

**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.

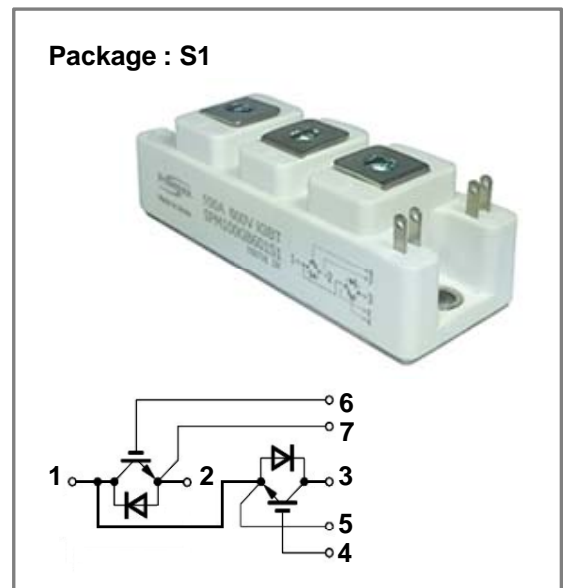
*preliminary data*

**Features**

- ✓ NPT Trench Technology
- ✓ Low Conduction Loss
- ✓ Fast & Soft inverse CAL Diodes
- ✓ Positive Temperature Coefficient
- ✓ Short Circuit Ruggedness
- ✓  $V_{CES}=600V$
- ✓  $I_C=100A$

**Application**

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



**Absolute Maximum Ratings** ( $T_C=25^{\circ}C$ , unless otherwise noted.)

Symbol	Parameter	Conditions	Values	Units
$V_{CES}$	collector-emitter voltage	$V_{GE}=0, T_j \geq 25^{\circ}C$	600	V
$V_{GES}$	gate-emitter peak voltage	-	$\pm 20$	V
$I_{C(AV)}$	DC collector current	$T_C=80^{\circ}C$	100	A
$I_{CRM}$	repetitive peak collector current	$T_C=80^{\circ}C, t_p=1ms$	200	A
$I_{F(AV)}$	DC forward current	-	100	A
$I_{FRM}$	repetitive peak forw. current	10 ms, sin 180°	985	A
$P_D$	total power dissipation	$T_C=25^{\circ}C$	440	W
		$T_C=80^{\circ}C$	248	W
$t_{SC}$	short circuit withstand time	$V_{CC}=300V, V_{CES}=600V, V_{GE}=15V, T_j=125^{\circ}C$	10	$\mu s$
$T_{j(max)}$	maximum junction temperature	-	-40 ~ 150	$^{\circ}C$
$T_{stg}$	storage temperature	-	-40 ~ 125	$^{\circ}C$
$V_{ISOL}$	isolation test voltage	RMS, f=50Hz, t=1 minutes	2,500	V
Weight	module	-	170	g
-	terminal mounting torque (M5)	typical	3.0	N.m

**Static Characteristics** ( $T_C=25^\circ\text{C}$ , unless otherwise noted.)

Symbol	Parameter	min.	typ.	max.	Units	Conditions
$BV_{CES}$	collector-emitter breakdown voltage	600	-	-	V	$I_C=1\text{mA}$ , $V_{GE}=0\text{V}$ , $T_J=25^\circ\text{C}$
$I_{CES}$	collector-emitter cut-off current	-	-	1	mA	$V_{CE}=600\text{V}$ , $V_{GE}=0\text{V}$
$I_{GES}$	gate-emitter Leakage Current	-500	-	500	nA	$V_{CE}=0\text{V}$ , $V_{GE}=\pm 20\text{V}$
$V_{GE(th)}$	gate-emitter threshold voltage	6.0	7.5	9.0	V	$V_{GE}=V_{CE}$ , $I_C=100\text{A}$
$V_{CE(SAT)}$	collector-emitter saturation voltage	-	2.2	2.6	V	$I_C=100\text{A}$ , $V_{GE}=15\text{V}$ , $T_C=25^\circ\text{C}$
		-	2.7	-	V	$I_C=100\text{A}$ , $V_{GE}=15\text{V}$ , $T_C=125^\circ\text{C}$
$R_{Gint}$	internal gate resistance	-	2.5	-	$\Omega$	

**Electrical Characteristics** ( $T_C=25^\circ\text{C}$ , unless otherwise noted.)

Symbol	Parameter	min.	typ.	max.	Units	Conditions
$t_{d(on)}$	turn-on delay time	-	70	-	ns	$V_{DC}=300\text{V}$ , $I_C=100\text{A}$ , $R_G=15\Omega$ , $V_{GE}=\pm 15\text{V}$ , $L=60\text{ nH}$ , Inductive Load, $T_J=25^\circ\text{C}$
$t_r$	rise time	-	40	-	ns	
$t_{d(off)}$	turn-off delay time	-	250	-	ns	
$t_f$	fall time	-	24	45	ns	
$E_{ON}$	turn-on switching loss	-	4.0	8.0	mJ	
$E_{OFF}$	turn-off switching Loss	-	2.1	2.6	mJ	
$t_{d(on)}$	turn-on delay time	-	65	-	ns	$V_{DC}=300\text{V}$ , $I_C=100\text{A}$ , $R_G=15\Omega$ , $V_{GE}=\pm 15\text{V}$ , $L=60\text{ nH}$ , Inductive Load, $T_J=125^\circ\text{C}$
$t_r$	rise time	-	45	-	ns	
$t_{d(off)}$	turn-off delay time	-	255	-	ns	
$T_f$	fall time	-	30	56	ns	
$E_{ON}$	turn-on switching loss	-	6.0	12.0	mJ	
$E_{OFF}$	turn-off switching loss	-	2.5	3.1	mJ	
$Q_g$	total gate charge	-	450	-	nC	$V_{CE}=300\text{V}$ , $I_C=100\text{A}$ , $V_{GE}=\pm 15\text{V}$
$C_{ies}$	input capacitance	-	12	-	nF	$V_{CE}=25\text{V}$ , $V_{GE}=0\text{V}$ $f=1\text{MHz}$
$C_{oes}$	output capacitance	-	0.8	-	nF	
$C_{res}$	reverse transfer capacitance	-	0.3	-	nF	

**Electrical Characteristics of Diode**

Symbol	Parameter	min.	typ.	max.	Units	Conditions
V <sub>F</sub>	forward voltage	-	1.3	1.6	V	T <sub>C</sub> = 25°C, I <sub>F</sub> = 75A
		-	1.2	-	V	T <sub>C</sub> = 125°C, I <sub>F</sub> = 75A
I <sub>RM</sub>	peak reverse recovery current	-	90	-	A	T <sub>j</sub> =150°C, 100A, 300V, 1,500A/us
E <sub>rec</sub>	reverse recovery current	-	2.02	-	mJ	
Q <sub>rr</sub>	reverse recovery charge	-	11.1	-	μC	

**Thermal Characteristics**

Symbol	Parameter	min.	typ.	max.	Units	Conditions
R <sub>th(j-c)</sub>	junction-to-case (IGBT)	-	-	0.28	K/W	
R <sub>th(j-c)</sub>	junction-to-case (FRD)	-	-	0.45	K/W	
R <sub>th(c-f)</sub>	case-to-heat sink (with thermal compound)	-	0.05	-	K/W	

**Performance Curves**

Fig. 1 Typical IGBT output characteristics ( $T_C = 25^\circ\text{C}$ )

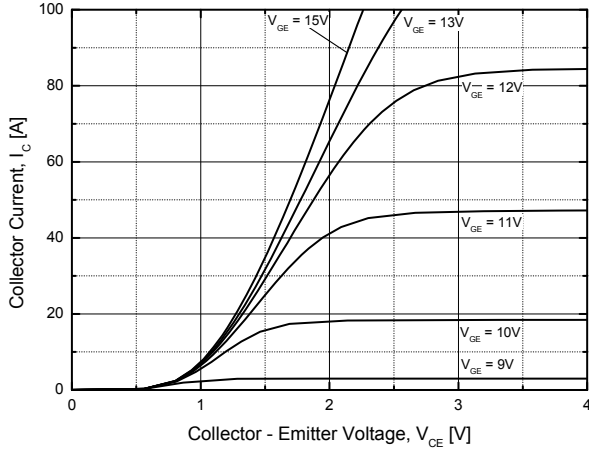


Fig. 2 Typical IGBT output characteristics ( $T_C = 125^\circ\text{C}$ )

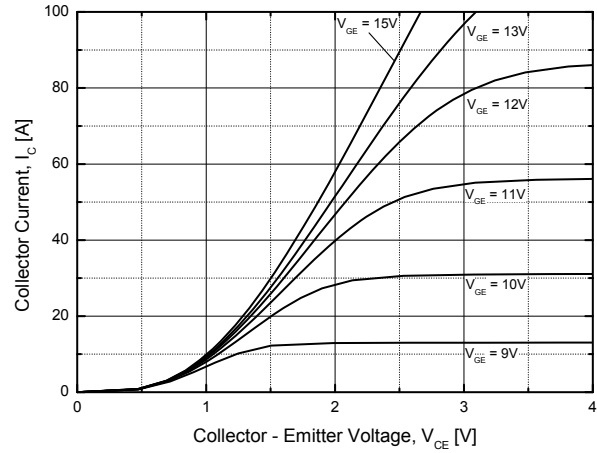


Fig. 3 Typical IGBT output characteristics,  $V_{CE(SAT)}$

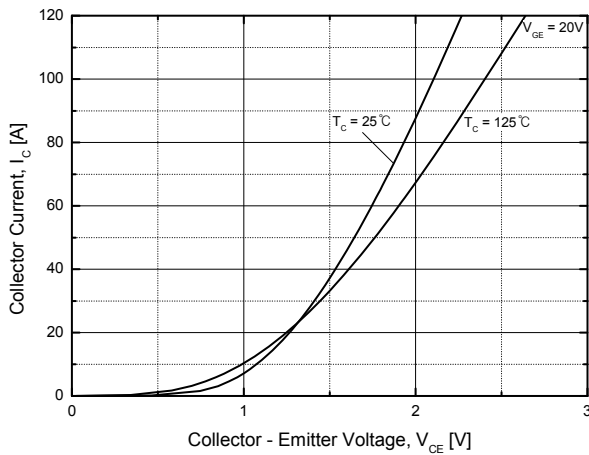


Fig. 4 Typical diode forward characteristics

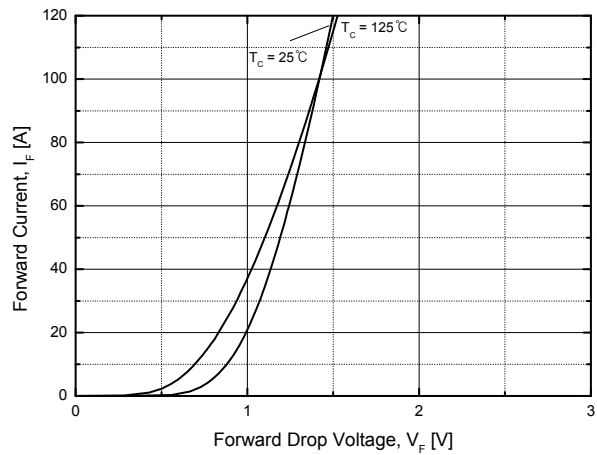


Fig. 5 Typical Capacitance

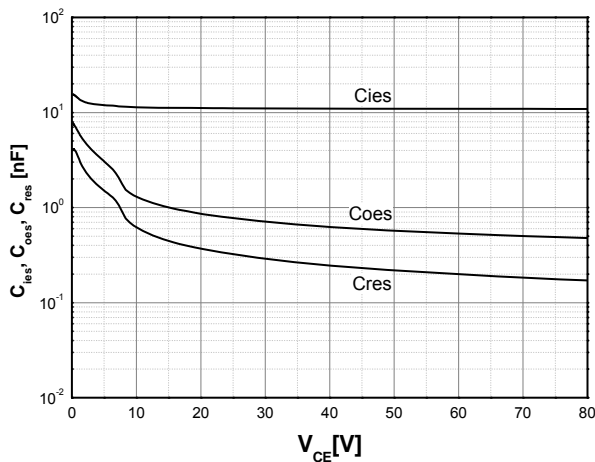
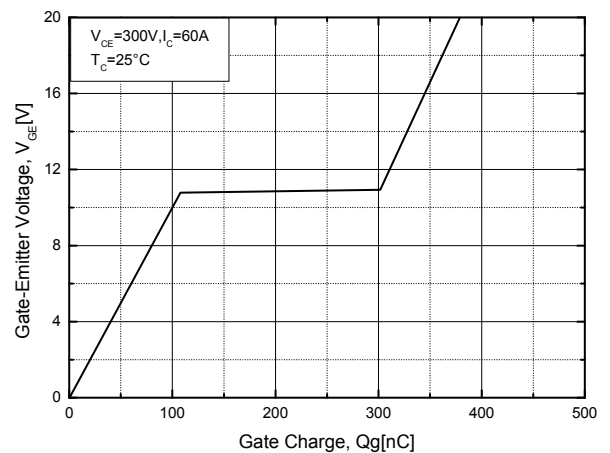
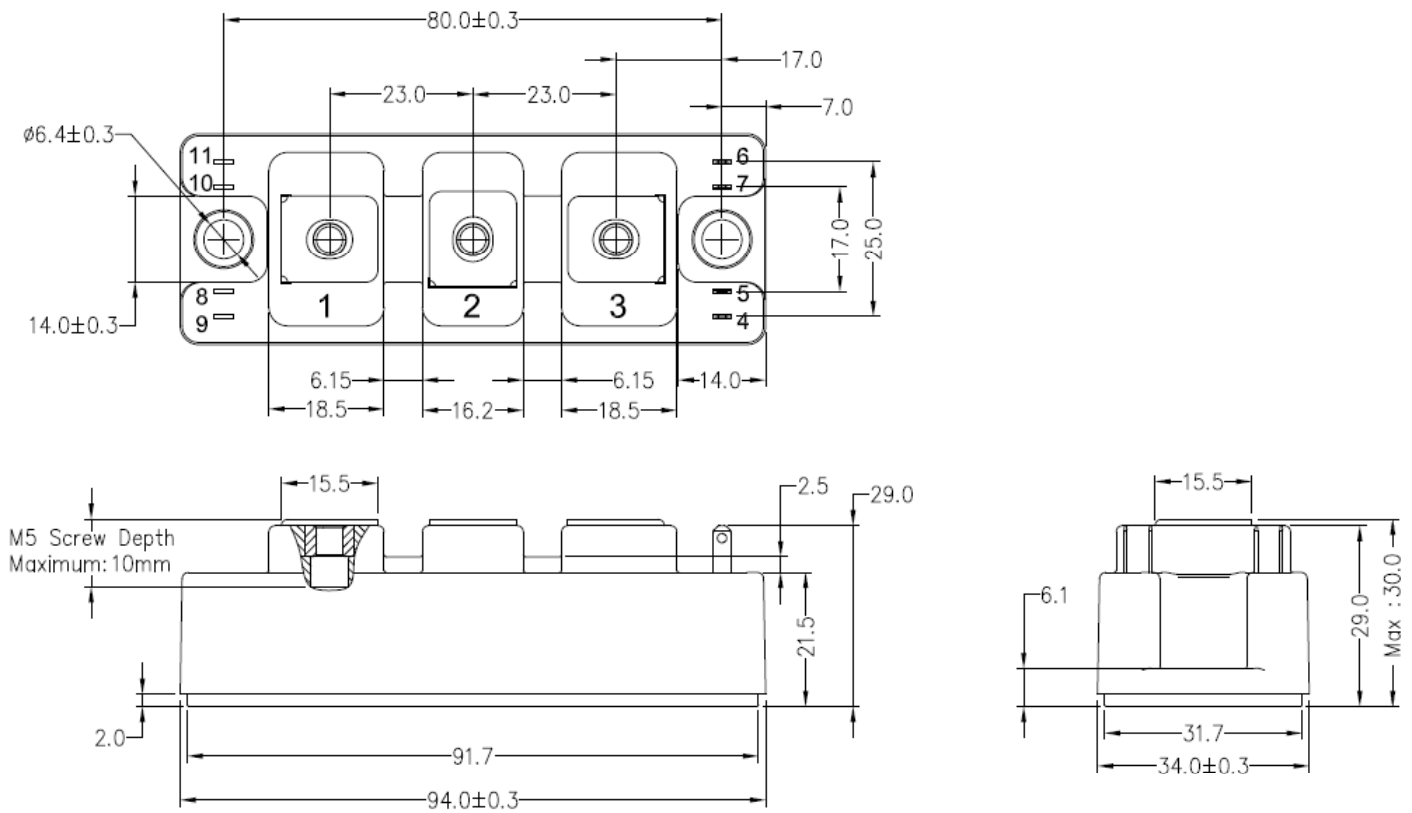


Fig. 6 Typical gate charge characteristics



**Package Outline (Dimension in mm)**



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