



SSC65TR10GTF

Trench FSII Fast IGBT

➤ Features

V_{CES}	V_{GES}	I_c
650V	$\pm 20V$	20A@25°C
		10A@100°C

➤ Description

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

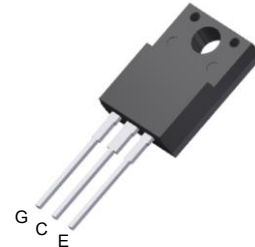
➤ Applications

- Welding Machines
- PFC Circuits
- UPS
- Power Inverters

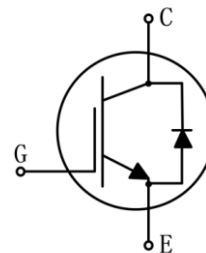
➤ Ordering Information

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

➤ Pin Configuration



TO-220F-3L (Top View)



Pin Configuration



Marking

(XXYY: Internal Traceability Code)



➤ **Absolute Maximum Ratings ($T_{vj}=25^{\circ}\text{C}$ 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	$T_C=25^{\circ}\text{C}$	20	A
		$T_C=100^{\circ}\text{C}$	10	
I_{Cpuls}	Pulsed Collector Current, t_p limited by T_{vjmax}		40	A
P_D	Power Dissipation ^a	$T_C=25^{\circ}\text{C}$	35	W
		$T_C=100^{\circ}\text{C}$	17	
T_J	Operating Junction and Storage Temperature Range		-40~175	$^{\circ}\text{C}$
T_{STG}	Operating Junction and Storage Temperature Range		-55~150	$^{\circ}\text{C}$
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	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case for IGBT		4.2	
$R_{\theta JC}$	Thermal Resistance, Junction to Case for Diode		5.6	

Note:

a. The maximum current rating is package limited

**➤ Electrical Characteristics of IGBT (T_{vj}=25°C 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, T _{vj} =25°C			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°C		1.8		V
		I _C =10A, V _{GE} =15V, T _{vj} =150°C		2.1		V
V _{GE(th)}	Gate Threshold Voltage	I _C = 250uA, V _{CE} = V _{GE}	5.5	5.8	6.2	V
C _{ies}	Input Capacitance	V _{CE} = 30V, V _{GE} = 0V, f = 1MHz		670		pF
C _{oes}	Output Capacitance			37		
C _{res}	Reverse Transfer Capacitance			10		
T _{D(ON)}	Turn-on delay time	T _{vj} =25°C, V _{CC} =400V, I _C =10A, V _{GE} =0/15V, R _g =10Ω, Inductive Load		12		ns
T _r	Rise time			11		
T _{D(OFF)}	Turn-off delay time			71		
T _f	Fall time			74		
E _{on}	Turn-On Switching Loss			0.18		mJ
E _{off}	Turn-Off Switching Loss			0.17		
E _{ts}	Total Switching Loss			0.35		
T _{D(ON)}	Turn-on delay time	T _{vj} =150°C, V _{CC} =400V, I _C =10A, V _{GE} =0/15V, R _g =10Ω, Inductive Load		10		ns
T _r	Rise time			12		
T _{D(OFF)}	Turn-off delay time			86		
T _f	Fall time			112		
E _{on}	Turn-On Switching Loss			0.21		mJ
E _{off}	Turn-Off Switching Loss			0.25		
E _{ts}	Total Switching Loss			0.46		
Q _G	Total Gate Charge	V _{CC} = 520V, I _C = 10A, V _{GE} = 0/15V		28		nC



➤ **Electrical Characteristics of Diode ($T_{vj}=25^{\circ}\text{C}$ unless otherwise noted)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VF	Diode forward voltage	IF=10A, $T_{vj}=25^{\circ}\text{C}$		1.4		V
		IF=10A, $T_{vj}=150^{\circ}\text{C}$		1.2		V
Trr	Diode reverse recovery time	VR=400V IF=10A diF/dt=750A/ μs $T_{vj}=25^{\circ}\text{C}$		57		ns
Irrm	Diode peak reverse recovery current			12		A
Qrr	Diode reverse recovery charge			411		nC
Trr	Diode reverse recovery time	VR=400V IF=10A diF/dt=750A/ μs $T_{vj}=150^{\circ}\text{C}$		118		ns
Irrm	Diode peak reverse recovery current			13		A
Qrr	Diode reverse recovery charge			728		nC

➤ **Typical Performance Characteristics ($T_{vj}=25^{\circ}\text{C}$ unless otherwise noted)**

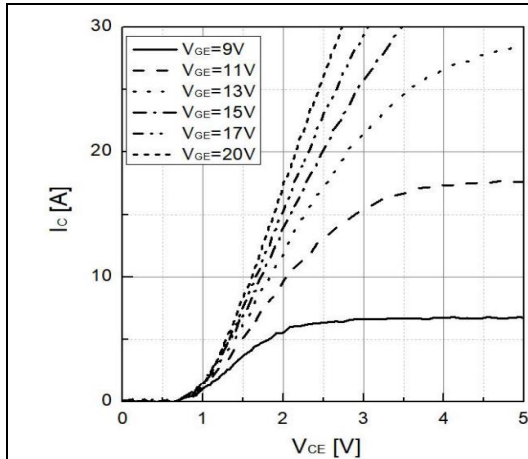


Fig 1. Typical output characteristic ($T_{vj}=25^{\circ}\text{C}$)

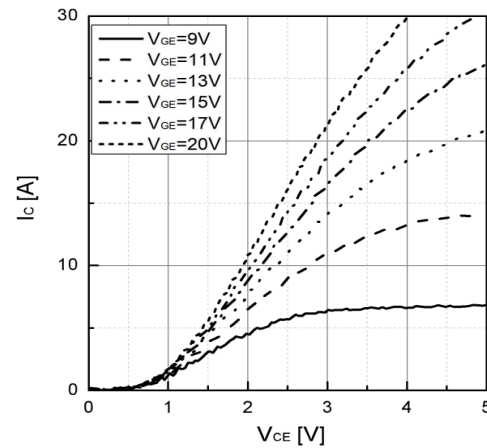


Fig 2. Typical output characteristic ($T_{vj}=150^{\circ}\text{C}$)

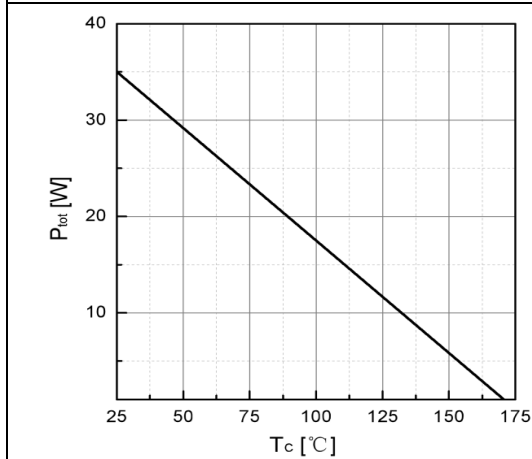


Fig 3. Power dissipation as a function of TC

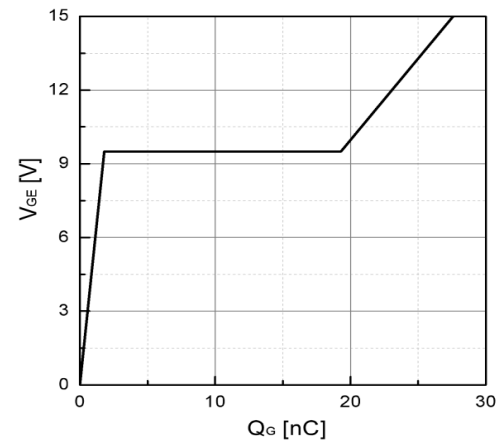
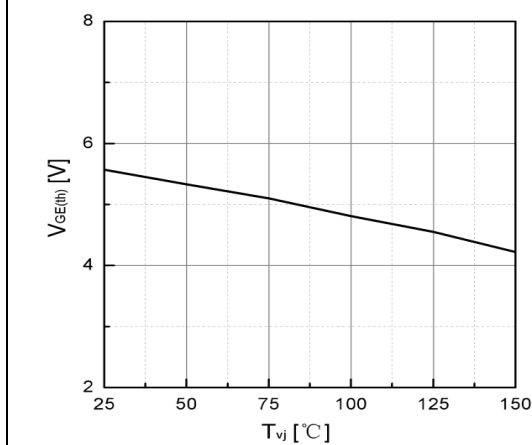


Fig 4. Typical Gate charge



**Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj}
($I_c=1\text{mA}$)**

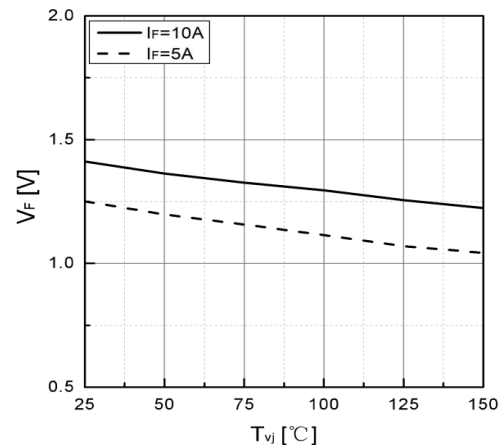


Fig 6. Typical V_F as a function of T_{vj}

➤ Typical Performance Characteristics ($T_{vj}=25^{\circ}\text{C}$ unless otherwise noted)

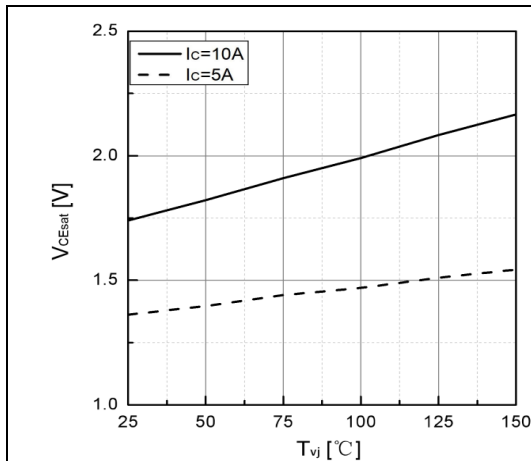


Fig 7. Typical V_{CEsat} as a function of T_{vj}

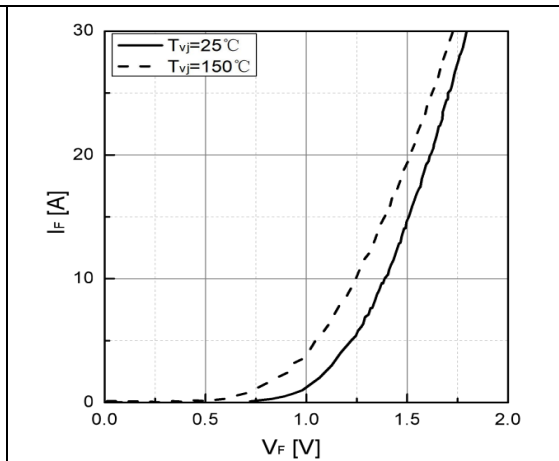


Fig 8. Typical I_F as a function of V_F

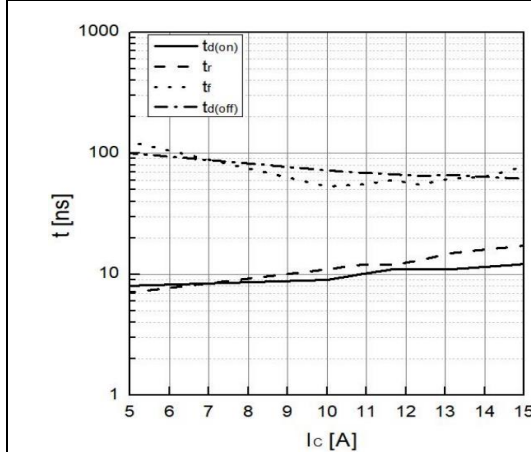


Fig 9. Typical switching time as a function of I_C

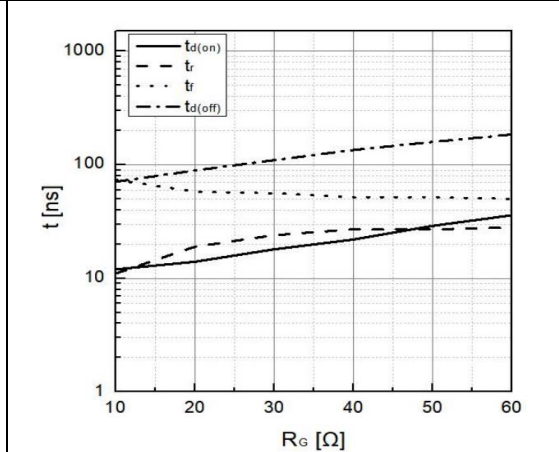


Fig 10. Typical switching times as a function of R_G

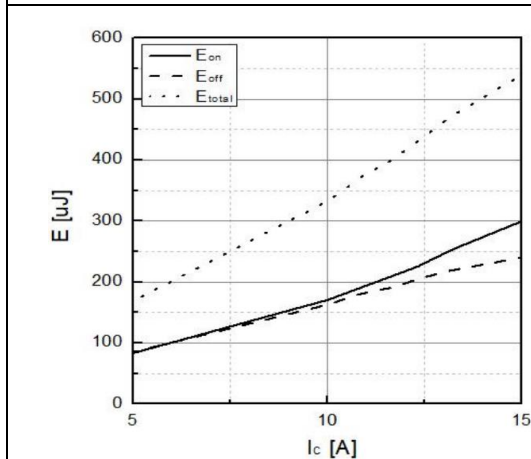


Fig 11. Typical switching energy losses as a function of I_C

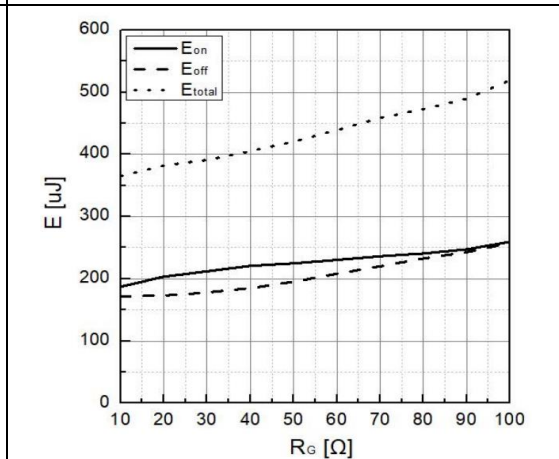


Fig 12. Typical switching times as a function of R_G



➤ **Typical Performance Characteristics ($T_{vj}=25^{\circ}\text{C}$ unless otherwise noted)**

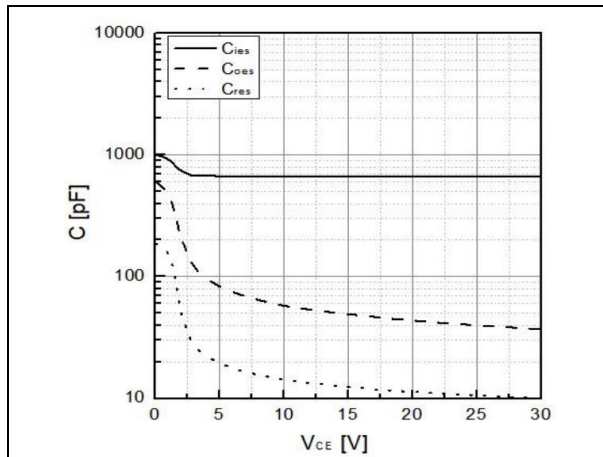


Fig 13. Typical capacitance as a function of V_{CE}
($f=1\text{Mhz}$, $V_{GE}=0\text{V}$)

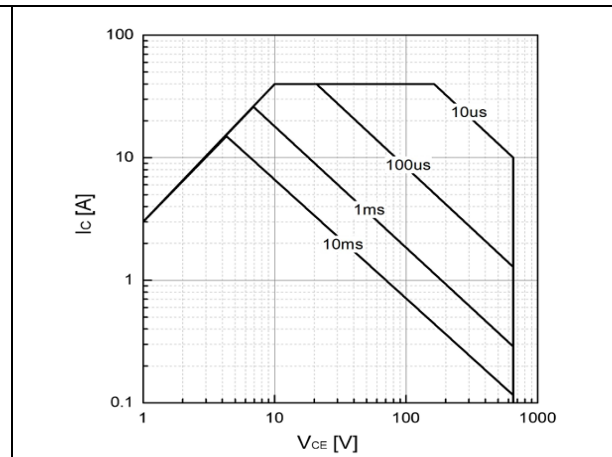
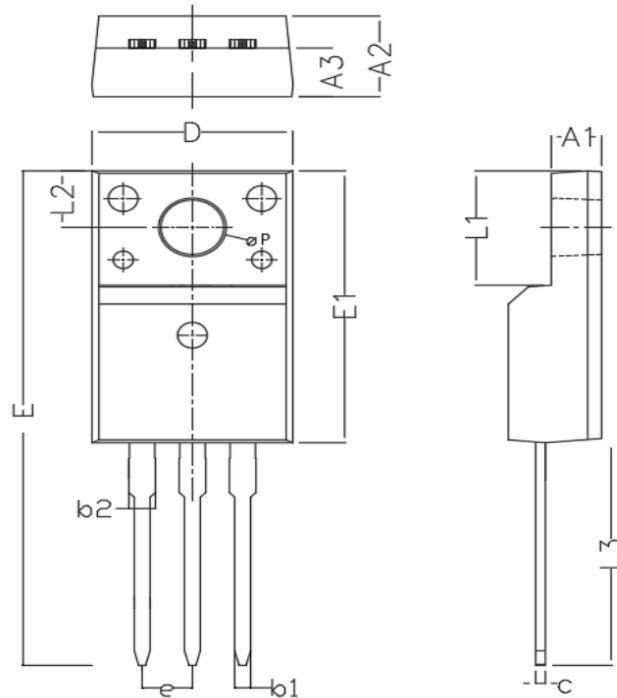


Fig 14. Safe operating area

➤ 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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