

LUH75G1201_Preliminary
LUH75G1201Z*_Preliminary

SUSPM™

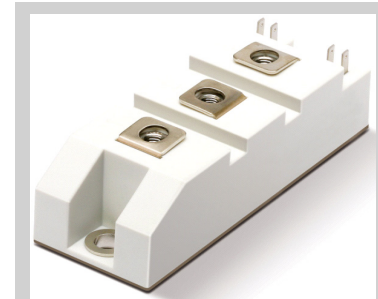
1200V 75A 2-Pack IGBT Module

Features

- Soft punch through IGBT(SPT⁺ IGBT)
 - Low saturation voltage
 - Positive temperature coefficient
 - Fast switching
 - High ruggedness
- Free wheeling diodes with fast and soft reverse recovery
- Industrial standard package with copper base plate
- 10us short circuit rated
- Included gate surge protection function

Application

- Welder
- Power supply
- Industrial motor drive
- Induction heating



SUSPM1

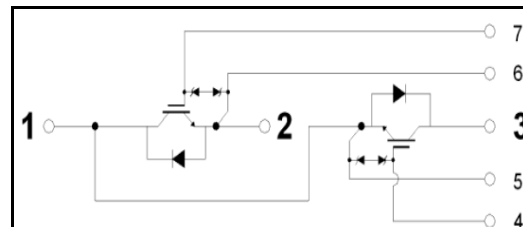
94 X 34 X 30mm

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

Item	Symbol	Condition	Value	Units
IGBT	V_{CES}	@ $T_C = 25^{\circ}\text{C}$	1200	V
	V_{GES}	@ $T_C = 25^{\circ}\text{C}$	± 20	V
	I_C	@ $T_C = 25^{\circ}\text{C}$	140	A
		@ $T_C = 80^{\circ}\text{C}$	75	A
	I_{CM}	$t_p=1\text{ms}$	150	A
	T_{sc}	@ $T_J = 125^{\circ}\text{C}$, $V_{CC} = 600\text{V}$, $V_{GE} = 15\text{V}$	10	μs
	$T_{J(max)}$	Maximum chip junction temperature	-40 to + 150	$^{\circ}\text{C}$
Inverse diode	P_D	@ $T_C = 25^{\circ}\text{C}$	390	W
		@ $T_C = 80^{\circ}\text{C}$	220	W
	V_{RRM}	@ $T_C = 25^{\circ}\text{C}$	1200	V
	I_F	@ $T_C = 25^{\circ}\text{C}$	-	A
		@ $T_C = 80^{\circ}\text{C}$	-	A
	I_{FRM}	@ $T_C = 25^{\circ}\text{C}$, $t_p=1\text{ms}$	-	A
	$T_{J(max)}$	Maximum chip junction temperature	-40 to + 150	$^{\circ}\text{C}$
Module	P_D	@ $T_C = 25^{\circ}\text{C}$	-	W
		@ $T_C = 80^{\circ}\text{C}$	-	W
	T_{stg}	Storage junction temperature	-40 to +125	$^{\circ}\text{C}$
	$T_{J(op)}$	Operating junction temperature	-40 to +125	$^{\circ}\text{C}$
	V_{iso}	@AC 1minute	2500	V
	Bolt length	Recommended Main Terminal bolt length(M5)	8 ~ 12	mm
	M_t	Main terminal mounting torque(M5)	2.5 ~ 5.0	Nm
	M_s	Heat sink mounting torque(M6)	3.0 ~ 5.0	Nm
	W	Weight	170	g

Internal Circuit & Pin Description

Pin Number	Pin Name	Pin Description
1	C2E1	Output
2	E2	Negative dc link output
3	C1	Positive dc link output
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



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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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Off Characteristics

BV _{CES}	C-E breakdown voltage	V _{GE} = 0V, I _C = 250uA	1200	-	-	V
I _{CES}	Collector cut-off current	V _{CE} = V _{CES} , V _{GE} = 0V	-	-	1.0	mA
I _{GES}	G-E leakage current	V _{GE} = V _{GES} , V _{CE} = 0V	-	-	200	nA

On Characteristics

V _{GE(th)}	G-E threshold voltage	V _{GE} = V _{CE} , I _C =75mA	6.4	6.9	7.4	V
V _{CE(sat)}	Collector to emitter	I _C = 75A, V _{GE} = 15V, T _C =25°C	-	1.92	2.42	V
	Saturation voltage	I _C = 75A, V _{GE} = 15V, T _C =125°C	-	2.14	-	V

Dynamic Characteristics

C _{ies}	Input capacitance	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz, T _C =25°C	-	5.52	-	nF
C _{oes}	Output capacitance		-	0.40	-	nF
C _{res}	Reverse transfer capacitance		-	0.26	-	nF

Switching Characteristics

t _{d(on)}	Turn-on delay time	T _C =25°C, R _G =15 ohm L=100 uH, V _{CC} =600V V _{GE} = ± 15 I _C =75A	-	110	-	ns
t _r	Rise time		-	50	-	ns
t _{d(off)}	Turn-off delay time		-	480	-	ns
t _f	Fall time		-	120	-	ns
E _{on}	Turn-on switching loss		-	6.75	-	mJ
E _{off}	Turn-off switching loss		-	3.90	-	mJ
E _{ts}	Total switching loss	T _C =125°C, R _G =15 ohm L=100 uH, V _{CC} =600V V _{GE} = ± 15 I _C =75A	-	10.65	-	mJ
t _{d(on)}	Turn-on delay time		-	110	-	ns
t _r	Rise time		-	50	-	ns
t _{d(off)}	Turn-off delay time		-	545	-	ns
t _f	Fall time		-	235	-	ns
E _{on}	Turn-on switching loss		-	8.0	-	mJ
E _{off}	Turn-off switching loss	V _{GE} =0V ~ +15V	-	6.5	-	mJ
E _{ts}	Total switching loss		-	14.5	-	mJ
Q _g	Total gate charge		-	-	-	nC
Q _{ge}	Gate-emitter charge	V _{GE} =0V ~ +15V	-	-	-	nC
Q _{gc}	Gate-collector charge		-	-	-	nC

Electrical Characteristics of Inverse Diode T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _F	Diode forward voltage	I _F =75A, V _{GE} =0V	T _C = 25°C	-	1.58	V
			T _C = 125°C	-	1.62	
t _{rr}	Diode reverse recovery time	-	T _C = 25°C	-	547	ns
			T _C = 125°C	-	394	
I _{RRM}	Diode peak reverse recovery current	R _G =15 Ohm L=100 uH, V _{CC} =600V V _{GE} = ± 15V, I _F =75A	T _C = 25°C	-	130	A
			T _C = 125°C	-	100	
Q _{rr}	Diode reverse recovery charge	-	T _C = 25°C	-	20.35	uC
			T _C = 125°C	-	11.13	
E _{rr}	Diode reverse recovery energy	-	T _C = 25°C	-	-	mJ
			T _C = 125°C	-	-	

Thermal Characteristics $T_C = 25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Min	Typ.	Max.	Units
$R_{th(J-C)}$	Junction-to-case (IGBT part)	-	-	0.32	$^{\circ}\text{C}/\text{W}$
$R_{th(J-C)D}$	Junction-to-case (Diode part)	-	-	-	$^{\circ}\text{C}/\text{W}$

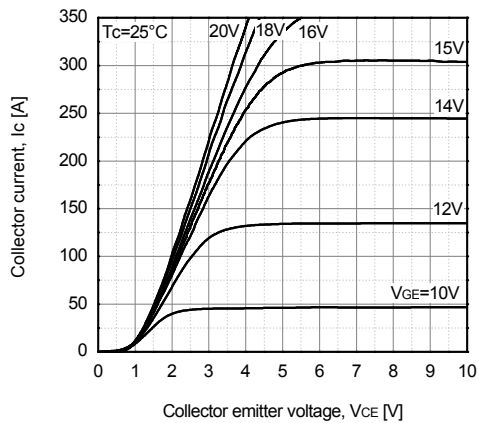


Fig 1. Typical output characteristics

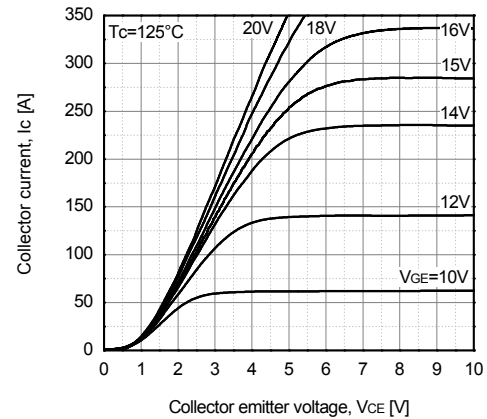


Fig 2. Typical output characteristics

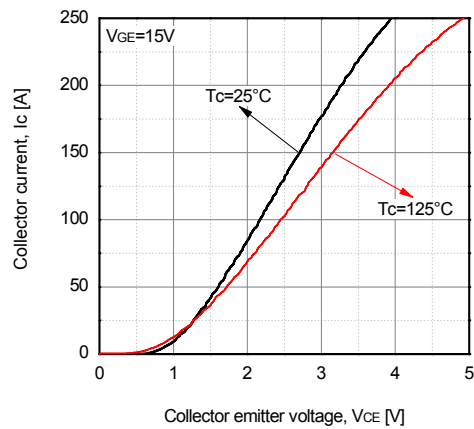


Fig 3. Typical transfer characteristics

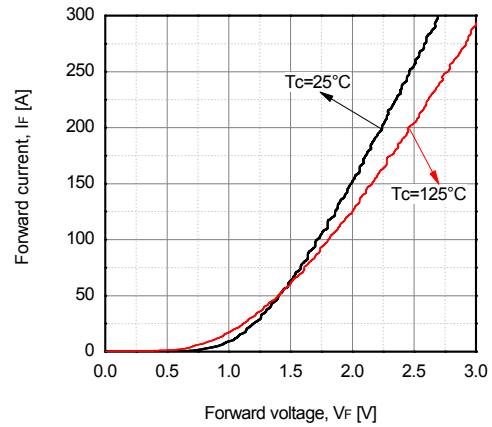


Fig 4. Typical diode forward characteristics

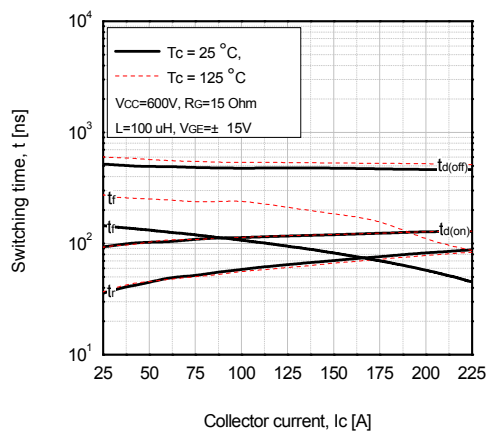


Fig 5. Typical switching time vs collector current

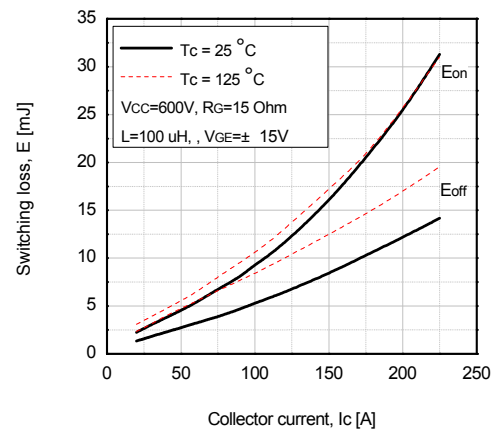


Fig 6. Typical switching loss vs collector current

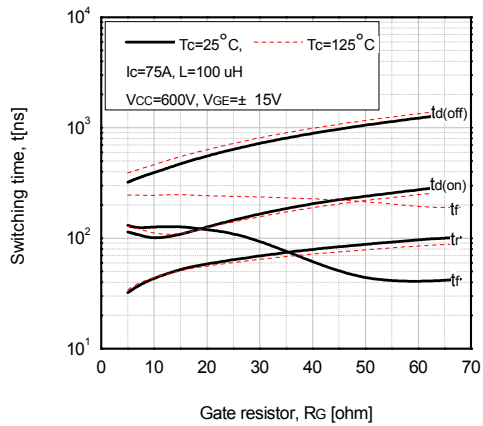


Fig 7. Typical switching time vs gate resistor

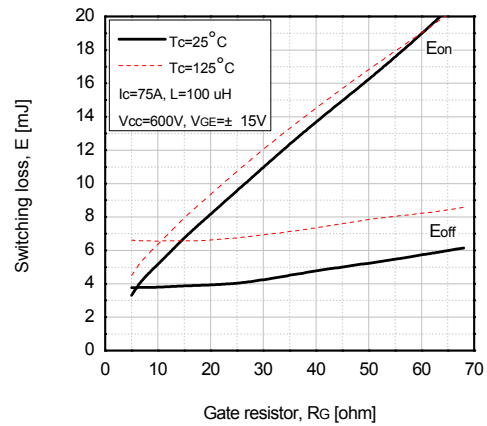


Fig 8. Typical switching loss vs gate resistor

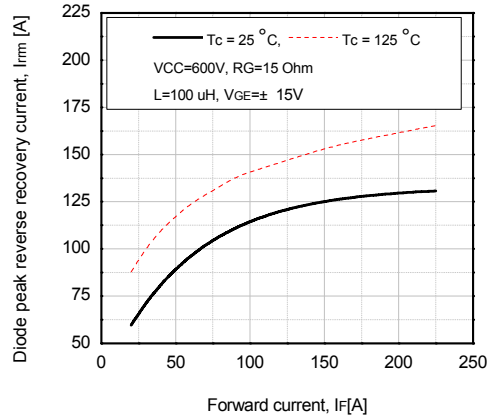


Fig 9. Diode peak reverse recovery current vs forward current

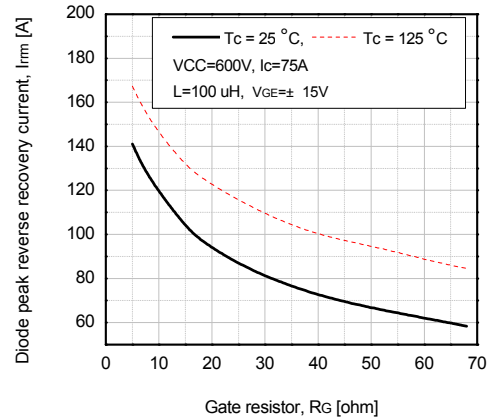


Fig 10. Diode peak reverse recovery current vs gate resistor

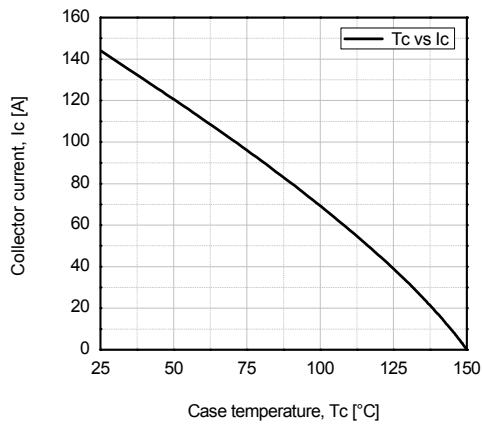


Fig 11. Case temperature vs collector current

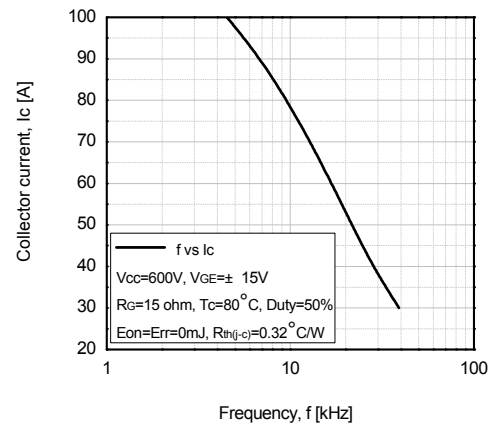


Fig 12. Frequency vs collector current

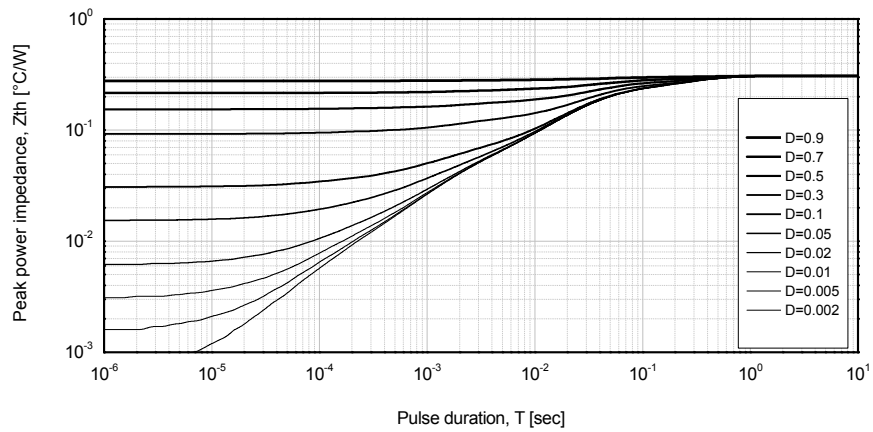


Fig 13. IGBT transient thermal impedance

Package dimension (dimensions in mm)

