

Data Sheet

Description

The FGM622S is 600 V trench IGBT. Sanken original trench structure decreases gate capacitance, and achieves high speed switching and switching loss reduction. Thus, the IGBT can improve the efficiency of your circuit.

Features

- Low Saturation Voltage
- High Speed Switching
- Bare Lead Frame: Pb-free (RoHS Compliant)

• V _{CE}	600 V
• I _C (T _C = 100 °C)	16 A
• V _{CE(sat)}	1.7 V typ.
• t _f (T _I = 25 °C)	120 ns typ.

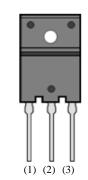
Applications

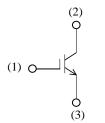
The following applications including partial switching PFC circuit:

- Air Conditioner
- Power Conditioner

Package

TO3PF-3L





- (1) Gate
- (2) Collector
- (3) Emitter

Not to scale

FGM622S

Absolute Maximum Ratings

Unless otherwise specified, $T_A = 25$ °C.

Parameter	Symbol	Conditions	Rating	Unit
Collector to Emitter Voltage	V _{CE}		600	V
Gate to Emitter Voltage	V_{GE}		±30	V
Continuous Collector Current	$I_{\rm C}$	T _C = 25 °C	25	A
		T _C = 100 °C	16	A
Pulsed Collector Current	I _{C(PULSE)}	$\begin{aligned} P_W &\leq 1 \text{ ms,} \\ \text{duty cycle} &\leq 1\% \end{aligned}$	75	A
Power Dissipation	P_{D}	$T_C = 25 ^{\circ}C$	60	W
Operating Junction Temperature	T_{J}		150	°C
Storage Temperature	T_{STG}		−55 to 150	°C

Thermal Characteristics

Unless otherwise specified, $T_A = 25$ °C.

Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit
Thermal Resistance (Junction to Case)	$R_{ heta JC}$		_	_	2.08	°C/W

FGM622S

Electrical Characteristics

Unless otherwise specified, $T_A = 25$ °C.

Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit
Collector to Emitter Breakdown Voltage	V _{(BR)CES}	$I_C = 100 \mu A, V_{GE} = 0 V$	600	_	_	V
Collector to Emitter Leakage Current	I_{CES}	$V_{CE} = 600 \text{ V}, V_{GE} = 0 \text{ V}$			100	μΑ
Gate to Emitter Leakage Current	I_{GES}	$V_{GE} = \pm 30 \text{ V}$	_	_	±500	nA
Gate Threshold Voltage	V _{GE(TH)}	$V_{CE} = 10 \text{ V}, I_{C} = 1 \text{ mA}$	4	_	7	V
Collector to Emitter Saturation Voltage	V _{CE(sat)}	$V_{GE} = 15 \text{ V}, I_{C} = 25 \text{ A}$	_	1.7	1.9	V
Input Capacitance	C_{ies}	$V_{CE} = 20 \text{ V},$ $V_{GE} = 0 \text{ V},$ $f = 1.0 \text{ MHz}$		1300	_	pF
Output Capacitance	C _{oes}			80	_	
Reverse Transfer Capacitance	C _{res}			40	_	
Gate Charge	Q_{g}	$V_{CE} = 300 \text{ V}, I_{C} = 25 \text{ A}, V_{GE} = 15 \text{ V}$		40	_	nC
Gate to Emitter Charge	Q_{ge}			10	_	
Gate to Collector Charge	Q_{gc}			10		
Turn-on Delay Time	t _{d(on)}	T _J = 25 °C; see Figure 1		50		
Rise Time	t _r			60		
Turn-off Delay Time	$t_{d(off)}$			200		ns
Fall Time	t_{f}			120	_	
Turn-on Delay Time	$t_{d(on)}$	T _J = 125 °C; see Figure 1		50		
Rise Time	t _r		_	60		
Turn-off Delay Time	$t_{d(off)}$		_	200	_	ns
Fall Time	t_{f}			200	_	

Test Circuits and Waveforms

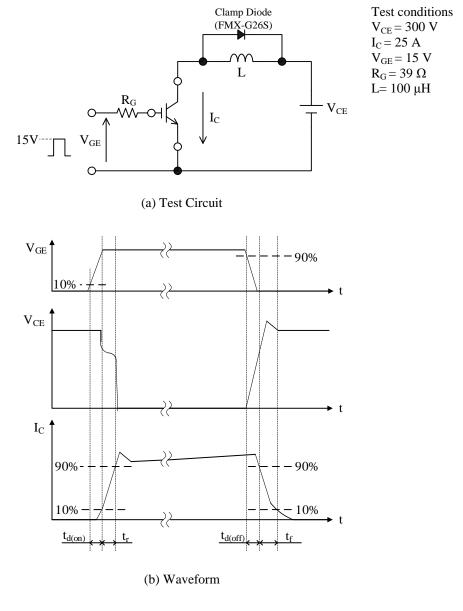


Figure 1. Test Circuits and Waveforms of dv/dt and Switching Time

Rating and Characteristic Curves

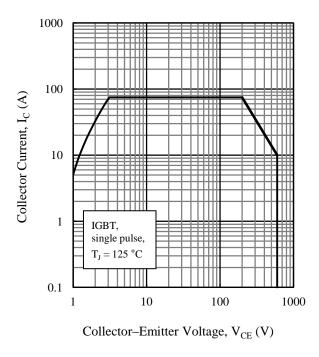


Figure 2. IGBT Reverse Bias Safe Operating Area

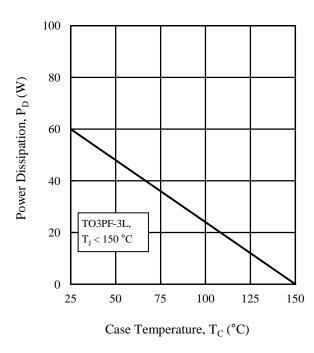


Figure 4. Power Dissipation vs. Case Temperature

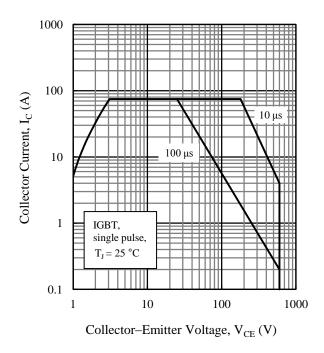


Figure 3. IGBT Safe Operating Area

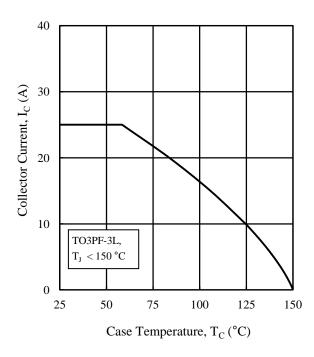


Figure 5. Collector Current vs. Case Temperature

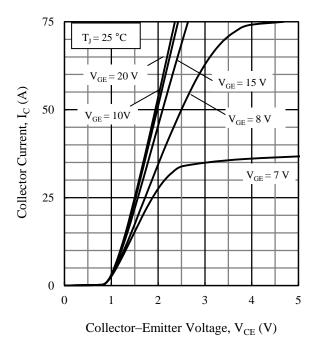


Figure 6. Output Characteristics ($T_J = 25$ °C)

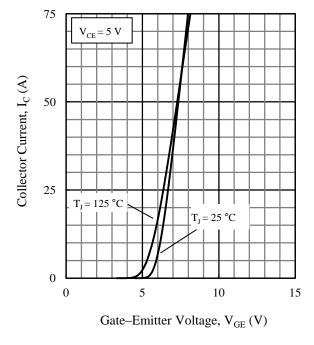


Figure 8. Transfer Characteristics

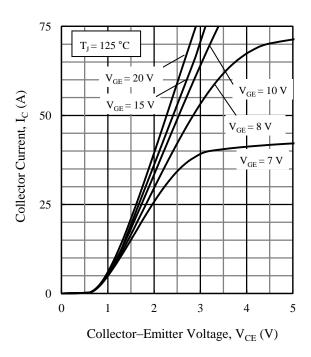


Figure 7. Output Characteristics ($T_J = 175$ °C)

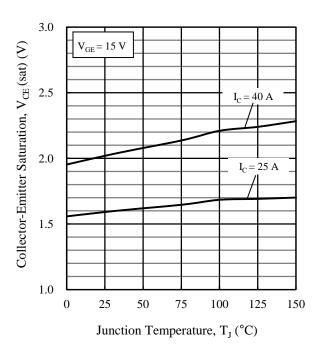


Figure 9. Saturation Voltage vs. Junction Temperature

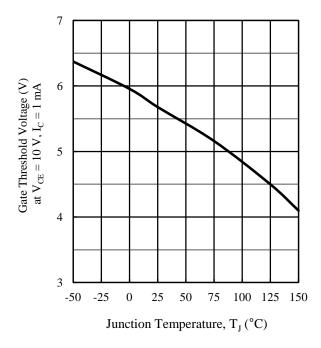


Figure 10. Gate Threshold Voltage vs. Junction Temperature

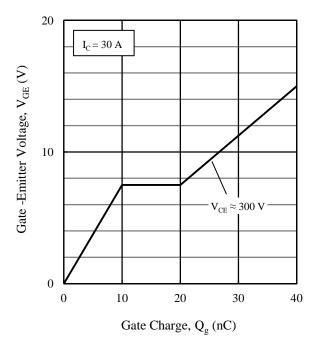


Figure 12. Typical Gate Charge

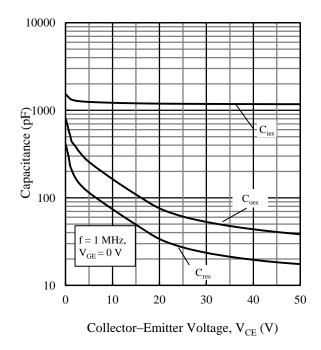


Figure 11. Capacitance Characteristics

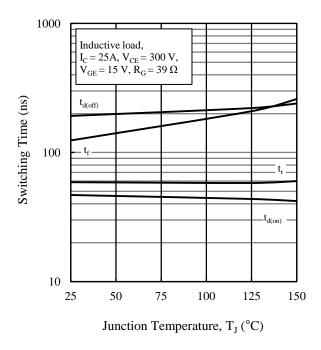


Figure 13. Switching Time vs. Junction Temperature

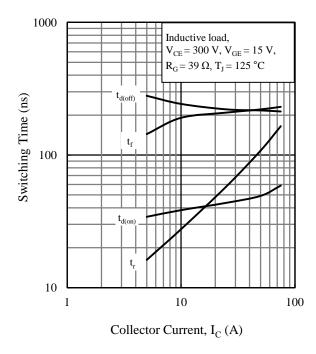


Figure 14. Switching Time vs. Collector Current

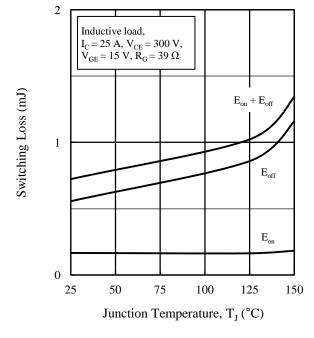


Figure 16. Switching Loss vs. Junction Temperature

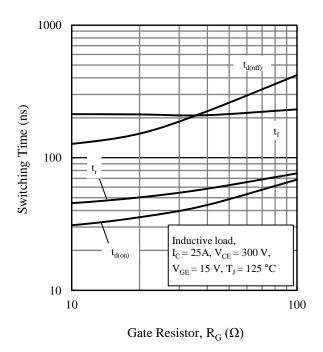


Figure 15. Switching Time vs. Gate Resistor

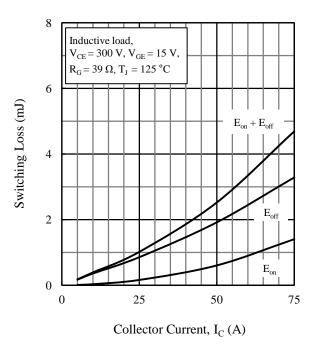


Figure 17. Switching Loss vs. Collector Current

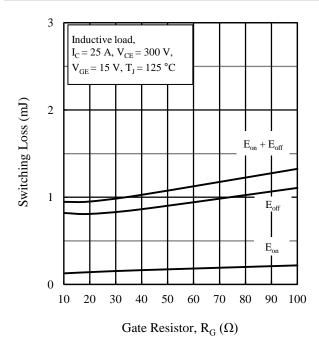


Figure 18. Switching Loss vs. Gate Resistor

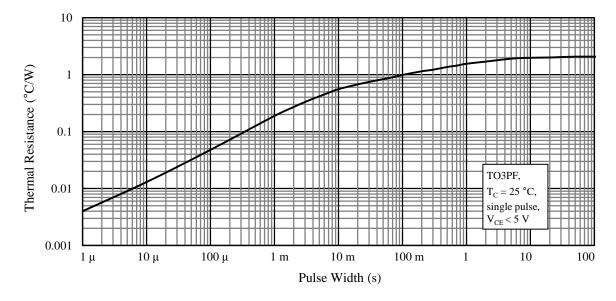
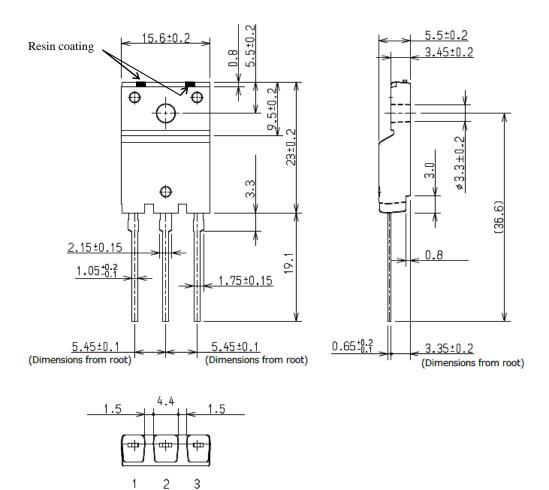


Figure 19. Transient Thermal Resistance

Physical Dimensions

• TO3PF-3L



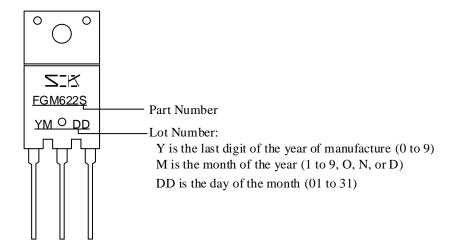
NOTES:

- Dimensions in millimeters
- Bare lead frame: Pb-free (RoHS compliant)
- When soldering the products, it is required to minimize the working time, within the following limits: Flow: 260 ± 5 °C / 10 ± 1 s, 2 times

Soldering Iron: 380 ± 10 °C / 3.5 ± 0.5 s, 1 time (Soldering should be at a distance of at least 1.5 mm from the body of the products.)

- Recommended screw torque for TO3PF: 0.686 N·m to 0.882 N·m (7 kgf·cm to 9 kgf·cm)

Marking Diagram



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