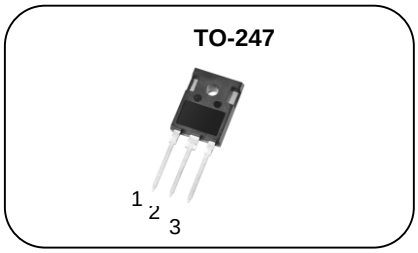
Field Stop Trench TO-247 IGBT

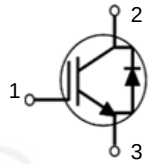
Features

- Field stop trench technology
- High speed switching
- Low saturation voltage: $V_{CE(sat)}$=1.6V@ I_C=75A
- High input impedance
- Application:UPS, Solar Inverter, Welding Machine



1. Gate 2. Collector 3. Emitter

BV_{CES} : 650V
I_C : 75A
$V_{CE(sat)}$: 1.6V



General Description

This device is used advanced field stop trench technology, which offer superior conduction and switching performances, and easy parallel operation with exceptional avalanche ruggedness. This device is designed for soft switching applications.

LEAD-FREE RoHS

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW T 75T065GFS	SW75T065GFS	TO-247	TUBE

Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector to emitter voltage	650	V
V_{GES}	Gate to emitter voltage	±20	V
I_C	Continuous collector current (@T_C=25°C)	150*	A
	Continuous collector current (@T_C=100°C)	75*	A
I_{CM}	Pulsed collector current	300	A
I_F	Diode continuous forward current(@T_C=25°C)	150	A
P_D	Total power dissipation (@T_C=25°C)	500	W
	Total power dissipation (@T_C=100°C)	250	W
T_J	Operating junction temperature	-55 ~ + 175	°C
T_{STG}	storage temperature Range	-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.	300	°C

*. Repetitive rating, Pulse width limited by max. junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc} (IGBT)	Thermal resistance, Junction to case	0.30	°C/W
R_{thjc} (Diode)	Thermal resistance, Junction to case	0.46	°C/W
R_{thja} (IGBT)	Thermal resistance, Junction to ambient	32.2	°C/W

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Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{CES}	Collector to emitter breakdown voltage	V_{GE}= 0V, I_C= 0.25mA	650			V
I_{CES}	Collector cut-off current	V_{CE}= V_{CES}, V_{GE}= 0V			1	mA
I_{GES}	Gate to emitter leakage current, forward	V_{GE}=20V, V_{CE}=0V			200	nA
	Gate to emitter leakage current, reverse	V_{GE}=-20V, V_{CE}=0V			-200	nA
On characteristics						
$V_{GE(TH)}$	Gate threshold voltage	V_{CE}=V_{GE}, I_C=0.75mA	3.8		5.0	V
$V_{CE(sat)}$	Collector to emitter saturation voltage	I_C = 75A, V_{GE}= 15V, T_C=25°C		1.6	2.0	V
		I_C = 75A, V_{GE}= 15V, T_C=175°C		2.0		V
G_{fs}	Forward transconductance	V_{CE}=20V, I_C=15A		24		S
Dynamic characteristics						
C_{ies}	Input capacitance	V_{GE}=0V, V_{CE}=25V, f=1MHz		4415		pF
C_{oes}	Output capacitance			174		
C_{res}	Reverse transfer capacitance			9		
$t_{d(on)}$	Turn on delay time	V_{CE}= 300V, I_C= 75A, R_G= 10Ω, V_{GE} = 15V		43		ns
tr	Rising time			165		
$t_{d(off)}$	Turn off delay time			164		
t_f	Fall time			155		
E_{on}	Turn-on switching loss			3		mJ
E_{off}	Turn-off switching loss			2.3		
E_{ts}	Total switching loss			5.3		
Q_g	Total gate charge	V_{CE}=400V, V_{GE}=15V, I_C=75A		141		nC
Q_{ge}	Gate-emitter charge			33		
Q_{gc}	Gate-collector charge			49		

Emitter to Collector diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_F	Diode forward voltage	I_F= 75A, T_C=25°C		1.63	2.0	V
		I_F= 75A, T_C=175°C		1.64		V
I_{rr}	Diode peak reverse recovery current	I_F=75A, di/dt = 500A/μs		14		A
T_{rr}	Reverse recovery time			115		ns
Q_{rr}	Reverse recovery charge			833		nC

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Fig. 1. Typical Output Characteristics(Tj=25℃)

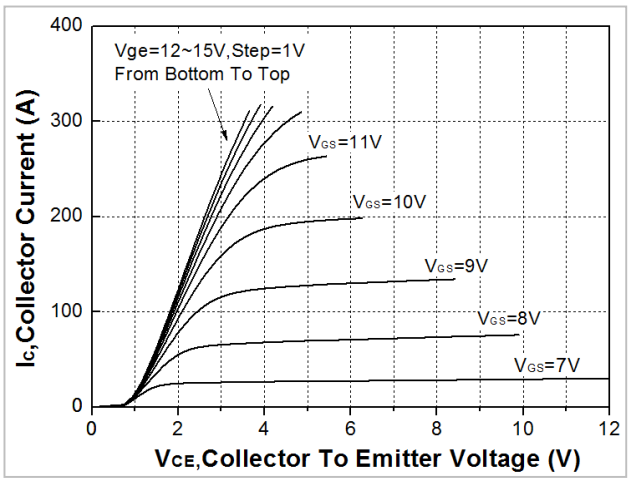

Fig. 2. Typical Output Characteristics(Tj=150℃)

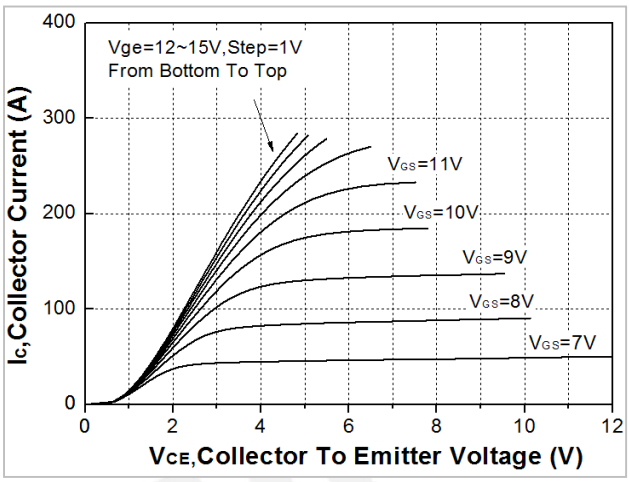

Fig. 3. Transfer Characteristics

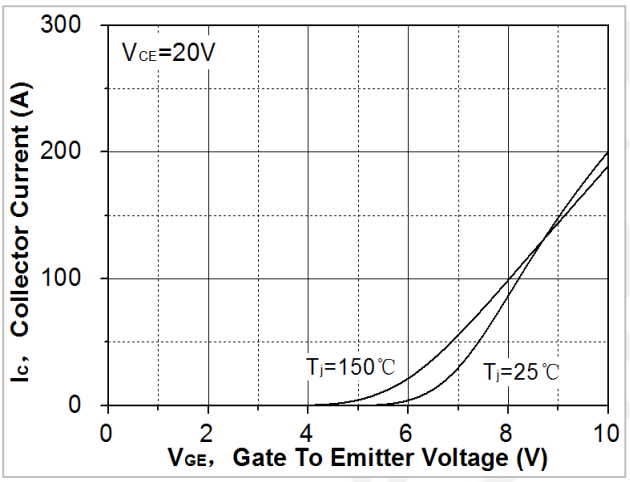

Fig. 4. Saturation Voltage vs. Case Temperature at Variant Current Level

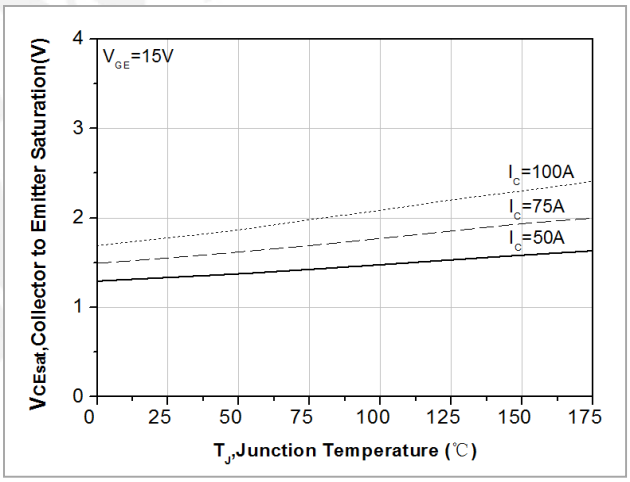

Fig. 5. Capacitance Characteristics

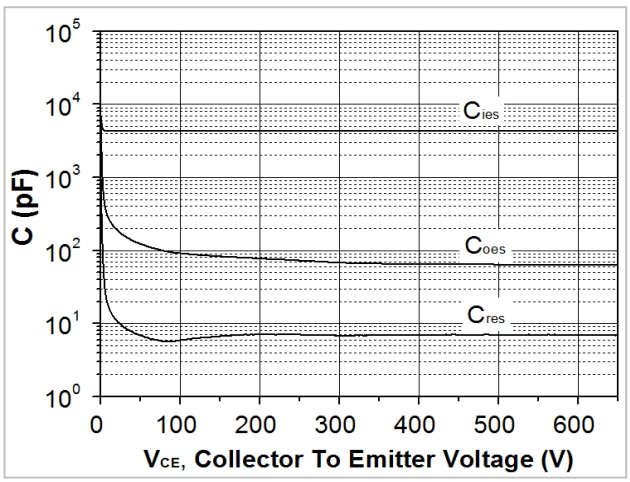

Fig. 6. Gate charge Characteristics

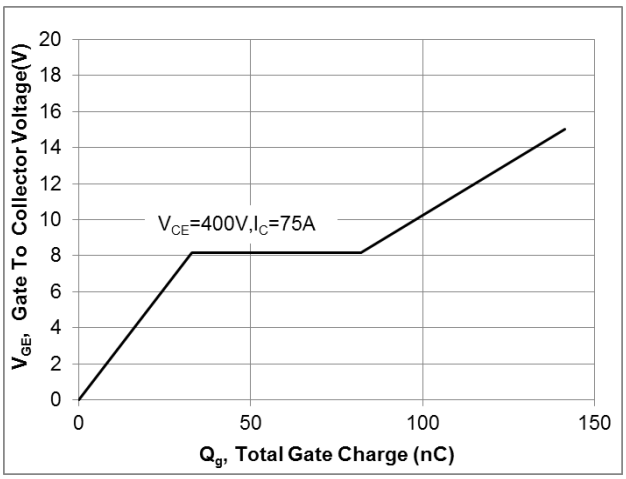

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Fig. 7. Forward Characteristics

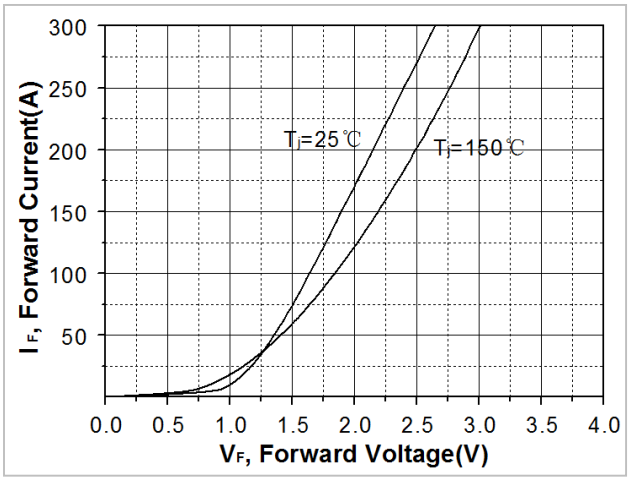

Fig. 8. Maximum safe operating area（IGBT）

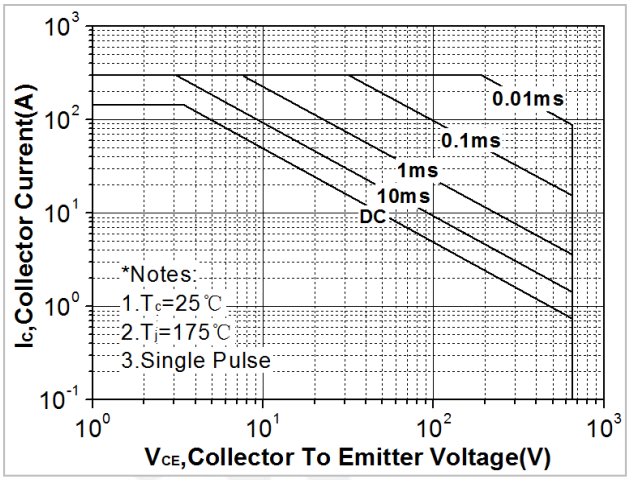

Fig. 9. Threshold Voltage vs. Case Temperature

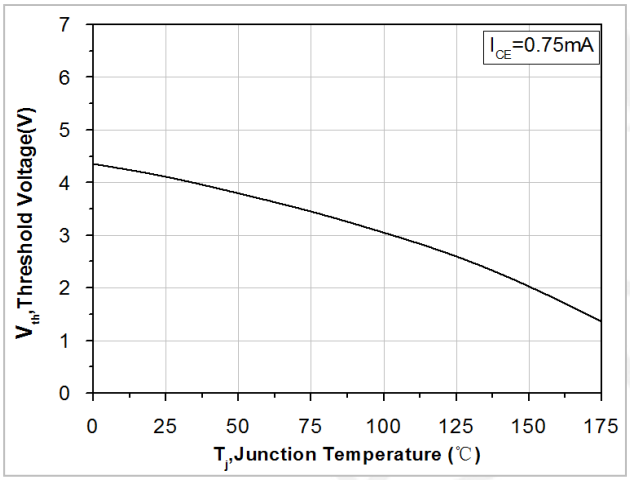

Fig. 10. Transient thermal response curve（IGBT）

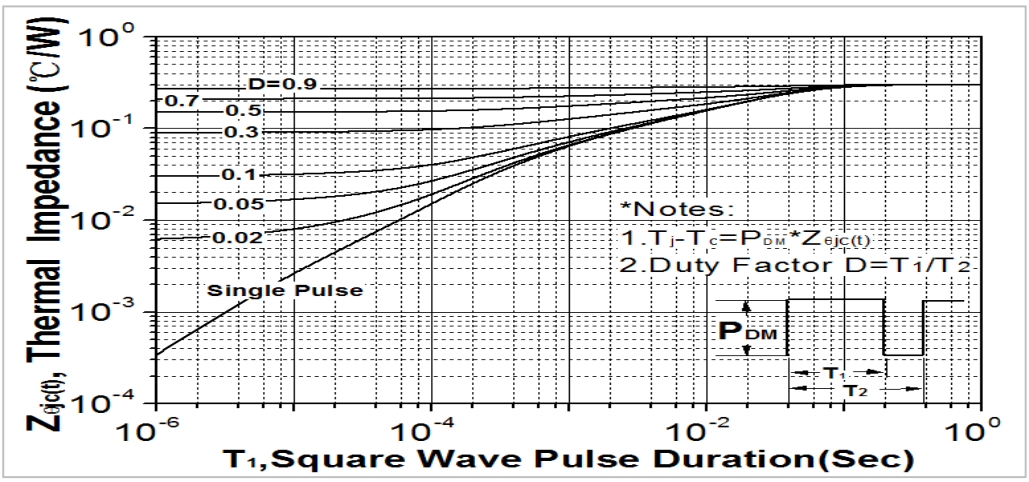

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Fig. 11. Transient thermal response curve (Diode)

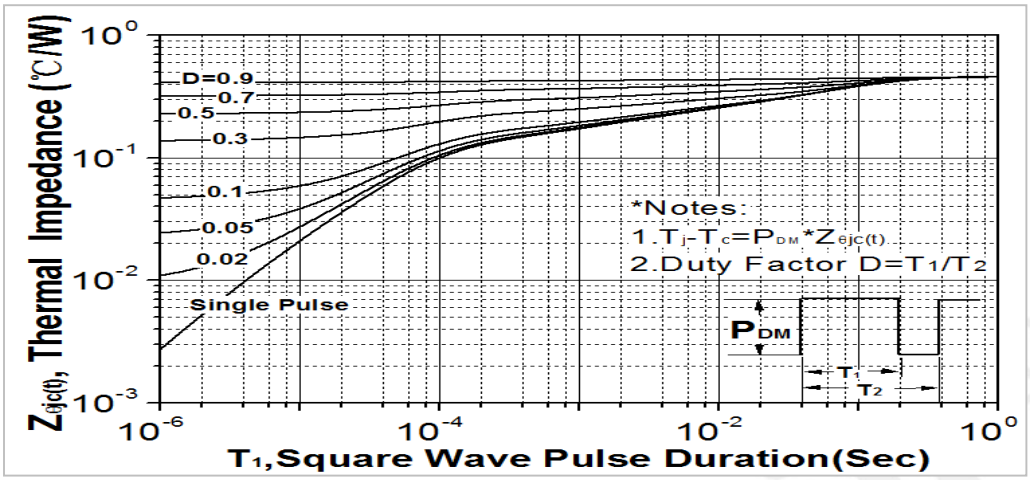

Fig. 12. Gate charge test circuit & waveform

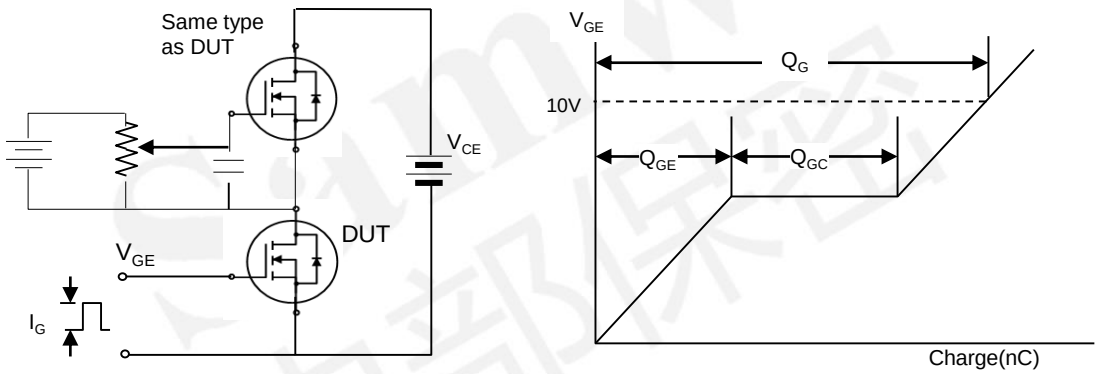

Fig. 13. Switching time test circuit & waveform

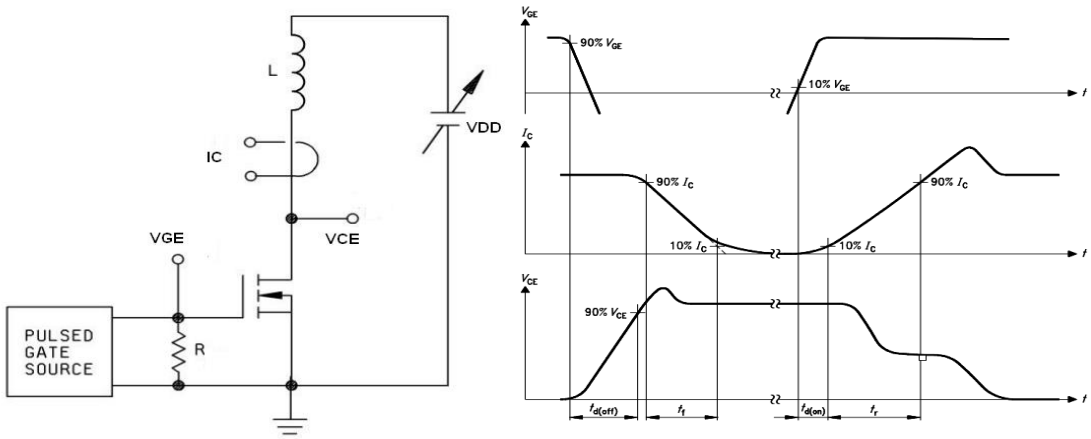

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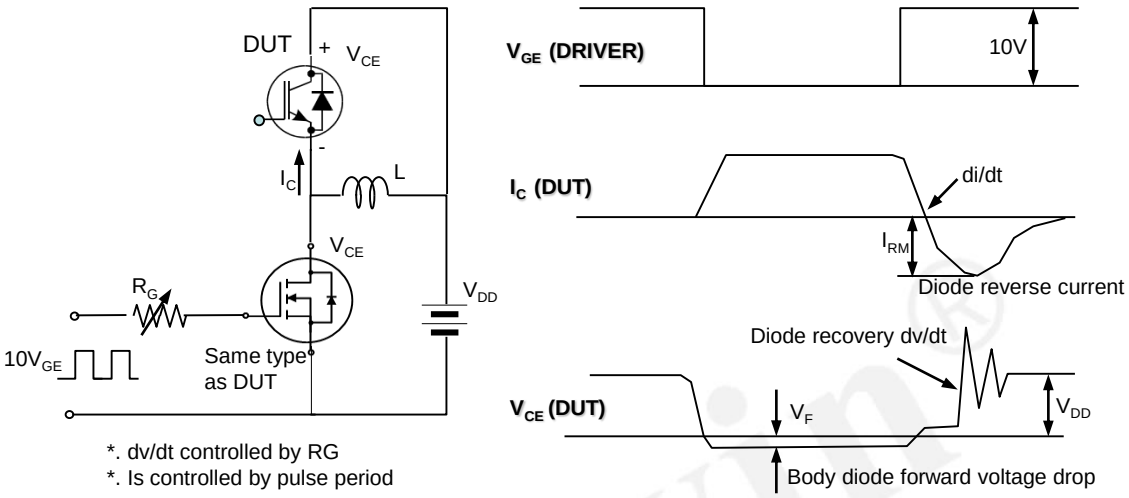
Fig. 14. Peak diode recovery dv/dt test circuit & waveform



Samwin 内部保密

DISCLAIMER

* All the data & curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (**http://www.semipower.com.cn**)
* Suggestions for improvement are appreciated, Please send your suggestions to **samwin@samwinsemi.com**

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