LFP15G1207

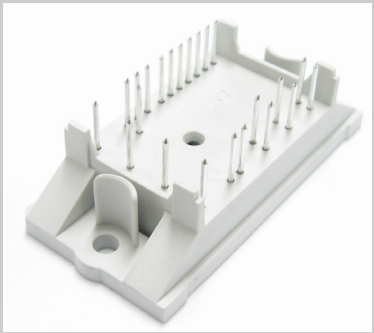
SISPM™

1200V 15A Converter-Inverter IGBT Module

Features

- Trench Field Stop Technology IGBT adopted (IGBT4)
- Low saturation voltage
- Positive temperature coefficient
- Fast switching
- Free wheeling diodes with fast and soft reverse recovery
- Industrial standard package with insulated substrate
- Temperature sensor (NTC) included
- Input from single or three phase grid

Preliminary Data



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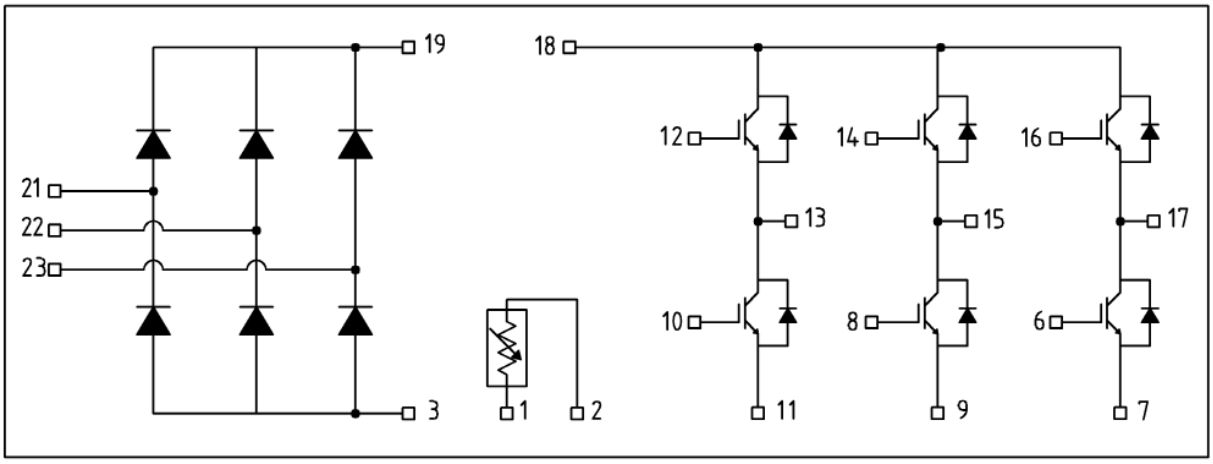
64.5 x 32.6 x 21.6 mm

Applications

- Three phase synchronous or asynchronous motor drive

Internal Equivalent Circuit



Pin Description

Pin Number	Pin Name	Pin Description
1,2	TH1, TH2	NTC-, NTC+
3	N	Negative DC Link Input
6, 8, 10	GWN, GVN, GUN	Gate Input for Low-side W Phase, V Phase, U Phase
7, 9, 11	DCN	Negative DC Link Output
12, 14, 16	GUP, GVP, GWP	Gate Input for High-side U Phase, V Phase, W Phase
13, 15, 17	U, V, W	Output for U Phase, V Phase, W Phase
18	DCP	Positive DC Link Output
19	P	Positive DC Link Input
21	R	Input for R Phase
22	S	Input for S Phase
23	T	Input for T Phase

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Item	Symbol	Parameter	Conditions	Value	Units
Input Rectifier	V_{RRM}	Repetitive Peak Reverse Voltage		1600	V
	I_{FAV}	Forward Current per Diode	@ T_j = 150 °C, T_C = 80 °C	15	A
	I_{FSM}	Surge Forward Current (Chip level)	@ t_P = 10 ms, half sine wave	220	A
	I^2t	I^2t - Value (Chip level)	@ t_P = 10 ms, half sine wave	200	A^2s
	P_D	Maximum Power Dissipation	@ T_j = 150 °C, T_C = 80 °C	40	W
	T_j	Operating Junction Temperature *(1)	-	-40 ~ 125	°C
Transistor Inverter	V_{CES}	Collector-Emitter Breakdown Voltage	-	1200	V
	V_{GES}	Gate-Emitter Peak Voltage	-	± 20	V
	I_C	DC Collector Current	@ T_j = 175 °C, T_C = 80 °C	15	A
	I_{cpulse}	Repetitive Peak Collector Current	@ t_P = 1 ms	30	A
	P_D	Maximum Power Dissipation	@ T_j = 175 °C, T_C = 80 °C	60	W
	T_{SC}	SC Withstand Time (Chip level)	V_{GE} = 15 V, V_{CE} = 600 V	10	µs
	T_j	Operating Junction Temperature *(2)	-	-40 ~ 125	°C
Diode Inverter	V_{RRM}	Repetitive Peak Reverse Voltage	-	1200	V
	I_F	DC Forward Current	-	15	A
	I_{FRM}	Repetitive Peak Forward Current	@ t_P = 1 ms	30	A
	P_D	Maximum Power Dissipation	@ T_j = 150 °C, T_C = 80 °C	30	W
	T_j	Operating Junction Temperature *(1)	-	-40 ~ 125	°C
Module	T_{stg}	Storage Temperature	-	-40~125	°C
	V_{iso}	Isolation Voltage	@ AC 1minute	2500	V
	W	Weight	-	30	g

(Note *1) The Maximum junction temperature of chip is 150 °C.
(Note *2) The Maximum junction temperature of chip is 175 °C.
(Note *3) This value is claculated. In other words, this is not the mearsured value.

Electrical Characteristics T_C = 25°C unless otherwise noted

Input Rectifier Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_F	Diode Forward Voltage	T_C = 25 °C, I_F = 15 A	-	1.1	-	V
		T_C = 125 °C, I_F = 15 A	-	1.0	-	V
V_{to}	Threshold Voltage	T_C = 125 °C	-	0.83	-	V
I_R	Reverse Current (Chip level)	T_C = 25 °C, V_R = V_{RRM}	-	0.1	-	mA
r_t	Slope Resistance	T_C = 125 °C	-	20.8	-	mΩ
$R_{th(J-C)}$	Thermal Resistance (IGBT Part) *(3)	Junction-to-Case	-	-	1.7	°C/W

Transistor-Inverter Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$V_{GE(th)}$	Gate-Emitter threshold Voltage	V_{CE} = V_{GE}, I_{CE} = 15 mA	-	6.5	-	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	T_C = 25 °C, I_{CE} = 15 A, V_{GE} = 15 V	-	2.0	-	V
		T_C = 125 °C, I_{CE} = 15 A, V_{GE} = 15 V	-	2.4	-	V
I_{CES}	Collector-Emitter Cut-off Current	V_{GE} = 0 V, V_{CE} = V_{CES}	-	-	250	μA
I_{CES}	Gate-Emitter Leakage Current	V_{GE} = ± 20 V, V_{CE} = 0 V	-	-	-	A
C_{iss}	Input Capacitance	V_{CE} = 25 V, V_{GE} = 0 V f = 1 MHz, T_C = 25 °C (Chip level)	-	0.9	-	nF
C_{oss}	Output Capacitance		-	0.08	-	nF
C_{rss}	Reverse Transfer Capacitance		-	0.06	-	nF
t_d(on)	Turn-On Delay Time	T_C = 125 °C, $R_{G\ ON}$ = 40 Ω $R_{G\ OFF}$ = 20 Ω, L = 500 μH V_{CE} = 600 V, V_{GE} = 0 V~15 V I_{CE} = 15 A	-	-	-	ns
t_r	Rise Time		-	-	-	ns
t_d(off)	Turn-Off Delay Time		-	-	-	ns
t_f	Fall Time		-	-	-	ns
E_{on}	Turn-On Switching Loss		-	-	-	mJ
E_{off}	Turn-Off Switching Loss		-	-	-	mJ
E_{ts}	Total Switching Loss		-	-	-	mJ
Q_G	Total Gate Charge	V_{GE} = 0 V ~ 15 V	-	-	-	nC
Q_{GE}	Gate-Emitter Charge		-	-	-	nC
Q_{GC}	Gate-Collector Charge		-	-	-	nC
$R_{th(J-C)}$	Thermal Resistance (IGBT Part) *(3)	Junction-to-Case		-	1.5	°C/W

Diode-Inverter Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Conditions		Min	Typ	Max	Units
V_F	Diode Forward Voltage	I_F = 15 A, V_{GE} = 0 V	T_C = 125 °C	-	1.7	-	V
t_{rr}	Diode Reverse Recovery Time	$R_{G\ ON}$ = 40 Ω L = 500 μH V_{CE} = 600 V V_{GE} = 0 V~15 V I_{CE} = 15 A	T_C = 125 °C	-	-	-	ns
I_{RRM}	Diode Peak Reverse Recovery Current		T_C = 125 °C	-	-	-	A
Q_{rr}	Diode Reverse Recovery Charge		T_C = 125 °C	-	-	-	μC
E_{rr}	Diode Reverse Recovery Energy		T_C = 125 °C	-	-	-	mJ
$R_{th(J-C)}$	Thermal Resistance (IGBT Part) *(3)	Junction-to-Case		-	-	2.0	°C/W

NTC thermestar Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
R_{25}	Resistance	T_C = 25 °C	-	22	-	kΩ
P	Power	T_C = 25 °C	-	210	-	mW
$B_{25/100}$	B Constant	T_C = 25 °C, ± 3% tolerance	-	4000	-	K

* This specifications may not be considered as an assurance of characteristics and may not have same characteristics.
in case of using different test systems from @LSIS. We therefore strongly recommend prior consultation of our engineers.

Package Dimension(Dimension in mm)