LS Industrial Systems

LWH200G1202

SUSPM™

1200V 200A 2-Pack IGBT Module

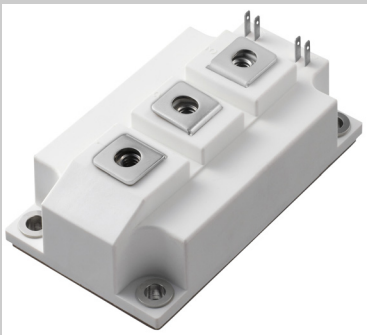
Features

- Non Punch Through (NPT) Technology
  - UltraFast
  - 10μs Short Circuit current
  - Positive $V_{CE(on)}$ Temperature Coefficient
  - Square RBSOA
- Free Wheeling Diodes with fast and soft reverse recovery
- Industrial standard package with copper base plate

Applications

- Welder / Power Supply
- UPS / Inverter
- Industrial Motor Drive

Preliminary data



SUSPM3

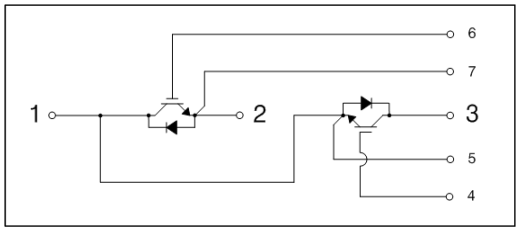
108 x 62 x 29.87 mm

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Item	Symbol	Conditions	Value	Units
IGBT	V_{CES}		1200	V
	V_{GES}		± 20	V
	I_C	@T_j= 150 °C, T_C = 25 °C, Continuous	250	A
		@T_j= 150 °C, T_C = 60°C, Continuous	200	A
	I_{CM}	@T_C = 60 °C, tp=1ms	400	A
	T_{SC}	Chip Level, @T_j = 150 °C, V_{GE}= 15V, V_{CES} < 1200V	10	μs
	T_j	Operating Junction Temperature *(1)	-40~125	°C
	P_D	@T_j= 150 °C, T_C = 25 °C	1100	W
		@T_j= 150 °C, T_C = 80 °C	600	W
Diode	V_{RRM}		1200	V
	I_F		200	A
	I_{FRM}	tp=1ms	400	A
	T_j	Operating Junction Temperature *(1)	-40~125	°C
Module	T_{stg}	Storage Junction Temperature	-40~125	°C
	V_{iso}	@AC 1minute	2500	V
	M_t	Main Terminal Mounting torque(M6)	2.5~6.0	Nm
	M_S	Heat sink Mounting torque(M6)	3.0~6.0	Nm
	W	Weight	350	g

Internal Circuit & Pin Description

Pin Number	Pin Name	Pin Description
1	C2E1	Output
2	E2	Negative DC Link Ouput
3	C1	Positive DC Link Ouput
4	G1	Gate Input for High-side
5	E1	Emitter Input for High-side
6	G2	Gate Input for Low-side
7	E2	Emitter Input for Low-side



(Note *1) The Maximum junction temperature of chip is 150°C

Electrical Characteristics of IGBT T_C = 25°C unless otherwise noted

Static Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{CES}	C-E Breakdown Voltage	V_{GE} = 0V, I_C = 1mA	1200	-	-	V
I_{CES}	C-E Cut-Off Current	V_{CE} = V_{CES}, V_{GE} = 0V	-	-	1	mA
I_{GES}	G-E Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0V	-	-	-	nA
$V_{GE(th)}$	G-E Threshold Voltage	V_{GE} = V_{CE}, I_C=200mA	-	6.6	-	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C =200A, V_{GE} = 15V, T_C=25°C	-	3.71	-	V
		I_C =200A, V_{GE} = 15V, T_C=125°C	-	4.28	-	V

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
C_{ies}	Input Capacitance	V_{CE} = 25V, V_{GE} = 0V f = 1MHz, T_C=25°C	-	-	-	nF
C_{oes}	Output Capacitance		-	-	-	nF
C_{res}	Reverse Transfer Capacitance		-	-	-	nF
t_d(on)	Turn-On Delay Time	T_C=125°C,R_G=5.1Ω L=100 μH, V_{DC}=600V V_{GE}=15V ~ -15V I_C=200A	-	96	-	ns
t_r	Rise Time		-	67	-	ns
t_d(off)	Turn-Off Delay Time		-	892	-	ns
t_f	Fall Time		-	38	-	ns
E_{on}	Turn-On Switching Loss		-	26.7	-	mJ
E_{off}	Turn-Off Switching Loss		-	11.2	-	mJ
E_{ts}	Total Switching Loss		-	37.8	-	mJ
Q_g	Total Gate Charge	V_{GE}=0V ~ +15V	-	1.6	-	μC
Q_{ge}	Gate-Emitter Charge		-	0.8	-	μC
Q_{gc}	Gate-Collector Charge		-	0.2	-	μC

Electrical Characteristics of Diode T_C = 25°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°C	-	1.80	-	V
			T_C = 125°C	-	1.75	-	
t_{rr}	Diode Reverse Recovery Time	R_G=5.1 Ω L=100 μH V_{DC}=600V V_{GE}=15V ~ -15V I_C=200A	T_C = 25°C	-	277	-	ns
			T_C = 125°C	-	492	-	
I_{RRM}	Diode Peak Reverse Recovery Current		T_C = 25°C	-	202	-	A
			T_C = 125°C	-	225	-	
Q_{rr}	Diode Reverse Recovery Charge		T_C = 25°C	-	21.4	-	μC
			T_C = 125°C	-	41.4	-	
E_{rr}	Diode Reverse Recovery Energy		T_C = 25°C	-	6.4	-	mJ
			T_C = 125°C	-	14.5	-	

Thermal Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$R_{th(J-C)}$	Thermal Resistance (IGBT Part)	Junction-to-Case	-	0.11	-	°C/W
$R_{th(J-C)D}$	Thermal Resistance (Diode Part)	Junction-to-Case	-	-	-	°C/W

* 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.

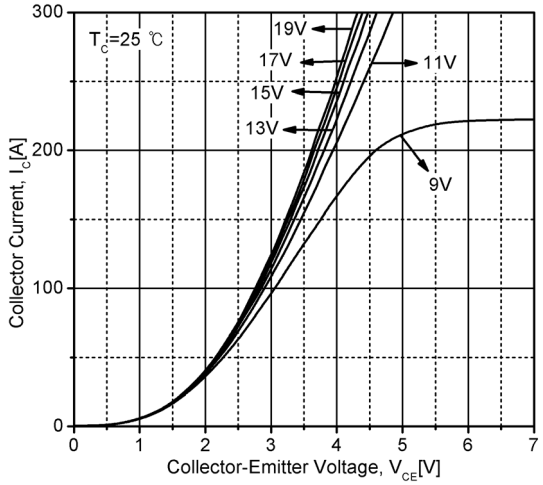


Fig 1. Typical IGBT Output Characteristics

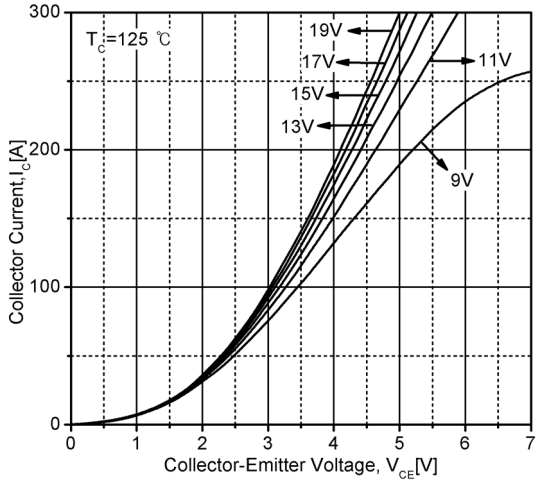


Fig 2. Typical IGBT Output Characteristics

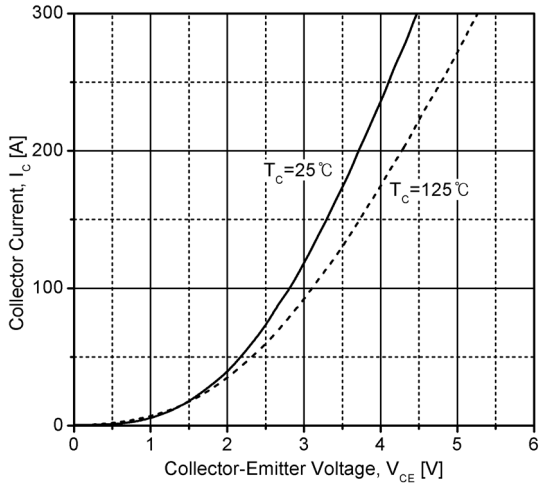


Fig 3. Typical IGBT Output Characteristics

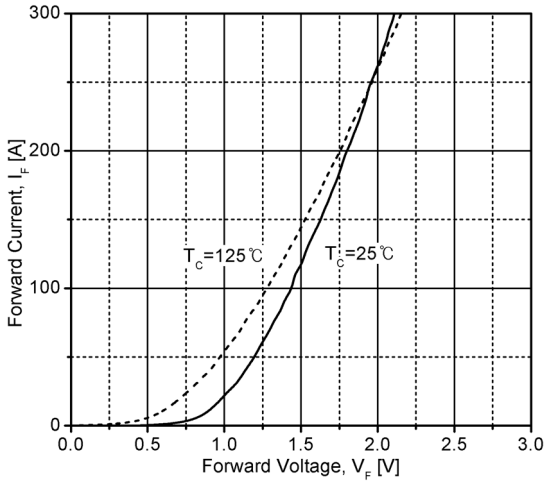


Fig 4. Typical Diode Forward Characteristics

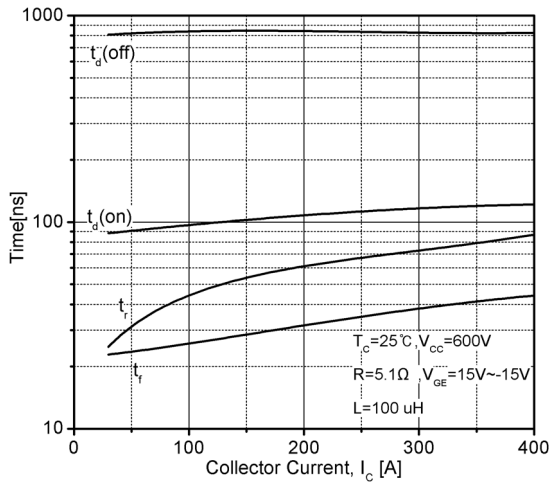


Fig 5. Typical Switching Time vs. Collector Current

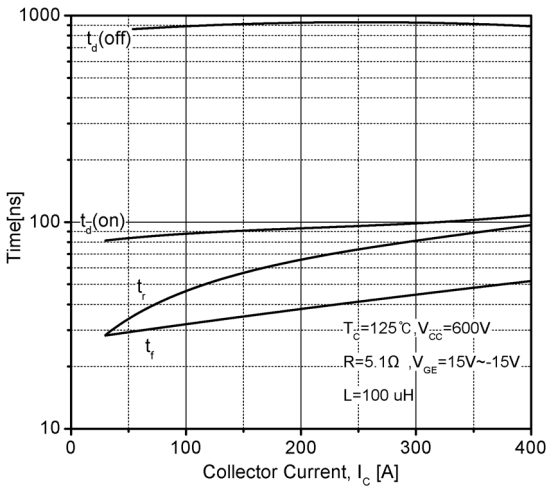


Fig 6. Typical Switching Time vs. Collector Current

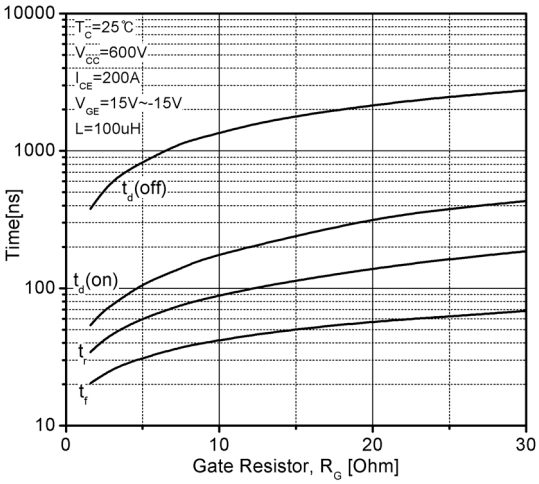


Fig 7. Typical Switching Time vs. Gate Resistor

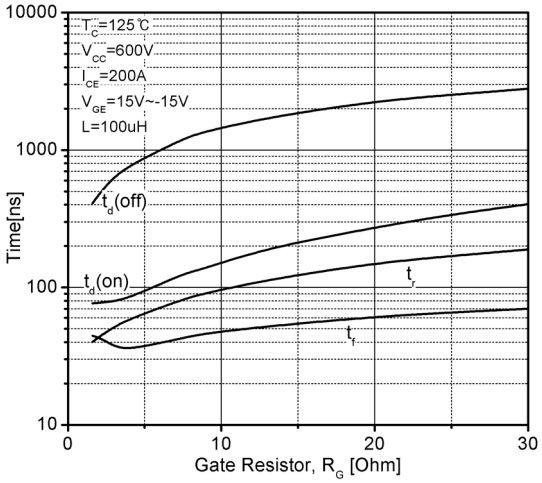


Fig 8. Typical Switching Time vs. Gate Resistor

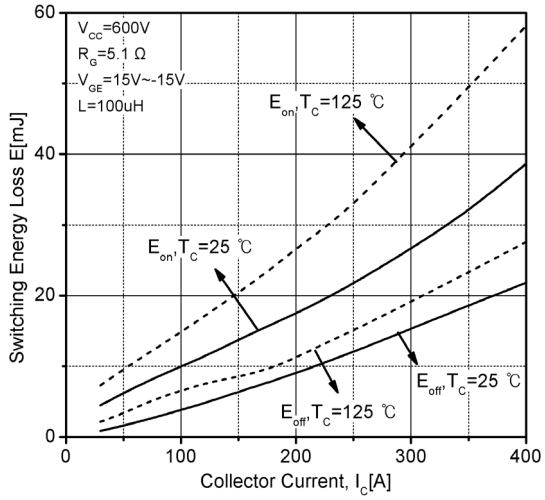


Fig 9. Typical IGBT Switching Loss

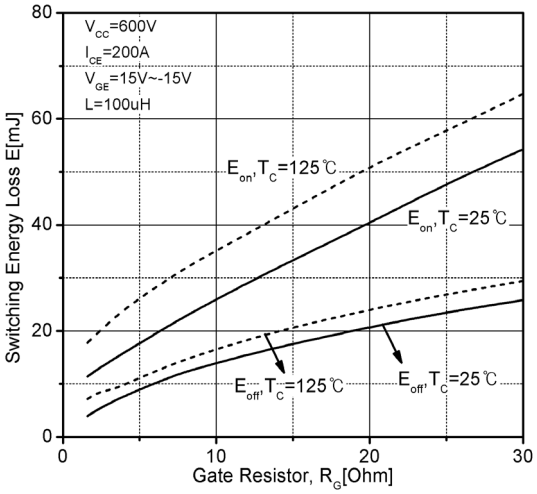


Fig 10. Typical IGBT Switching Loss

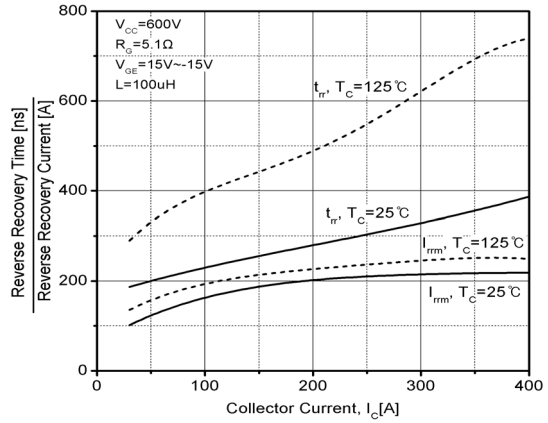


Fig 11. Typical Recovery Characteristics of Diode

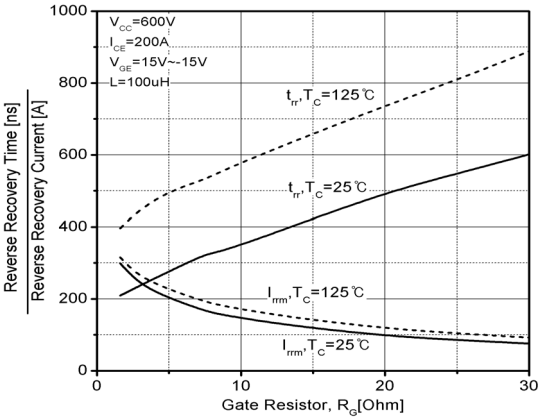


Fig 12. Typical Recovery Characteristics of Diode

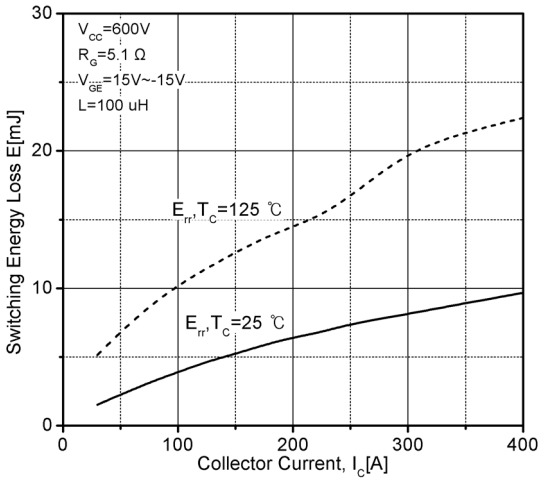


Fig 13. Typical Diode Switching Loss

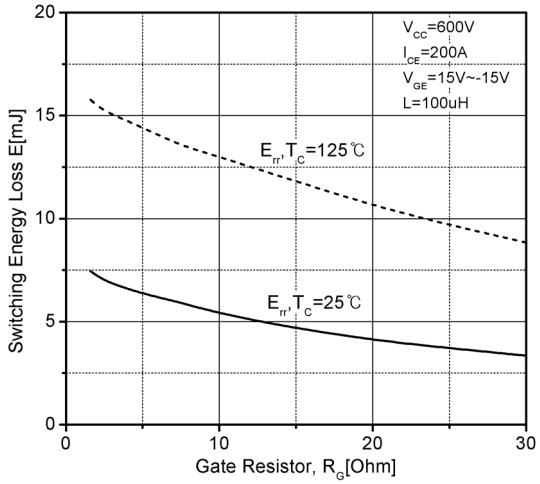


Fig 14. Typical Diode Switching Loss

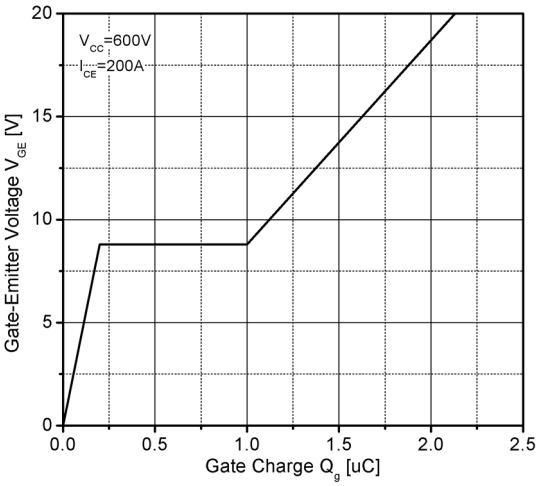


Fig 15. Typical Gate Charge Characteristics

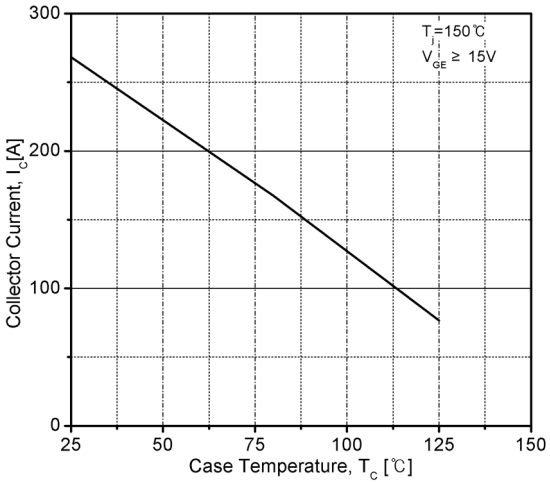


Fig 16. Case Temperature vs. Collector Current

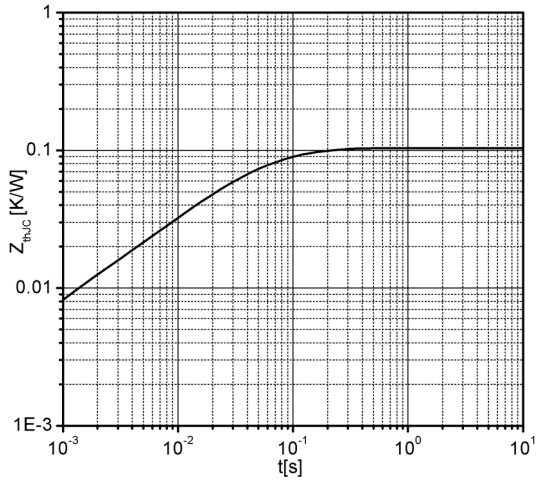


Fig 17. Typical Transient Thermal Impedance

Package Dimension(Dimension in mm)