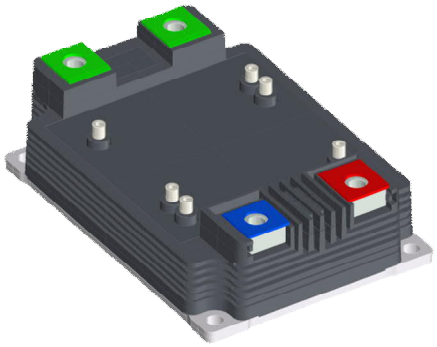
Target Specification

5SNG 0300Z650300

LinPak phase leg IGBT module, 10.2kV insulation

V_{CE} = 6500 V
I_C = 2 x 300 A

Ultra low inductance phase-leg module
Compact design with very high current density
Paralleling without derating
AlSiC base-plate for high power cycling capability
Low-loss, fast and rugged SPT++ chip-set



Maximum rated values [1)]

Parameter	Symbol	Conditions	min	max	Unit
Collector-emitter voltage	V_{CES}	V_{GE} = 0 V, T_{vj} ≥ 25 °C		6500	V
		V_{GE} = 0 V, T_{vj} ≥ -40 °C		tbd	V
DC collector current	I_C	T_C = 105°C, T_{vj} = 150 °C		300	A
Peak collector current	I_{CM}	t_p = 1 ms		600	A
Gate-emitter voltage	V_{GES}		-20	20	V
Total power dissipation	P_{tot}	T_C = 25 °C, T_{vj} = 150 °C		4800	W
DC forward current	I_F			300	A
Peak forward current	I_{FRM}	t_p = 1 ms		600	A
Surge current	I_{FSM}	V_R = 0 V, T_{vj} = 150 °C, t_p = 10 ms, half-sinewave		3300	A
IGBT short circuit SOA	t_{psc}	V_{CC} = 4500 V, $V_{CEM\ CHIP}$ ≤ 6500 V V_{GE} ≤ 15 V, $T_{vj\ start}$ ≤ 150 °C		10	µs
Isolation voltage	V_{isol}	1 min, f = 50 Hz		10200	V
Junction temperature	T_{vj}			175	°C
Junction operating temperature	$T_{vj(op)}$		-40	150	°C
Case temperature	T_C		-40	150	°C
Storage temperature	T_{stg}		-40	125	°C
Mounting torques	M_s	Base-heatsink, M6 screws	4	6	Nm
	M_{t1}	Main terminals, M8 screws	8	10	
	M_{t2}	Auxiliary terminals, M3 screws	0.9	1.1	

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

IGBT characteristic values [3]

Parameter	Symbol	Conditions		min	typ	max	Unit
Collector (-emitter) breakdown voltage	$V_{(BR)CES}$	V_{GE} = 0 V, I_C = 10 mA, T_{vj} = 25 °C		6500			V
Collector-emitter [4] saturation voltage	$V_{CE\ sat}$	I_C = 300 A, V_{GE} = 15 V	T_{vj} = 25 °C		3.1		V
			T_{vj} = 125 °C		4.1		V
			T_{vj} = 150 °C		4.4		V
Collector cut-off current	I_{CES}	V_{CE} = 6500 V, V_{GE} = 0 V	T_{vj} = 25 °C			1	mA
			T_{vj} = 125 °C		8		mA
			T_{vj} = 150 °C		30		mA
Gate leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = ± 20 V, T_{vj} = 125 °C		-500		500	nA
Gate-emitter threshold voltage	$V_{GE(TO)}$	I_C = 70 mA, V_{CE} = V_{GE}, T_{vj} = 25 °C		5.5		7.5	V
Gate charge	Q_{ge}	I_C = 300 A, V_{CE} = 3600 V, V_{GE} = -15 V ..15 V			tbd		µC
Input capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz, T_{vj} = 25 °C			tbd		nF
~~Output capacitance~~	~~C_{oes}~~				~~tbd~~		~~nF~~
~~Reverse transfer capacitance~~	~~C_{res}~~				~~tbd~~		~~nF~~
Internal gate resistance	R_{Gint}	per switch			tbd		Ω
Turn-on delay time	$t_{d(on)}$	V_{CC} = 3600 V, I_C = 300 A, R_G = ? Ω, C_{GE} = 0 nF, V_{GE} = ±15 V, L_σ = 20? nH, inductive load	T_{vj} = 25 °C		tbd		ns
			T_{vj} = 125 °C		tbd		ns
			T_{vj} = 150 °C		tbd		ns
Rise time	t_r		T_{vj} = 25 °C		tbd		ns
			T_{vj} = 125 °C		tbd		ns
			T_{vj} = 150 °C		tbd		ns
Turn-off delay time	$t_{d(off)}$	V_{CC} = 3600 V, I_C = 300 A, R_G = ? Ω, C_{GE} = 0 nF, V_{GE} = ±15 V, L_σ = 20? nH, inductive load	T_{vj} = 25 °C		tbd		ns
			T_{vj} = 125 °C		tbd		ns
			T_{vj} = 150 °C		tbd		ns
Fall time	t_f		T_{vj} = 25 °C		tbd		ns
			T_{vj} = 125 °C		tbd		ns
			T_{vj} = 150 °C		tbd		ns
Turn-on switching energy	E_{on}	V_{CC} = 3600 V, I_C = 300 A, R_G = ? Ω, C_{GE} = 0 nF, V_{GE} = ±15 V, L_σ = 20? nH, inductive load	T_{vj} = 25 °C		1230		mJ
			T_{vj} = 125 °C		1575		mJ
			T_{vj} = 150 °C		1740		mJ
Turn-off switching energy	E_{off}	V_{CC} = 3600 V, I_C = 300 A, R_G = ? Ω, C_{GE} = 0 nF, V_{GE} = ±15 V, L_σ = 20? nH, inductive load	T_{vj} = 25 °C		1261		mJ
			T_{vj} = 125 °C		1621		mJ
			T_{vj} = 150 °C		1697		mJ
Short circuit current	I_{SC}	V_{CC} = 4500 V, V_{GE} = 15 V	$T_{vj\ start}$ = 150 °C		1500		A

[3] Characteristic values according to IEC 60747 – 9
[4] Collector-emitter saturation voltage is given at chip level

Diode characteristic values [5)]

Parameter	Symbol	Conditions		min	typ	max	Unit
Forward voltage [6)]	V_F	I_F = 300 A	T_{vj} = 25 °C		3.05		V
			T_{vj} = 125 °C		3.4		V
			T_{vj} = 150 °C		3.35		V
Peak reverse recovery current	I_{RM}	V_{CC} = 3600 V, I_F = 300 A, V_{GE} = ±15 V, R_G = ? Ω, C_{GE} = 0 nF, L_σ = 20 nH, inductive load	T_{vj} = 25 °C		520		A
			T_{vj} = 125 °C		675		A
			T_{vj} = 150 °C		750		A
Recovered charge	Q_{rr}		T_{vj} = 25 °C		tbd		µC
			T_{vj} = 125 °C		tbd		µC
			T_{vj} = 150 °C		tbd		µC
Reverse recovery time	t_{rr}		T_{vj} = 25 °C		tbd		ns
			T_{vj} = 125 °C		tbd		ns
			T_{vj} = 150 °C		tbd		ns
Reverse recovery energy	E_{rec}		T_{vj} = 25 °C		690		mJ
			T_{vj} = 125 °C		1246		mJ
			T_{vj} = 150 °C		1471		mJ

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

Package properties [7)]

Parameter	Symbol	Conditions		min	typ	max	Unit
IGBT thermal resistance junction to case	$R_{th(j-c)IGBT}$					26	K/kW
Diode thermal resistance junction to case	$R_{th(j-c)DIODE}$					39	K/kW
IGBT thermal resistance case to heatsink	$R_{th(c-s)IGBT}$	IGBT per switch, λ grease = 1W/m x K			23		K/kW
Diode thermal resistance case to heatsink	$R_{th(c-s)DIODE}$	Diode per switch, λ grease = 1W/m x K			40		K/kW
Partial discharge voltage	V_e	f = 50 Hz, QPD ≤ 10pC (acc. to IEC 61287)		5100			V
Comparative tracking index	CTI			>600			
Module stray inductance	$L_{\sigma CE}$	total C1-E2			≤ 30		nH
Resistance, terminal-chip	$R_{C1E1\ IGBT\ /\ Diode}$		T_C = 25 °C		tbd		mΩ
			T_C = 125 °C		tbd		
			T_C = 150 °C		tbd		
	$R_{C2E2\ IGBT\ /\ Diode}$		T_C = 25 °C		tbd		
			T_C = 125 °C		tbd		
			T_C = 150 °C		tbd		

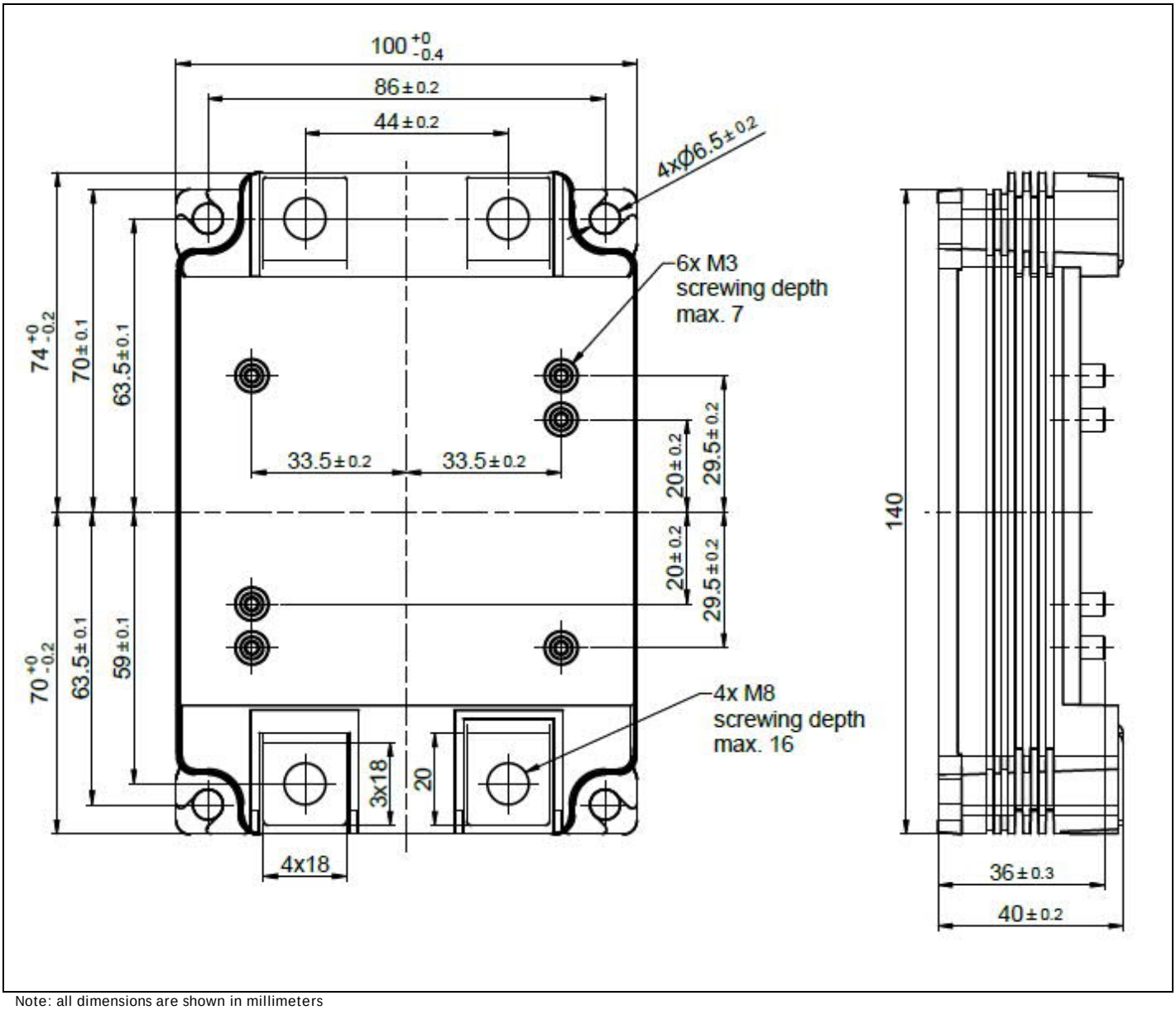
Mechanical properties [7)]

Parameter	Symbol	Conditions		min	typ	max	Unit
Dimensions	L x W x H	Typical		144 X 100 X 40			mm
Clearance distance in air	d_a	according to IEC 60664-1 and EN 50124-1	Term. to base:	40			mm
			Term. to term:	26			
Surface creepage distance	d_s	according to IEC 60664-1 and EN 50124-1	Term. to base:	64			mm
			Term. to term:	56			
Mass	m			800			g

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

Electrical configuration

Outline drawing



Note: all dimensions are shown in millimeters

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