parameter	Symbol	Conditions	min	typ	max	units
IGBT thermal resistance junction to case	$R_{th(j-c)} \text{ IGBT}$	per switch			0.048	K/W
Diode thermal resistance junction to case	$R_{th(j-c)} \text{ DIODE}$	per switch			0.087	K/W
IGBT thermal resistance case to heatsink	$R_{th(c-s)} \text{ IGBT}$	IGBT per switch, $\lambda \text{ TIM} = 5 \text{ W/m} \times \text{K}$		0.025		K/W
Diode thermal resistance case to heatsink	$R_{th(c-s)} \text{ DIODE}$	Diode per switch, $\lambda \text{ TIM} = 5 \text{ W/m} \times \text{K}$		0.044		K/W
Comparative tracking index	CTI					
Module stray inductance	$L_{\sigma \text{ CE}}$	per switch		20		nH
Resistance, terminal-chip	$R_{CC'+EE'}$	per switch	$T_{vj}=25^\circ\text{C}$	0.95		m-ohms
			$T_{vj}=125^\circ\text{C}$	1.35		
			$T_{vj}=150^\circ\text{C}$	1.55		

Mechanical properties

Parameter	Symbol	Conditions		min	typ	max	units
Dimensions	L x W x H	Typical		152 x 62 x 17			mm
Clearance distance in air	d _a	according to IEC 60664-1 and EN 50124-1	Term. to base:	12.5			
			Term. to term:	10			
Surface creepage distance	d _s		Term. to base:	14.5			
			Term. to term:	13			
Mass	m				350		g

Electrical configuration



Outline drawing ³⁾

Note: all dimensions are shown in millimeters

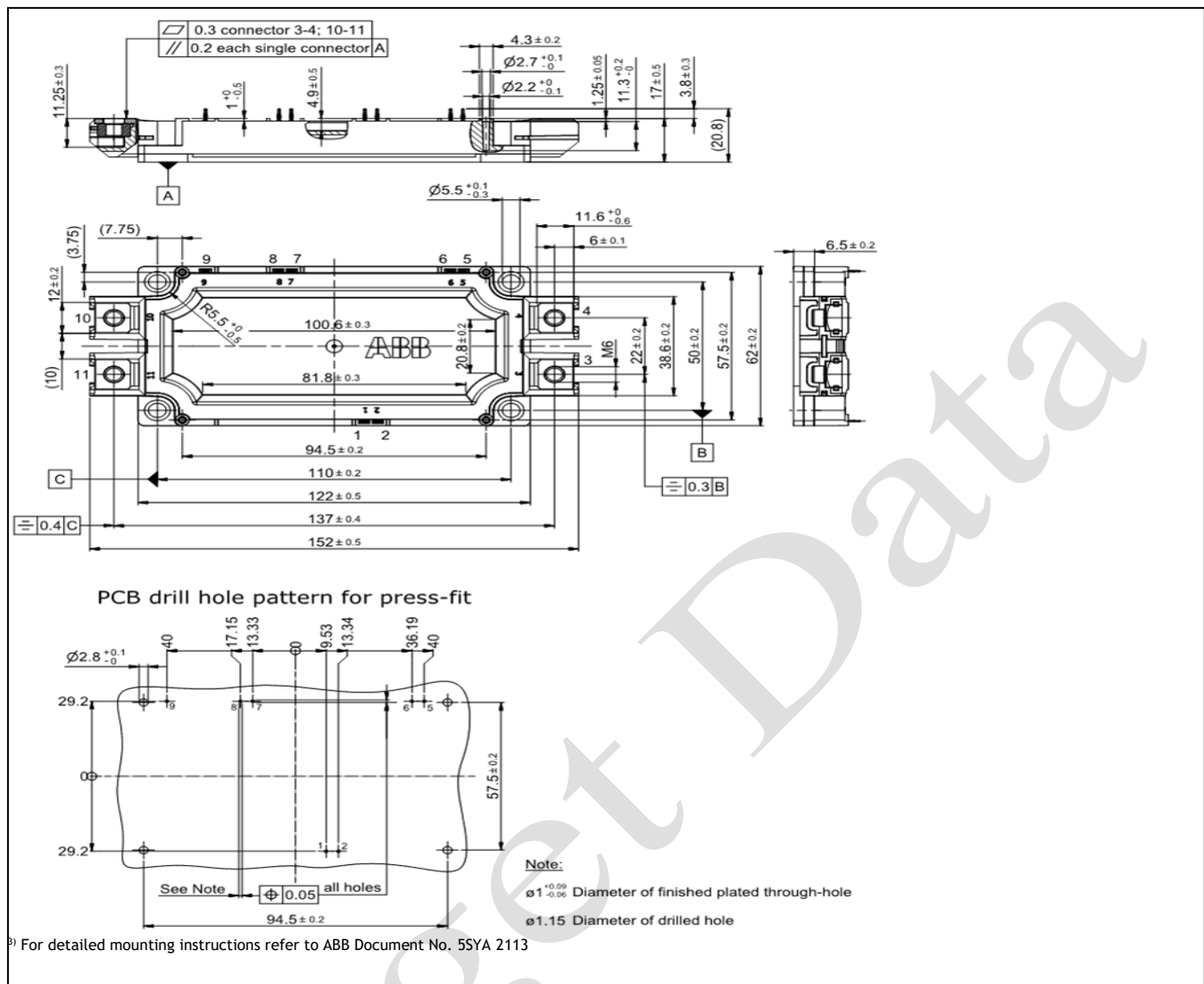


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