

LVH150G1201_Preliminary
LVH150G1201Z*_Preliminary

SUSPM™

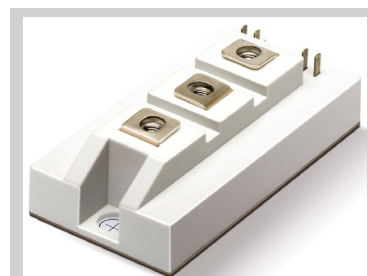
1200V 150A 2-Pack IGBT Module

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



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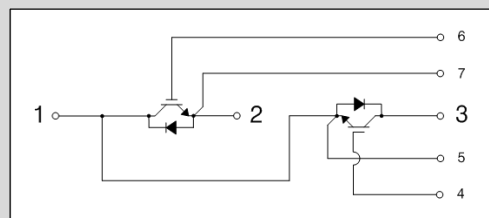
94.5 X 48.5 X 30 mm

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

Item	Symbol	Condition	Value	Units
IGBT	V _{CES}		1200	V
	V _{GES}		± 20	V
	I _C	@T _C = 25 °C		A
		@T _C = 80 °C	150	A
	I _{CM}	@T _C = 25 °C, t _p =1ms		A
	T _{sc}	@T _j = 125 °C, V _{CC} = 600V, V _{GE} = 15V	10	us
	T _j	Operating Junction Temperature	-40 to + 125	°C
	P _D	@T _C = 25 °C	1786	W
@T _C = 80 °C		1000	W	
Inverse Diode	V _{RRM}		1200	V
	I _F	@T _C = 25 °C		A
		@T _C = 80 °C	150	A
	I _{FRM}	@T _C = 25 °C, t _p =1ms		A
	I _{FSM}	@T _C = 25 °C, t _p =10ms, Sine		A
		@T _C = 125 °C, t _p =10ms, Sine		A
	T _j	Operating Junction Temperature	-40 to + 125	°C
	P _D	@T _C = 25 °C	735	W
@T _C = 80 °C		412	W	
Module	T _{stg}	Storage Temperature	-40 to + 125	°C
	V _{iso}	@AC 1minute	2500	V
	M _t	Main Terminal Mounting torque(M6)	2.5 ~ 5.0	Nm
	M _s	Heat sink Mounting torque(M6)	3.0 ~ 5.0	Nm
	W	Weight	240	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 $T_C = 25^\circ\text{C}$ unless otherwise noted

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

BV_{CES}	C-E Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	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	-	200	nA

On Characteristics

$V_{GE(th)}$	G-E Threshold Voltage	$V_{GE} = V_{CE}, I_C = 150mA$	-	6.95	-	V
$V_{CE(sat)}$	Collector to Emitter	$I_C = 150A, V_{GE} = 15V, T_C = 25^\circ\text{C}$	-	1.9	-	V
	Saturation Voltage	$I_C = 150A, V_{GE} = 15V, T_C = 125^\circ\text{C}$	-	2.1	-	V

Dynamic Characteristics

C_{ies}	Input Capacitance	$V_{CE} = 25V, V_{GE} = 0V,$ $f = 1MHz, T_C = 25^\circ\text{C}$	-		-	nF
C_{oes}	Output Capacitance		-		-	nF
C_{res}	Reverse Transfer Capacitance		-		-	nF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$T_C = 25^\circ\text{C}, R_G = 10\ \Omega$ $L = 100\ \mu H, V_{DC} = 600V$ $V_{GE} = 15V \sim -15V$ $I_C = 100A$	-	100	-	ns
t_r	Rise Time		-	65	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	535	-	ns
t_f	Fall Time		-	135	-	ns
E_{on}	Turn-On Switching Loss		-	14.35	-	mJ
E_{off}	Turn-Off Switching Loss		-	8.75	-	mJ
E_{ts}	Total Switching Loss	$V_{GE} = 0V \sim +15V$	-	23.10	-	mJ
Q_g	Total Gate Charge		-		-	nC
Q_{ge}	Gate-Emitter Charge		-		-	nC
Q_{gc}	Gate-Collector Charge		-		-	nC

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F = 150A, V_{GE} = 0V$	$T_C = 25^\circ\text{C}$	-	1.6	V
			$T_C = 125^\circ\text{C}$	-	1.6	
t_{rr}	Diode Reverse Recovery Time		$T_C = 25^\circ\text{C}$	-	-	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		$T_C = 25^\circ\text{C}$	-	-	uC
			$T_C = 125^\circ\text{C}$	-	-	
E_{rr}	Diode Reverse Recovery Energy		$T_C = 25^\circ\text{C}$	-	-	mJ
			$T_C = 125^\circ\text{C}$	-	-	

Thermal Characteristics

Symbol	Parameter	Min	Typ.	Max.	Units
$R_{th(J-C)}$	Junction-to-Case (IGBT Part)	-	0.07	-	$^\circ\text{C}/W$
$R_{th(J-C)D}$	Junction-to-Case (Diode Part)	-	0.17	-	$^\circ\text{C}/W$

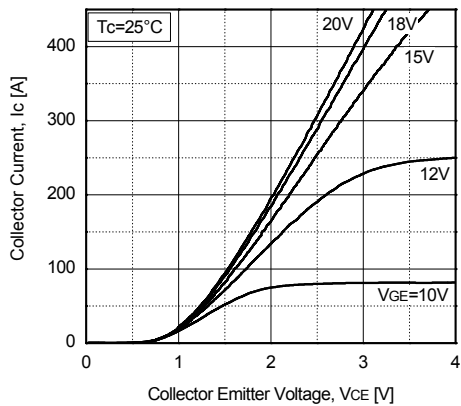


Fig 1. Typical Output Characteristics

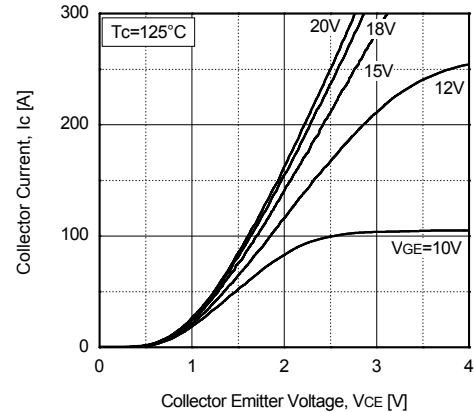


Fig 2. Typical Output Characteristics

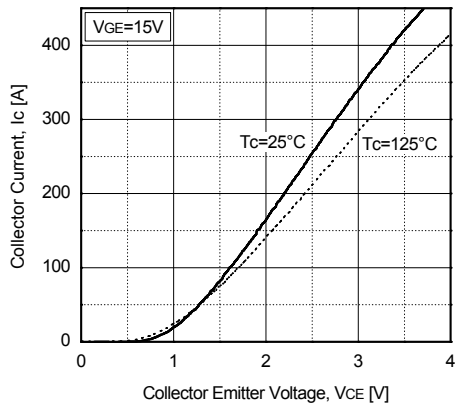


Fig 3. Typical Transfer Characteristics

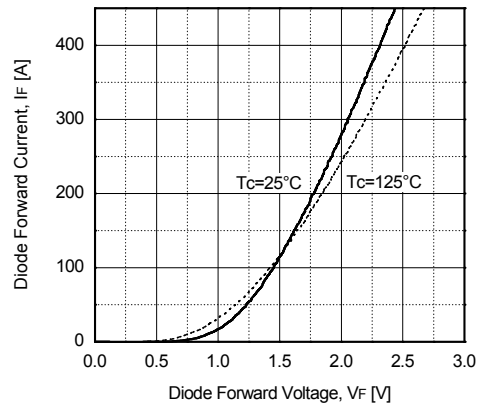


Fig 4. Typical Diode Forward Characteristics

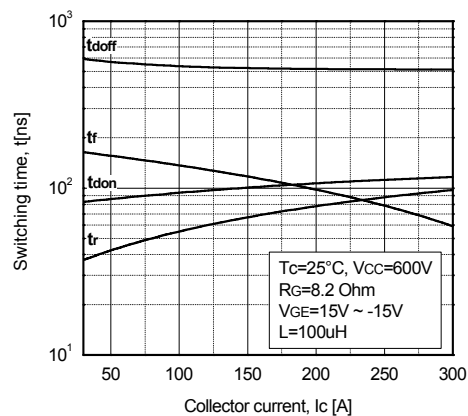


Fig 5. Typical Switching Time vs Collector Current

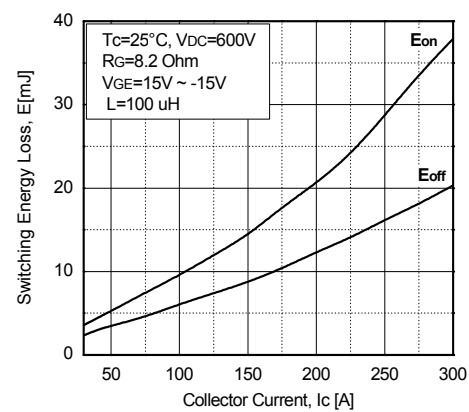


Fig 6. Typical Switching Loss vs Collector Current

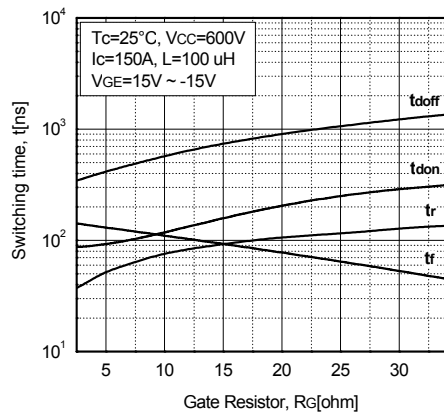


Fig 7. Typical Switching Time vs Gate Resistor

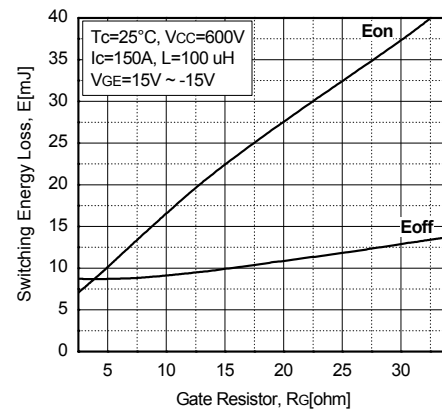


Fig 8. Typical Switching Loss vs Gate Resistor

Package Dimension (dimensions in mm)

