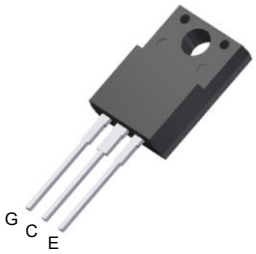
SSC65TR10GTF

Trench FSII Fast IGBT

➢ Features

V_{CES}	V_{GES}	I_C
650V	±20V	20A@25℃
		10A@100℃

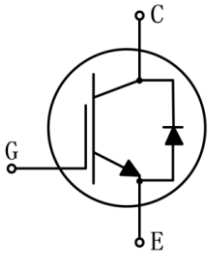
➢ Pin Configuration



TO-220F-3L (Top View)

➢ Description

- High ruggedness performance
- 10μs short circuit capability
- High efficiency for motor control
- Excellent current sharing in parallel operation
- RoHS compliant



Pin Configuration

➢ Applications

- Welding Machines
- PFC Circuits
- UPS
- Power Inverters

➢ Ordering Information

Device	Package	Shipping
SSC65TR10GTF	TO-220F-3L	50/Tube

Marking

(XXYY: Internal Traceability Code)

➢ Absolute Maximum Ratings (T_{vj}=25℃ unless otherwise noted)

Symbol	Parameter		Ratings	Unit
V_{CES}	Collector-Emitter Voltage		650	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Collector Current	T_C=25℃	20	A
		T_C=100℃	10	
I_{Cpuls}	Pulsed Collector Current, t_p limited by T_{vJmax}		40	A
P_D	Power Dissipation[a]	T_C=25℃	33	W
		T_C=100℃	16	
T_J	Operating Junction and Storage Temperature Range		-40~175	℃
T_{STG}	Operating Junction and Storage Temperature Range		-55~150	℃
t_{sc}	Short circuit withstand time		10	us

➢ Thermal Resistance Ratings

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance		65	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case for IGBT		4.5	
$R_{\theta JC}$	Thermal Resistance, Junction to Case for Diode		5.8	

Note:

a. The maximum current rating is package limited

➢ Electrical Characteristics of IGBT (T_{vj}=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 0.25mA	650			V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=650V, Tvj=25℃			50	uA
$I_{GES(F)}$	Gate to Emitter Forward Leakage	V_{GE} = +20V, V_{CE} = 0V			100	nA
$I_{GES(R)}$	Gate to Emitter Reverse Leakage	V_{GE} = -20V, V_{CE} = 0V			-100	nA
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=10A, V_{GE}=15V, T_{vj}=25℃		1.78		V
		I_C=10A, V_{GE}=15V, T_{vj}=150℃		2.05		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C = 250uA, V_{CE} = V_{GE}	5.2	5.7	6.2	V
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz		680		pF
C_{oes}	Output Capacitance			40		
C_{res}	Reverse Transfer Capacitance			12		
$T_{D(ON)}$	Turn-on delay time	T_{vj}=25℃, V_{CC}=400V, I_C=10A, V_{GE}=0/15V, R_g=10Ω, Inductive Load		13		ns
T_r	Rise time			12		
$T_{D(OFF)}$	Turn-off delay time			74		
T_f	Fall time			78		
E_{on}	Turn-On Switching Loss			0.2		mJ
E_{off}	Turn-Off Switching Loss			0.18		
E_{ts}	Total Switching Loss			0.38		
$T_{D(ON)}$	Turn-on delay time	T_{vj}=150℃, V_{CC}=400V, I_C=10A, V_{GE}=0/15V, R_g=10Ω, Inductive Load		12		ns
T_r	Rise time			15		
$T_{D(OFF)}$	Turn-off delay time			87		
T_f	Fall time			115		
E_{on}	Turn-On Switching Loss			0.23		mJ
E_{off}	Turn-Off Switching Loss			0.28		
E_{ts}	Total Switching Loss			0.51		
Q_G	Total Gate Charge	V_{CC} = 520V, I_C = 10A, V_{GE} = 0/15V		31		nC

➢ Electrical Characteristics of Diode (T_{vj}=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VF	Diode forward voltage	IF=10A, T_{vj}=25℃		1.45		V
		IF=10A, T_{vj}=150℃		1.3		V
Trr	Diode reverse recovery time	VR=400V IF=10A diF/dt=750A/μs T_{vj}=25℃		60		ns
Irrm	Diode peak reverse recovery current			12		A
Qrr	Diode reverse recovery charge			413		nC
Trr	Diode reverse recovery time	VR=400V IF=10A diF/dt=750A/μs T_{vj}=150℃		120		ns
Irrm	Diode peak reverse recovery current			15		A
Qrr	Diode reverse recovery charge			734		nC

➢ Typical Performance Characteristics (T_{vj}=25℃ unless otherwise noted)

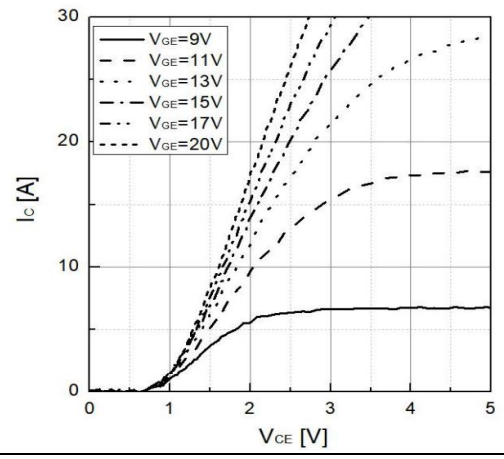


Fig 1. Typical output characteristic (T_{vj}=25℃)

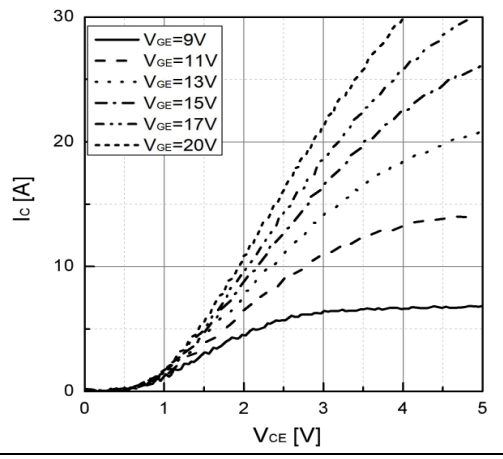


Fig 2. Typical output characteristic(T_{vj}=150℃)

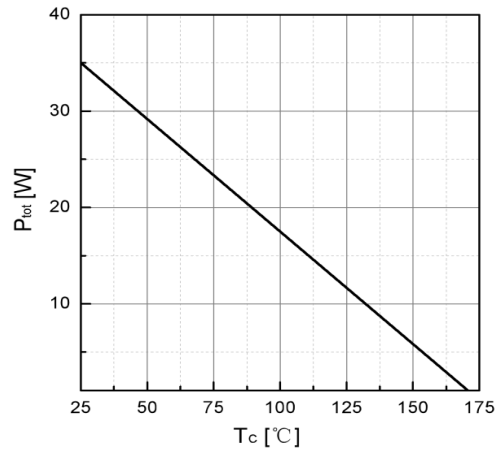


Fig 3. Power dissipation as a function of TC

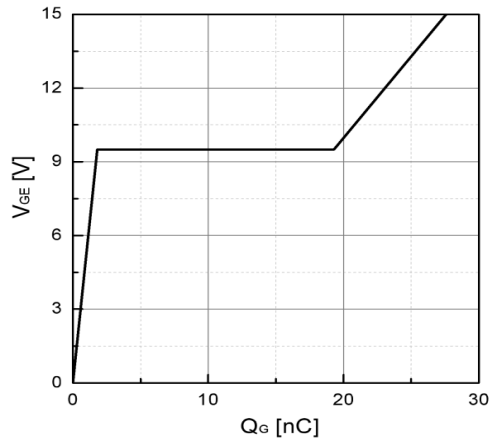


Fig 4. Typical Gate charge

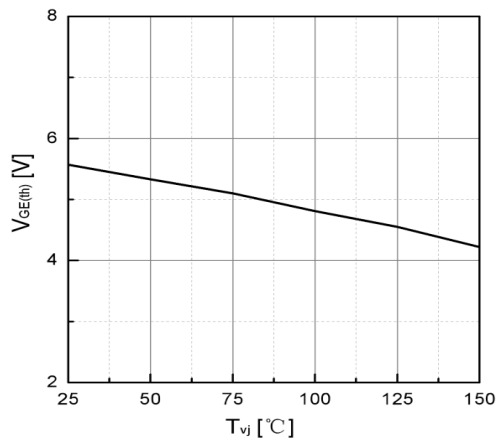


Fig 5. Typical VGE(th) as a function of T_{vj} (IC=1mA)

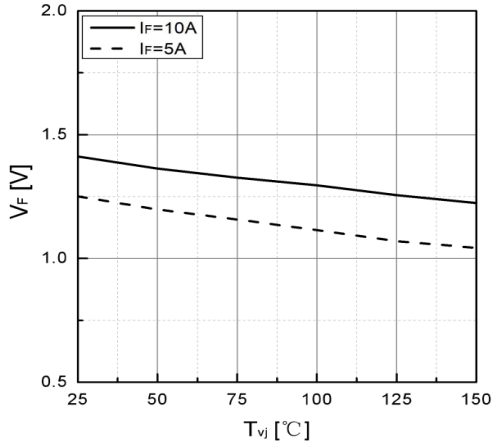


Fig 6. Typical VF as a function of T_{vj}

➢ Typical Performance Characteristics (T_{vj}=25℃ unless otherwise noted)

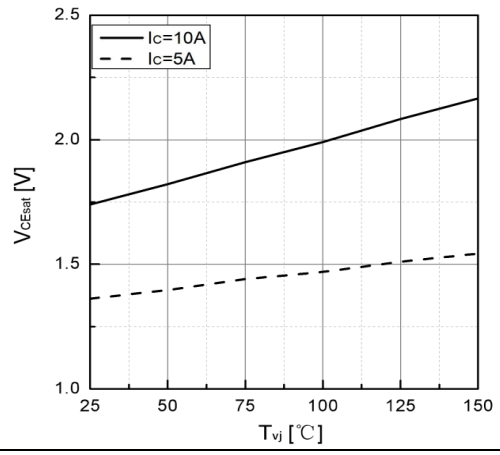


Fig 7. Typical VCEsat as a function of Tvj

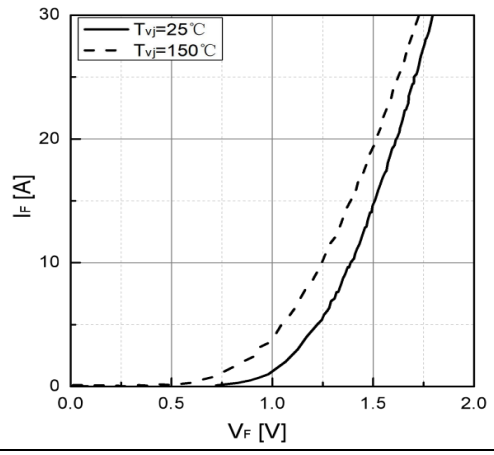


Fig 8. Typical IF as a function of VF

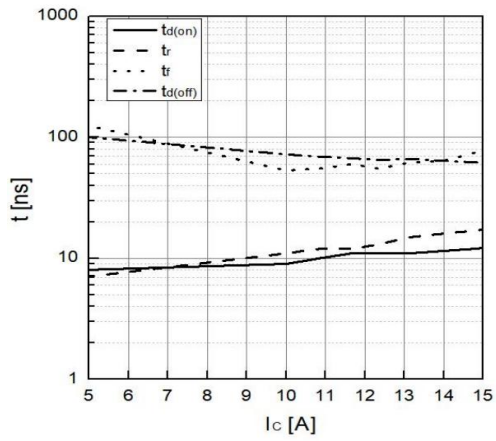


Fig 9. Typical switching time as a function of IC

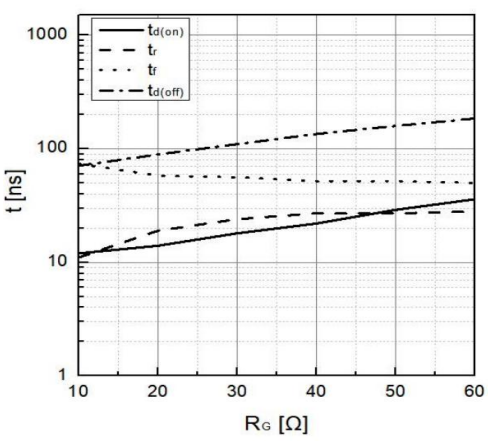


Fig 10. Typical switching times as a function of RG

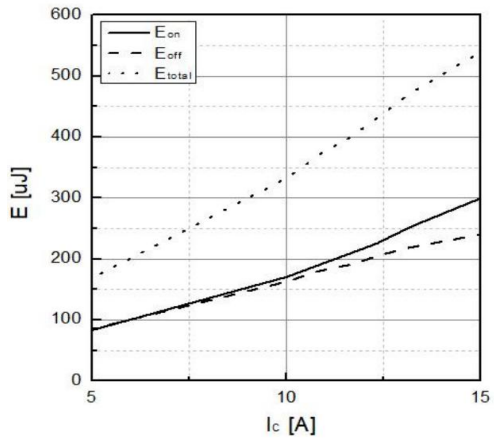


Fig 11. Typical switching energy losses as a function of IC

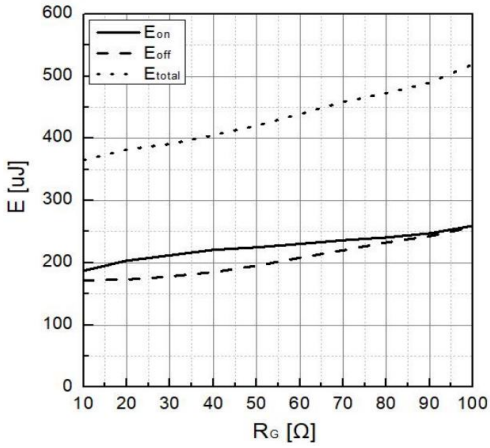


Fig 12. Typical switching times as a function of RG

➢ Typical Performance Characteristics (T_{vj}=25℃ unless otherwise noted)

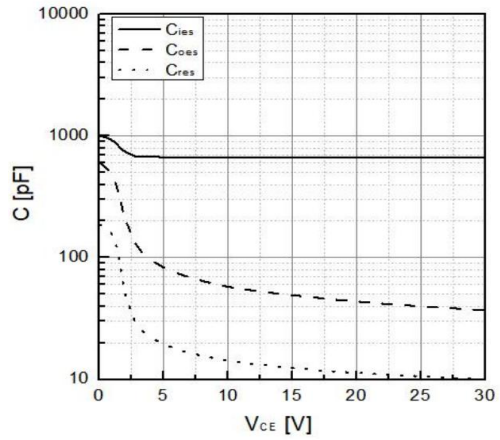


Fig 13. Typical capacitance as a function of VCE (f=1Mhz, VGE=0V)

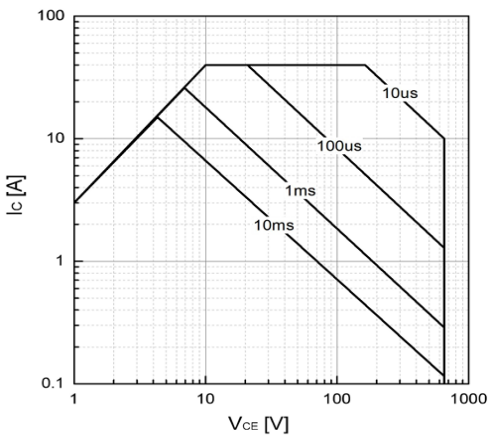
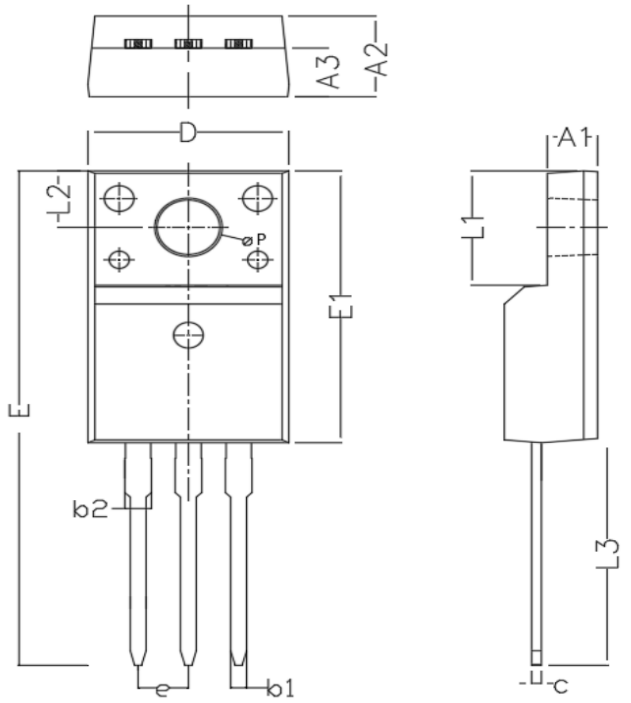


Fig 14. Safe operating area

➢ Package Information

TO220F



Symbol	MILL IMETER		
	Min	Nom	Max
A1	2.34	2.54	2.74
A2	4.5	4.7	4.9
A3	2.56	2.76	2.96
b1	0.7	0.8	0.9
b2	1.23	1.3	1.47
c	0.45	0.5	0.6
D	9.96	10.16	10.36
E	28.35	28.85	29.35
E1	15.67	15.87	16.07
e	2.54REF		
L1	6.48	6.68	6.88
L2	3.2	3.3	3.4
L3	12.68	12.98	13.28
øP	3.03	3.4	3.5

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