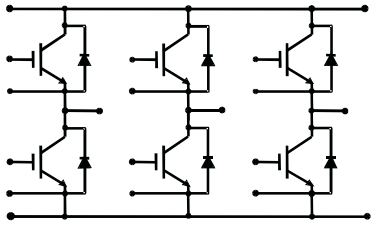
V_{CE} = 1200 V
I_C = 100 A



IGBT Module LoPak3 SPT

5SNS 0100W120100

PRELIMINARY

Doc. No. 5SYA1522-01 May. 01

- **Low-loss, rugged IGBT SPT chip-set**
- **EMC friendly diode with positive temp. coefficient of on-state**
- **Low profile compact baseless package**
- **Industry standard package**
- **UL File no. E63532**

Maximum Rated Values

(T_{vj} = 25°C, unless specified otherwise)

Parameter	Symbol	Conditions	Values	Unit
Collector-Emitter Voltage	V_{CES}	V_{GE} shorted	1200	V
DC Collector Current	I_C	T_{hs} = 70°C	100	A
Peak Collector Current	I_{CM}	Pulse: tp=1ms, T_{hs} = 70°C	200	A
Gate Emitter Voltage	V_{GES}		±20	V
Total Power Dissipation	Ptot	T_{hs} = 25°C per switch	450	W
IGBT Switching SOA	SwSOA	I_C = 200 A, V_{CEM} = 1200 V, V_{CC} ≤ 1000 V, V_{GE} = ±15 V, T_{vj} =125°C voltages measured on auxiliary terminals		
IGBT Short Circuit SOA	SCSOA	V_{CC} = 900 V, V_{CEM} = 1200 V, t_p = 10 µs, V_{GE} = ±15 V, T_{vj} =125 °C		
DC Forward Current	I_F		100	A
Peak Forward Current	I_{FM}	Pulse: tp = 1ms, T_{hs} = 70°C	200	A

Maximum Rated Values (cont.)

(T_{vj} = 25°C, unless specified otherwise)

Parameter	Symbol	Conditions		Values	Unit
Junction Temperature	T_{vj}			- 40 ~ 150	°C
Storage Temperature	T_{tstg}/T_{cop}			- 40 ~ 125	°C
Isolation Voltage	V_{iso}	1 min, f = 50Hz		2500	V
Mounting	Base to Heatsink	(M5) Hole 5.5mm diameter		3 ~ 6	Nm
	Main Terminals	Pin: 1.15*1.0 mm			
	PCB mounting	Pitch of pins : 3.81 mm			
	Gate, Emitter Aux.	Pin: 1.15*1.0 mm			

IGBT Characteristic Values

(T_{vj} = 25°C, unless specified otherwise)

Parameter	Symbol	Conditions		min.	typ.	max.	Unit
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$*	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25 °C		2.00	2.35	V
			T_{vj} = 125 °C		2.20		V
Collector Cut-off Current	I_{CES}	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 125 °C				8	mA
Gate-Emitter 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 = 4 mA, V_{CE} = V_{GE}		4.5		6.5	V
Total Gate Charge	Q_{ge}	I_C = 100 A, V_{CE} = 600 V, V_{GE} = -15 to 15 V			1000		nC
Input Capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1MHz			9.0		nF
Output Capacitance	C_{oes}				2.2		nF
Reverse Transfer Capacitance	C_{res}				1.8		nF
Turn-On Delay Time	$t_{d(on)}$	I_C = 100 A, V_{CC} = 600 V, R_{gon} = 10 Ω, T_{vj} = 125 °C, V_{GE} = ±15 V			0.08		µs
Rise Time	t_r				0.06		µs
Turn-Off Delay Time	$t_{d(off)}$	I_C = 100 A, V_{CC} = 600 V, R_{goff} = 10 Ω, T_{vj} = 125 °C, V_{GE} = ±15 V			0.5		µs
Fall Time	t_f				0.09		µs
Turn-on Switching Energy	E_{on}	R_{gon} = 10 Ω	I_C = 100 A, T_{vj} = 125 °C, V_{CC} = 600 V, V_{GE} = ±15 V, inductive load, integrated up to: 3% V_{CE} (E_{on}), 1% I_C (E_{off})		11.0		mJ
Turn-off Switching Energy	E_{off}	R_{goff} = 10 Ω			9.5		mJ
Module stray Inductance Plus to Minus	$L_{s\ DC}$					25	nH
Resistance terminal-chip	$R_{CC'+EE'}$		T_{hs} = 25 °C		1.25		mΩ
			T_{hs} = 125 °C		1.90		

* Note 1: Collector emitter saturation voltage is given at die level.

Diode Characteristic Values

(T_{vj} = 25°C, unless specified otherwise)

Parameter	Symbol	Conditions		min.	typ.	max.	Unit
Forward Voltage	V_F*	I_F = 100 A	T_{vj} = 25 °C		2.00	2.40	V
			T_{vj} = 125 °C		2.00		
Reverse Recovery Current	I_{rrm}	I_F = 100 A, R_{gon} = 10 Ω, V_{CC} = 600 V, V_{GE} = ±15 V, T_{vj} = 125 °C			120		A
Reverse Recovery Charge	Q_{rr}				20		µC
Reverse Recovery Time	t_{rr}				0.30		µs
Reverse Recovery Energy	E_{rec}	I_F = 100 A, T_{vj} = 125 °C, V_{CC} = 600V, R_{gon} = 10 Ω, V_{GE} = ±15 V, inductive load, fully integrated			8.5		mJ
Resistance terminal-chip	$R_{CC'+EE'}$		T_{hs} = 25 °C		1.25		mΩ
			T_{hs} = 125 °C		1.90		

* Note 2: Forward voltage is given at die level

Thermal Characteristics

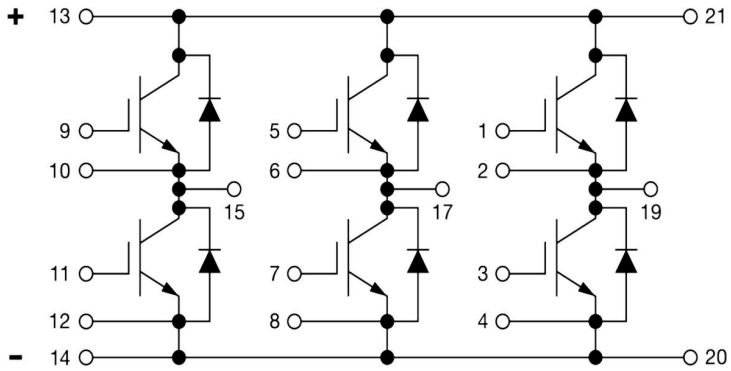
(T_j = 25°C, unless specified otherwise)

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
IGBT Thermal Resistance Junction to Heatsink	R_{th} j-h Igbt	Heatsink: flatness < +/- 20 µm, roughness < 6 µm without ridge Thermal grease: thickness: 30 µm < t < 50 µm			0.280	°C/W
Diode Thermal Resistance Junction to Heatsink	R_{th} j-h Diode				0.560	°C/W
Equivalent IGBT Thermal Resistance Junct. to Case	R_{th} j-c Igbt				0.180	°C/W
Equivalent Diode Thermal Resistance Junct. to Case	R_{th} j-c Diode				0.360	°C/W

Mechanical Properties

Parameter	Symbol	Conditions		min.	typ.	max.	Unit
Dimensions	L* W* H	Typical , see outline drawing		121.5 * 61.5 * 20.5			mm
Clearance Distance	D_C	acc. IEC 664-1 and prEN50124-1:1995	Term. to base:	8.5			mm
			Term. to term:	9.5			mm
Surface Creepage Distance	D_{SC}	acc. IEC 664-1 and prEN50124-1:1995	Term. to base:	12.5			mm
			Term. to term:	15.5			mm
Weight					215		gr

Electrical configuration



Outline drawing