SEMIPOWEREX®

SPM75GA601S7

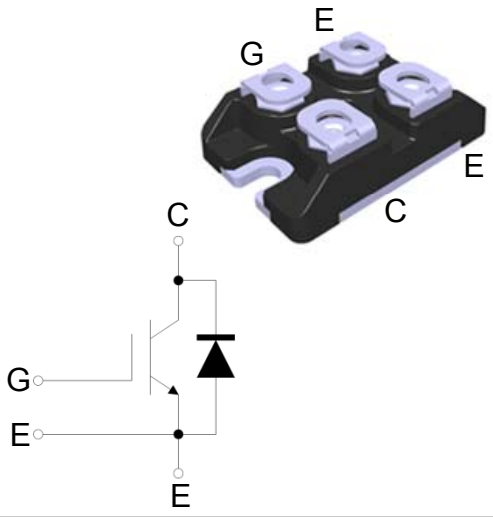
Single IGBT Module
75A 600V

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 : S7(SOT-227)



Features

- ✓ NPT Trench Technology
- ✓ Low Conduction Loss
- ✓ Fast & Soft inverse CAL Diodes
- ✓ Positive Temperature Coefficient
- ✓ Short Circuit Ruggedness
- ✓ V_{CES}=600V
- ✓ I_C=75A

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	600	V
V_{GES}	gate-emitter peak voltage	-	± 20	V
$I_{C(AV)}$	DC collector current	T_C=80°C	75	A
I_{CRM}	repetitive peak collector current	T_C=80°C, tp=1ms	150	A
$I_{F(AV)}$	DC forward current	-	75	A
I_{FRM}	repetitive peak forw. current	10 ms, sin 180°	490	A
P_D	total power dissipation	T_C=25°C	325	W
		T_C=80°C	180	W
t_{SC}	short circuit withstand time	V_{CC}= 300V, V_{CES}= 600V , 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	-	29	g
-	terminal mounting torque (M4)	typical	1.45	N.m

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

Symbol	Parameter	min.	typ.	max.	Units	Conditions
BV_{CES}	collector-emitter breakdown voltage	600	-	-	V	I_C=1mA, V_{GE}=0V, T_j=25°C
I_{CES}	collector-emitter cut-off current	-	-	1	mA	V_{CE}=600V, V_{GE}=0V
I_{GES}	gate-emitter Leakage Current	-500	-	500	nA	V_{CE}=0V, V_{GE}=±20V
$V_{GE(th)}$	gate-emitter threshold voltage	6.0	7.5	9.0	V	V_{GE}=V_{CE}, I_C=75A
$V_{CE(SAT)}$	collector-emitter saturation voltage	1.8	2.1	2.6	V	I_C=75A, V_{GE}=15V, T_C=25°C
		-	2.5	-	V	I_C=75A, V_{GE}=15V, T_C=125°C
R_{Gint}	internal gate resistance	-	2.5	-	Ω	

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Conditions
$t_{d(on)}$	turn-on delay time	-	70	-	ns	V_{DC}=300V, I_C=75A, R_G=30Ω, V_{GE}=±15V, L= 60 nH, Inductive Load, T_j=25°C
t_r	rise time	-	40	-	ns	
$t_{d(off)}$	turn-off delay time	-	250	-	ns	
t_f	fall time	-	20	36	ns	
E_{ON}	turn-on switching loss	-	TBD	-	mJ	
E_{OFF}	turn-off switching Loss	-	1.6	2.0	mJ	
$t_{d(on)}$	turn-on delay time	-	65	-	ns	V_{DC}=300V, I_C=75A, R_G=30Ω, V_{GE}=±15V, L= 60 nH, Inductive Load, T_j=125°C
t_r	rise time	-	45	-	ns	
$t_{d(off)}$	turn-off delay time	-	255	-	ns	
T_f	fall time	-	25	45	ns	
E_{ON}	turn-on switching loss	-	TBD	-	mJ	
E_{OFF}	turn-off switching loss	-	1.9	2.4	mJ	
Q_g	total gate charge	-	240	-	nC	V_{CE}=300V, I_C=75A,V_{GE}=±15V
C_{ies}	input capacitance	-	5.5	-	nF	V_{CE}=25V, V_{GE}=0V f=1MHz
C_{oes}	output capacitance	-	0.6	-	nF	
C_{res}	reverse transfer capacitance	-	0.22	-	nF	

Electrical Characteristics of Diode

Symbol	Parameter	min.	typ.	max.	Units	Conditions
V_F	forward voltage	-	1.3	1.6	V	T_C = 25°C, I_F = 50A
		-	1.2	-	V	T_C = 125°C, I_F = 50A
I_{RM}	peak reverse recovery current	-	48	-	A	T_j=150°C, 75A, 300V, 1,100A/us
E_{rec}	reverse recovery current	-	1.1	-	mJ	
Q_{rr}	reverse recovery charge	-	6.0	-	μC	

Thermal Characteristics

Symbol	Parameter	min.	typ.	max.	Units	Conditions
Rth(j-c)	junction-to-case (IGBT)	-	-	0.38	K/W	
Rth(j-c)	junction-to-case (FRD)	-	-	0.60	K/W	
Rth(c-f)	case-to-heat sink (with thermal compound)	-	0.05	-	K/W	

Performance Curves

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

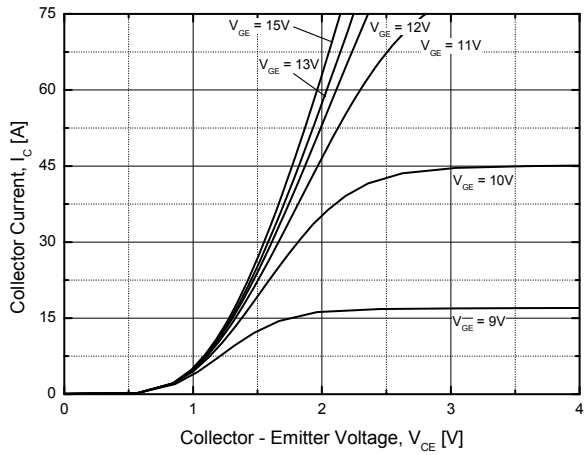


Fig. 2 Typical IGBT output characteristics(T_C = 125℃)

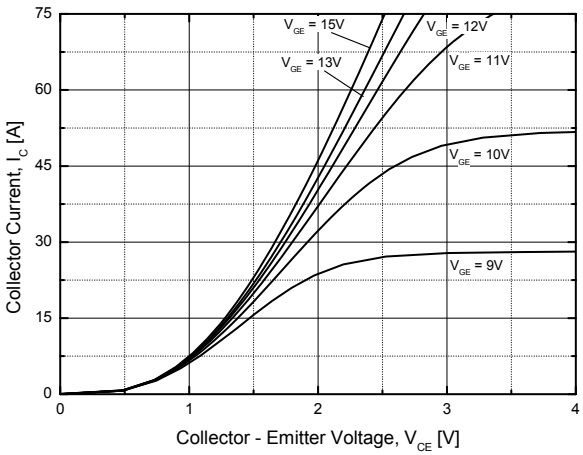


Fig. 3 Typical IGBT output characteristics, $V_{CE(SAT)}$

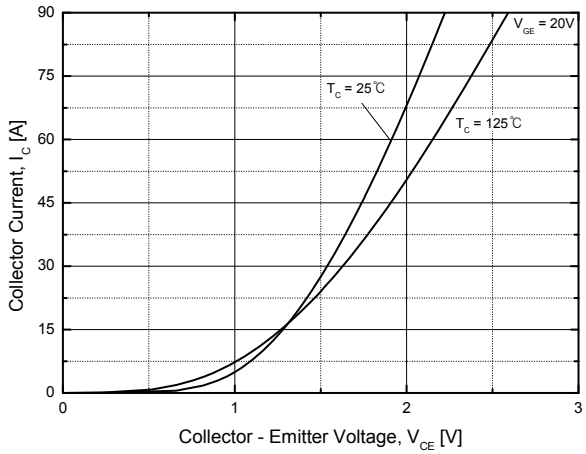


Fig. 4 Typical diode forward characteristics

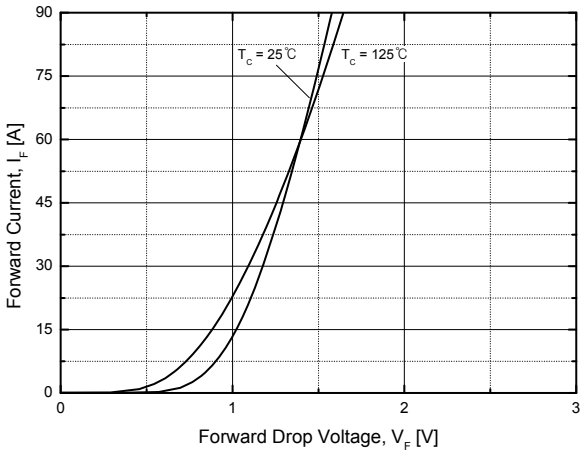


Fig. 5 Typical Capacitance

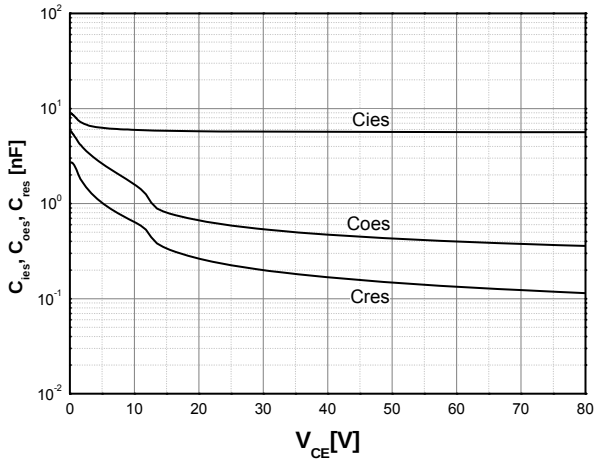
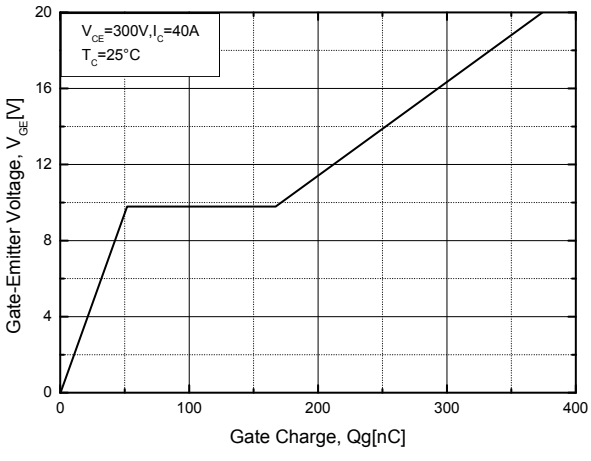
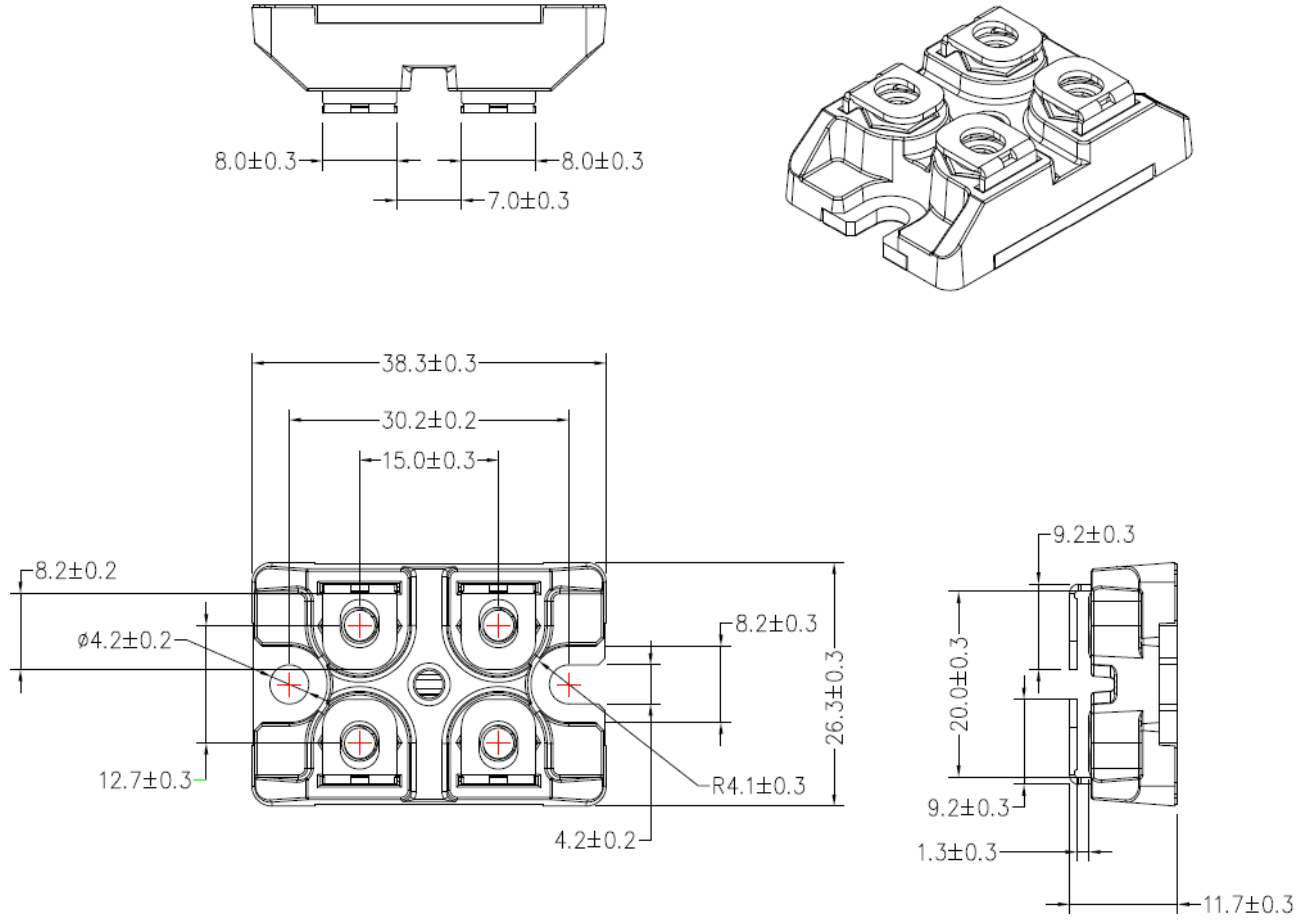


Fig. 6 Typical gate charge characteristics



Package Outline (Dimension in mm)



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