SEMIPOWEREX®

SPM150GB1201S3

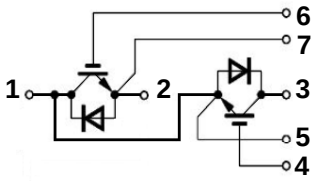
2-PACK IGBT Module
150A 1200V

preliminary data

General Description

IGBT power module provides ultra low conduction loss as well as short circuit ruggedness. It is designed for applications such as general SMPS and UPS.

Package : S3



Features

- ✓ Soft Punch Through(SPT+) Technology
- ✓ Fast & Soft inverse CAL Diodes
- ✓ Positive Temperature Coefficient
- ✓ Short Circuit Ruggedness
- ✓ V_{CES}=1200V
- ✓ I_C=150A

Application

- ✓ Switching Mode Power Supplies(SMPS)
- ✓ High Power Inverter
- ✓ UPS, Robotics
- ✓ Electrical Welding Machine

Absolute Maximum Ratings (T_C=25℃, unless otherwise noted.)

Symbol	Parameter	Conditions	Values	Units
V_{CES}	collector-emitter voltage	V_{GE} =0, T_j≥25°C	1,200	V
V_{GES}	gate-emitter peak voltage	-	± 20	V
$I_{C(AV)}$	DC collector current	T_C=80°C	150	A
I_{CRM}	repetitive peak collector current	T_C=80°C, tp=1ms	300	A
$I_{F(AV)}$	DC forward current	T_C=80°C	150	A
I_{FRM}	repetitive peak forw. current	10 ms, sin 180°	860	A
P_D	total power dissipation	T_C=25°C	830	W
		T_C=80°C	430	W
t_{SC}	short circuit withstand time	V_{CC}= 900V, V_{CES}= 1200V , V_{GE}=15 V, T_j =125 °C	10	μs
$T_{j(max)}$	maximum junction temperature	-	-40 ~ 150	°C
T_{stg}	storage temperature	-	-40 ~ 125	°C
V_{ISOL}	Isolation test voltage	RMS, f=50Hz, t=1 minutes	2,500	V
Weight	module	-	320	g
-	terminal mounting torque (M6)	typical	4.5	N.m

Static Characteristics (T_C=25℃, unless otherwise noted.)

Symbol	Parameter	min.	typ.	max.	Units	Conditions
BV_{CES}	collector-emitter breakdown voltage	1,200	-	-	V	I_C=1mA, V_{GE}=0V, T_j=25°C
I_{CES}	collector-emitter cut-off current	-	-	200	uA	V_{CE}=1,200V, V_{GE}=0V
I_{GES}	gate-emitter Leakage Current	-400	-	400	nA	V_{CE}=0V, V_{GE}=±20V
$V_{GE(th)}$	gate-emitter threshold voltage	5.0	6.0	7.0	V	V_{GE}=V_{CE}, I_C=6mA
$V_{CE(SAT)}$	collector-emitter saturation voltage	-	2.0	2.4	V	I_C=150A, V_{GE}=15V, T_C=25°C
		-	2.2	-	V	I_C=150A, V_{GE}=15V, T_C=125°C
R_{Gint}	internal gate resistance	-	1.5	-	Ω	

Electrical Characteristics (T_C=25℃, unless otherwise noted.)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Conditions
$t_{d(on)}$	turn-on delay time	-	170	-	ns	V_{DC}=600V, I_C=150A, R_G=15Ω, V_{GE}=±15V, L= 60nH, Inductive Load, T_j=25°C
t_r	rise time	-	75	-	ns	
$t_{d(off)}$	turn-off delay time	-	445	-	ns	
t_f	fall time	-	50	-	ns	
E_{ON}	turn-on switching loss	-	9.3	-	mJ	
E_{OFF}	turn-off switching Loss	-	4.5	-	mJ	
$t_{d(on)}$	turn-on delay time	-	180	-	ns	V_{DC}=600V, I_C=150A, R_G=15Ω, V_{GE}=±15V, L= 60nH, Inductive Load, T_j=125°C
t_r	rise time	-	70	-	ns	
$t_{d(off)}$	turn-off delay time	-	510	-	ns	
T_f	fall time	-	70	-	ns	
E_{ON}	turn-on switching loss	-	12.4	-	mJ	
E_{OFF}	turn-off switching loss	-	7.5	-	mJ	
Q_g	total gate charge	-	1,560	-	nC	V_{CE}=600V, I_C=150A, V_{GE}=±15V
C_{ies}	input capacitance	-	10.1	-	nF	V_{CE}=25V, V_{GE}=0V f=1MHz, T_j=25°C
C_{oes}	output capacitance	-	1.2	-	nF	
C_{res}	reverse transfer capacitance	-	0.5	-	nF	

Electrical Characteristics of Diode

Symbol	Parameter	min.	typ.	max.	Units	Conditions
V_F	forward voltage	-	1.9	2.3	V	T_C = 25°C, I_F =100A
		-	1.8	-	V	T_C = 125°C, I_F = 100A
I_{RM}	peak reverse recovery current	-	150	-	A	T_j=150°C, 150A, 600V, 3,200A/us
E_{rec}	reverse recovery current	-	8.4	-	mJ	
t_{rr}	diode reverse recovery time	-	0.5	-	us	

Thermal Characteristics

Symbol	Parameter	min.	typ.	max.	Units	Conditions
Rth(j-c)	junction-to-case (IGBT Part,Per 1/2 Module)	-	-	0.15	K/W	
Rth(j-c)	junction-to-case (FRD Part,Per 1/2 Module)	-	-	0.32	K/W	
Rth(c-f)	case-to-heat sink (with thermal compound)	-	0.05	-	K/W	

Performance Curves

Fig.1 IGBT output characteristics (typical)@T_C = 25℃

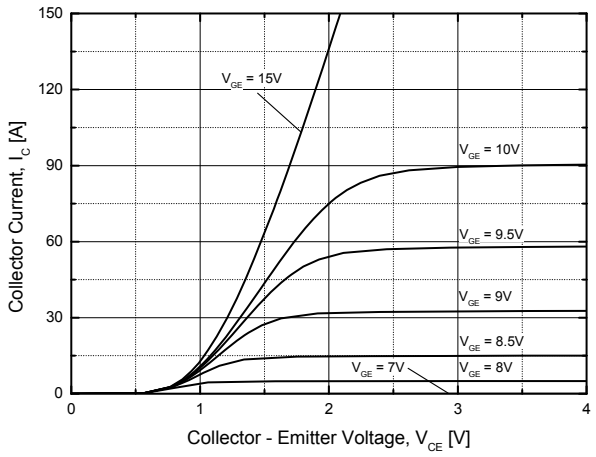


Fig.2 IGBT output characteristics (typical)@T_C = 125℃

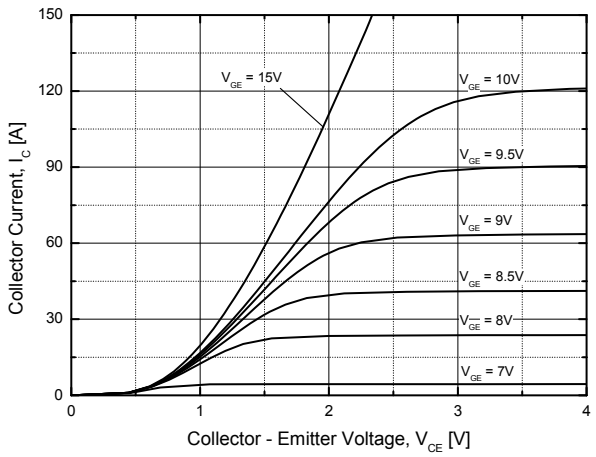


Fig.3 IGBT output characteristics, $V_{CE(SAT)}$ (typical)

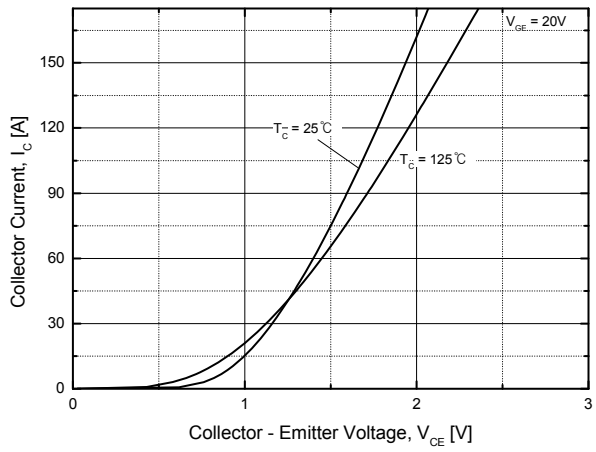


Fig.4 Diode forward characteristics (typical)

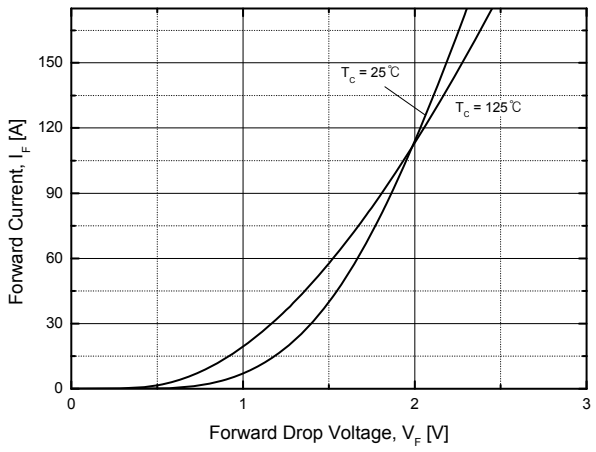


Fig.5 Capacitance (typical)

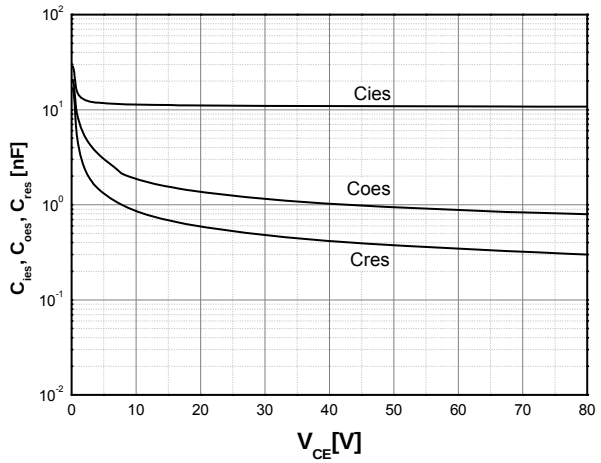
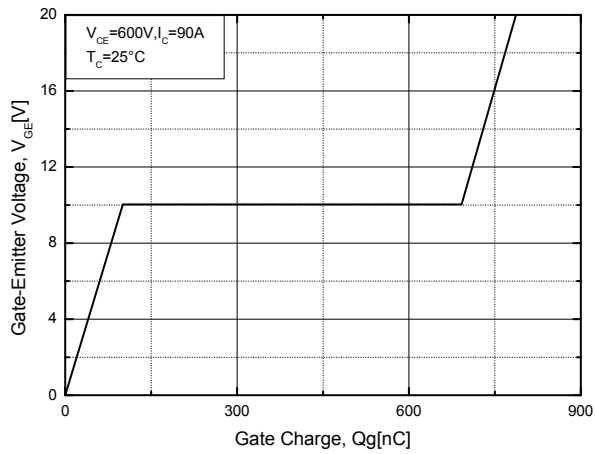
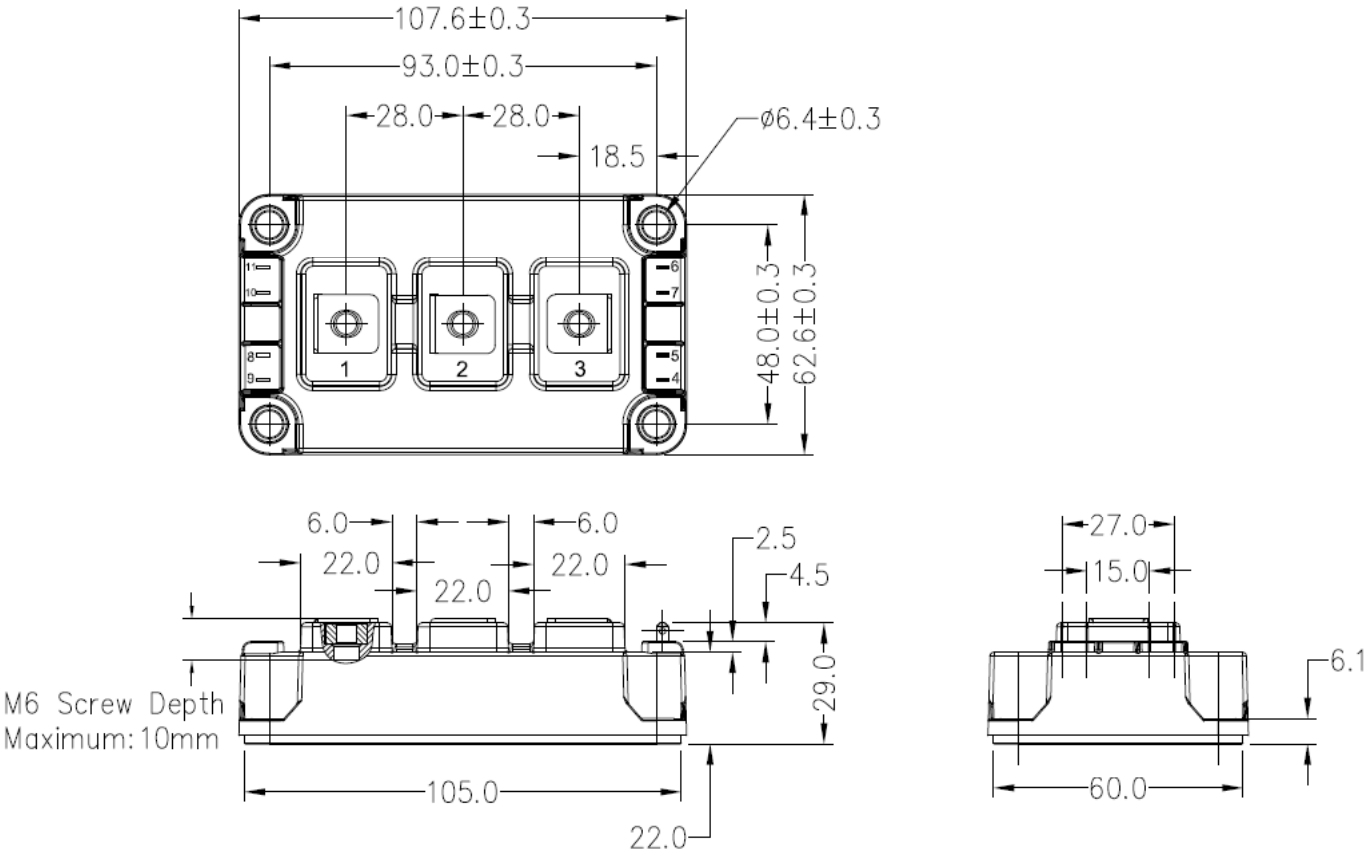


Fig.6 Gate charge characteristics (typical)



Package Outline (Dimension in mm)



* Technical information on this specification subject to change without any notice.