

# LEH200M106

# SISPM™

100V 200A 2-Pack MOSFET Module

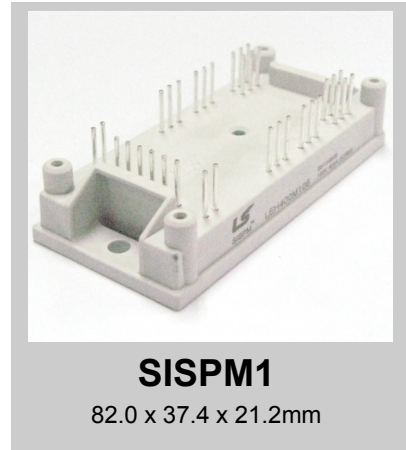
## Features

- Trench technology
- Compact package with isolated substrate and soldering pins for PCB mounting
- Included snubber capacitors
- Included temperature sensor

## Applications

- Power Supply
- UPS / Inverter
- Motor Drive

## Target data

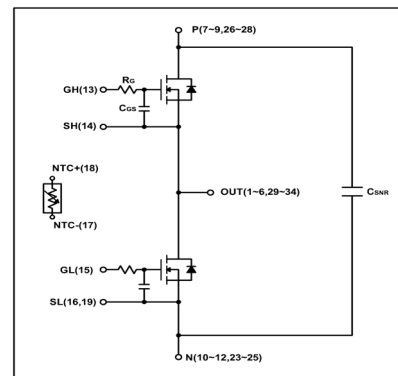


## Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Item	Symbol	Conditions	Value	Units
MOSFET	$V_{DSS}$		100	V
	$V_{GSS}$		$\pm 20$	V
	$I_D$	@ $T_j = 175^\circ\text{C}$ , $T_C = 25^\circ\text{C}$ , Continuous	-	A
		@ $T_j = 175^\circ\text{C}$ , $T_C = 80^\circ\text{C}$ , Continuous	200	A
	$I_{DM}$	@ $T_C = 80^\circ\text{C}$ , $tp=1\text{ms}$	400	A
	$T_j$	Operating Junction Temperature <sup>(1)</sup>	-40~125	$^\circ\text{C}$
$P_D$	@ $T_j = 175^\circ\text{C}$ , $T_C = 25^\circ\text{C}$	1250	W	
	@ $T_j = 175^\circ\text{C}$ , $T_C = 80^\circ\text{C}$	790	W	
Diode	$V_{RRM}$		100	V
	$I_F$		200	A
	$I_{FRM}$	$tp=1\text{ms}$	400	A
	$T_j$	Operating Junction Temperature <sup>(1)</sup>	-40~125	$^\circ\text{C}$
Module	$T_{stg}$	Storage Junction Temperature	-40~125	$^\circ\text{C}$
	$V_{iso}$	@AC 1minute	2500	V
	$M_S$	Heat sink Mounting torque(M4)	2.0~2.2	Nm
	$W$	Weight	40	g

## Internal Circuit & Pin Description

Pin Number	Pin Name	Pin Description
1~6, 29~34	OUT	Output
7~9, 26~28	P	PositiveDC Link Ouput
10~12, 23~25	N	Negative DC Link Ouput
13	GH	Gate Input for High-side
14	SH	Emitter Input for High-side
15	GL	Gate Input for Low-side
16(19)	SL	
17,18		NTC
$R_G$		3.0 $\Omega$
$C_{GS}$		33 nF
$C_{SNR}$		0.1 $\mu\text{F}$



(Note \*1) The Maximum junction temperature of chip is 175 $^\circ\text{C}$ .

## Electrical Characteristics of IGBT $T_C = 25^\circ\text{C}$ unless otherwise noted

### Static Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$B_{(BR)DSS}$	D-S Breakdown Voltage	$V_{GS} = 0V, I_C = 250\mu A$	100	-	-	V
$I_{DSS}$	Leakage Current	$V_{DS} = V_{DSS}, V_{GS} = 0V$	-	-	250	$\mu A$
$I_{GSS}$	G-S Leakage Current	$V_{GS} = V_{DSS}, V_{DS} = 0V$	-	-	-	nA
$V_{GS(th)}$	G-S Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu A$	-	2.8	-	V
$R_{DS(on)}$	Static Drain to Source On-Resistance	$I_D = 200A, V_{GS} = 10V, T_C = 25^\circ\text{C}$	-	3.5	-	m $\Omega$
		$I_D = 200A, V_{GS} = 10V, T_C = 125^\circ\text{C}$	-	6.6	-	m $\Omega$

### Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$C_{iss}$	Input Capacitance	*Chip level $V_{DS} = 50V, V_{GS} = 0V$ $f = 100kHz, T_C = 25^\circ\text{C}$	-	19.9	-	nF
$C_{oss}$	Output Capacitance		-	1.4	-	nF
$C_{rss}$	Reverse Transfer Capacitance		-	0.5	-	nF
$t_d(on)$	Turn-On Delay Time	$T_C = 125^\circ\text{C}, R_G = 10\Omega$ $L = 50\mu H, V_{DS} = 50V$ $V_{GS} = 0V \sim 15V$ $I_D = 200A$	-	-	-	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
$E_{is}$	Total Switching Loss		-	-	-	mJ
$Q_g$	Total Gate Charge	$V_{GS} = 0V \sim +10V$	-	-	-	$\mu C$
$Q_{gs}$	Gate-Source Charge		-	-	-	$\mu C$
$Q_{gd}$	Gate-Drain Charge		-	-	-	$\mu C$

## Electrical Characteristics of Diode $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units	
$V_F$	Diode Forward Voltage	$I_F = 200A, V_{GE} = 0V$	$T_C = 25^\circ\text{C}$	-	1.2	-	V
			$T_C = 125^\circ\text{C}$	-	1.1	-	
$t_{rr}$	Diode Reverse Recovery Time	$R_G = 10\Omega$ $L = 50\mu H$ $V_{DC} = 50V$ $V_{GS} = 0V \sim 15V$ $I_C = 200A$	$T_C = 25^\circ\text{C}$	-	-	-	ns
			$T_C = 125^\circ\text{C}$	-	-	-	
$I_{RRM}$	Diode Peak Reverse Recovery Current		$T_C = 25^\circ\text{C}$	-	-	-	A
			$T_C = 125^\circ\text{C}$	-	-	-	
$Q_{rr}$	Diode Reverse Recovery Charge		$T_C = 25^\circ\text{C}$	-	-	-	$\mu C$
			$T_C = 125^\circ\text{C}$	-	-	-	
$E_{rr}$	Diode Reverse Recovery Energy	$T_C = 25^\circ\text{C}$	-	-	-	mJ	
		$T_C = 125^\circ\text{C}$	-	-	-		

### Thermal Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$R_{th(J-C)}$	Thermal Resistance (MOSFET Part)	Junction-to-Case	-	0.12	-	$^\circ\text{C/W}$

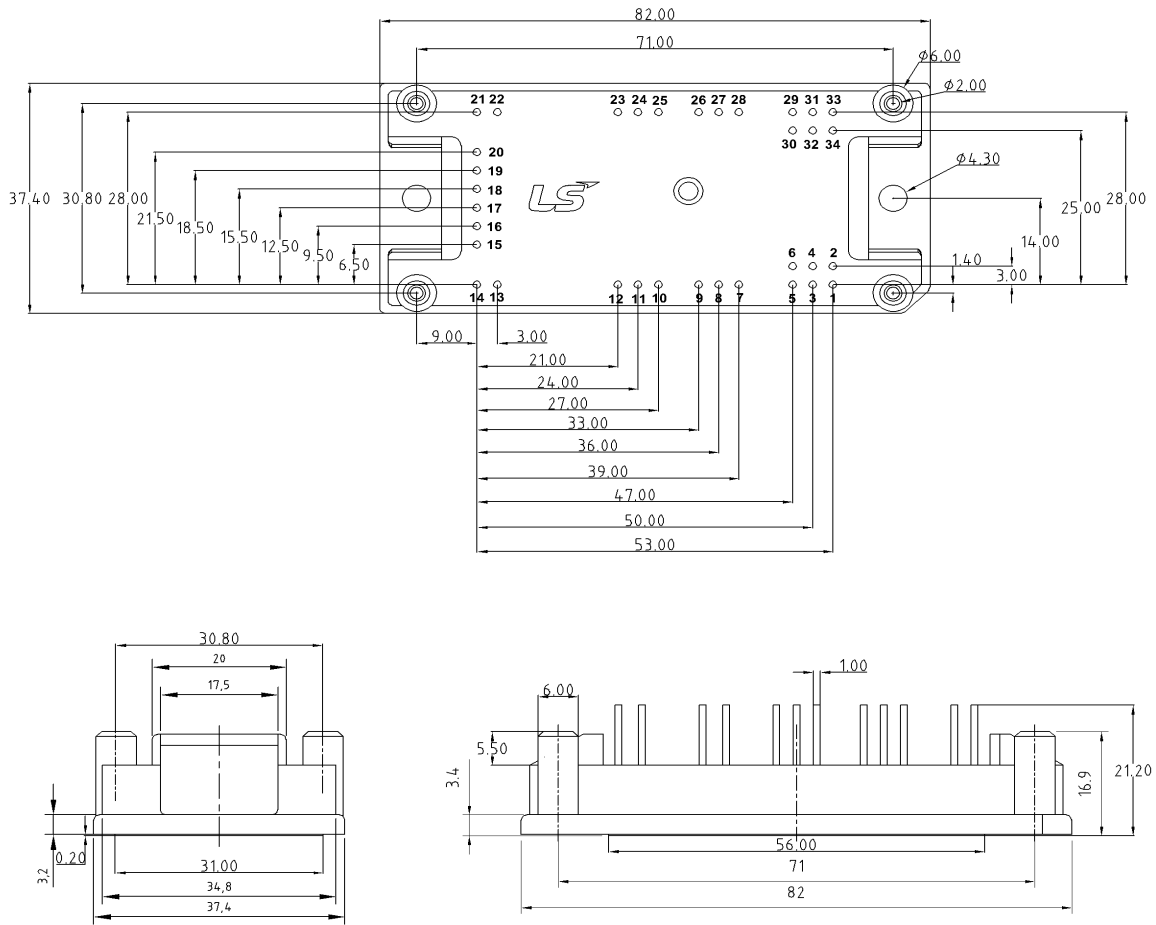
### NTC thermistar Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$R_{25}$	Resistance	$T_C = 25^\circ\text{C}$	-	22	-	k $\Omega$
P	Power	$T_C = 25^\circ\text{C}$	-	210	-	mW
$B_{25/100}$	B constant	$T_C = 25^\circ\text{C}, \pm 3\%$ 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.

# LEH200M106

## Package Dimension(Dimension in mm)



# LEH400M106

# SISPM™

100V 400A 2-Pack MOSFET Module

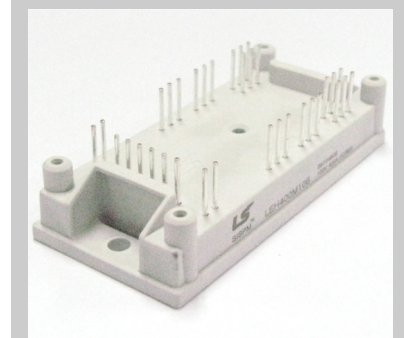
## Features

- Trench technology
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## Applications

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## Target data



### SISPM1

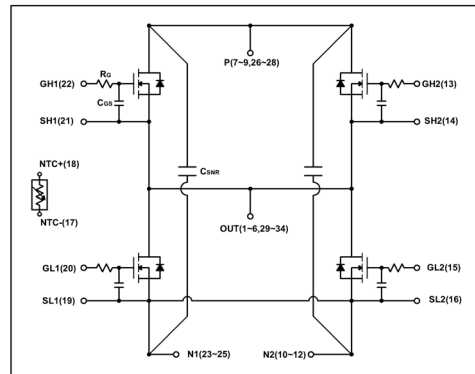
82.0 x 37.4 x 21.2mm

## Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Item	Symbol	Conditions	Value	Units
MOSFET	$V_{DSS}$		100	V
	$V_{GSS}$		$\pm 20$	V
	$I_D$	@ $T_j = 175^\circ\text{C}$ , $T_C = 25^\circ\text{C}$ , Continuous	-	A
		@ $T_j = 175^\circ\text{C}$ , $T_C = 80^\circ\text{C}$ , Continuous	400	A
	$I_{DM}$	@ $T_C = 80^\circ\text{C}$ , $tp=1\text{ms}$	800	A
	$T_j$	Operating Junction Temperature <sup>(1)</sup>	-40~125	$^\circ\text{C}$
$P_D$	@ $T_j = 175^\circ\text{C}$ , $T_C = 25^\circ\text{C}$	2500	W	
	@ $T_j = 175^\circ\text{C}$ , $T_C = 80^\circ\text{C}$	1580	W	
Diode	$V_{RRM}$		100	V
	$I_F$		400	A
	$I_{FRM}$	$tp=1\text{ms}$	800	A
	$T_j$	Operating Junction Temperature <sup>(1)</sup>	-40~125	$^\circ\text{C}$
Module	$T_{stg}$	Storage Junction Temperature	-40~125	$^\circ\text{C}$
	$V_{iso}$	@AC 1minute	2500	V
	$M_S$	Heat sink Mounting torque(M4)	2.0~2.2	Nm
	W	Weight	40	g

## Internal Circuit & Pin Description

Pin Number	Pin Name	Pin Description
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16,19	SL	
17,18		NTC
$R_G$		3.0 $\Omega$
$C_{GS}$		33 nF
$C_{SNR}$		0.1 $\mu\text{F}$



(Note \*1) The Maximum junction temperature of chip is 175 $^\circ\text{C}$ .

## Electrical Characteristics of IGBT $T_C = 25^\circ\text{C}$ unless otherwise noted

### Static Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$B_{(BR)DSS}$	D-S Breakdown Voltage	$V_{GS} = 0V, I_C = 250\mu A$	100	-	-	V
$I_{DSS}$	Leakage Current	$V_{DS} = V_{DSS}, V_{GS} = 0V$	-	-	250	$\mu A$
$I_{GSS}$	G-S Leakage Current	$V_{GS} = V_{DSS}, V_{DS} = 0V$	-	-	-	nA
$V_{GS(th)}$	G-S Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu A$	-	3.0	-	V
$R_{DS(on)}$	Static Drain to Source On-Resistance	$I_D = 400A, V_{GS} = 10V, T_C = 25^\circ\text{C}$	-	3.95	-	m $\Omega$
		$I_D = 400A, V_{GS} = 10V, T_C = 125^\circ\text{C}$	-	7.20	-	m $\Omega$

### Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$C_{iss}$	Input Capacitance	*Chip level $V_{DS} = 50V, V_{GS} = 0V$ $f = 100kHz, T_C = 25^\circ\text{C}$	-	19.9	-	nF
$C_{oss}$	Output Capacitance		-	1.4	-	nF
$C_{rss}$	Reverse Transfer Capacitance		-	0.5	-	nF
$t_d(on)$	Turn-On Delay Time	$T_C = 125^\circ\text{C}, R_G = 10\Omega$ $L = 50\mu H, V_{DS} = 50V$ $V_{GS} = 0V \sim 15V$ $I_D = 400A$	-	-	-	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
$E_{is}$	Total Switching Loss		-	-	-	mJ
$Q_g$	Total Gate Charge	$V_{GS} = 0V \sim +10V$	-	-	-	$\mu C$
$Q_{gs}$	Gate-Source Charge		-	-	-	$\mu C$
$Q_{gd}$	Gate-Drain Charge		-	-	-	$\mu C$

### Electrical Characteristics of Diode $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units	
$V_F$	Diode Forward Voltage	$I_F = 400A, V_{GE} = 0V$	$T_C = 25^\circ\text{C}$	-	1.46	-	V
			$T_C = 125^\circ\text{C}$	-	1.51	-	
$t_{rr}$	Diode Reverse Recovery Time	$R_G = 10\Omega$ $L = 50\mu H$ $V_{DC} = 50V$ $V_{GS} = 0V \sim 15V$ $I_C = 400A$	$T_C = 25^\circ\text{C}$	-	-	-	ns
			$T_C = 125^\circ\text{C}$	-	-	-	
$I_{RRM}$	Diode Peak Reverse Recovery Current		$T_C = 25^\circ\text{C}$	-	-	-	A
			$T_C = 125^\circ\text{C}$	-	-	-	
$Q_{rr}$	Diode Reverse Recovery Charge		$T_C = 25^\circ\text{C}$	-	-	-	$\mu C$
			$T_C = 125^\circ\text{C}$	-	-	-	
$E_{rr}$	Diode Reverse Recovery Energy	$T_C = 25^\circ\text{C}$	-	-	-	mJ	
		$T_C = 125^\circ\text{C}$	-	-	-		

### Thermal Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$R_{th(J-C)}$	Thermal Resistance (MOSFET Part)	Junction-to-Case	-	0.06	-	$^\circ\text{C/W}$

### NTC thermistar Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$R_{25}$	Resistance	$T_C = 25^\circ\text{C}$	-	22	-	k $\Omega$
P	Power	$T_C = 25^\circ\text{C}$	-	210	-	mW
$B_{25/100}$	B constant	$T_C = 25^\circ\text{C}, \pm 3\%$ tolerance	-	4000	-	K

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## Package Dimension(Dimension in mm)

