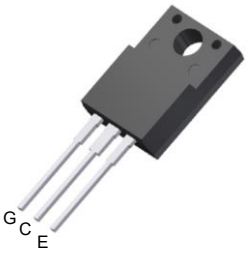
SSC65T20GTF

Trench FSII Fast IGBT

➢ Features

V_{CES}	V_{GES}	I_C
650V	±20V	40A@25℃
		20A@100℃

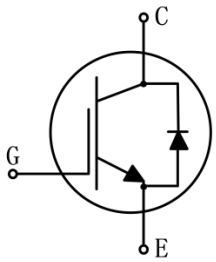
➢ Pin Configuration



TO-220F-3L (Top View)

➢ Description

- High ruggedness performance.
- 10μs short circuit capability.
- Positive VCE (sat) temperature coefficient.
- High efficiency for motor control.
- Excellent current sharing in parallel operation.
- RoHS compliant.



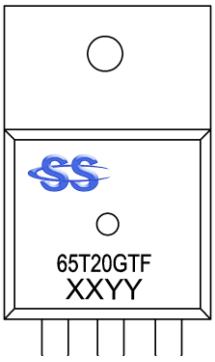
Pin Configuration

➢ Applications

- Home appliance
- Motor drives
- Motor drives

➢ Ordering Information

Device	Package	Shipping
SSC65T20GTF	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℃	40	A
		T_C=100℃	20	
I_{Cpuls}	Pulsed Collector Current, t_p limited by T_{vjmax}		80	A
P_D	Power Dissipation	T_A=25℃	51	W
		T_A=100℃	25	
T_{VJ}	Operating Junctio Temperature Range		-40~175	℃
T_{STG}	Storage Temperature Range		-55~150	℃
tsc	Short circuit withstand time		10	μs

➢ Thermal Resistance Ratings (T_{vj}=25℃ unless otherwise noted)

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance		52	℃/W
$R_{\theta JC}$	Thermal resistance, junction to case for IGBT		2.9	
$R_{\theta JC}$	Thermal resistance, junction to case for Diode		4.0	

➢ 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, T_{vj}=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=20A, V_{GE}=15V, T_{vj}=25℃		1.63		V
		I_C=20A, V_{GE}=15V, T_{vj}=175℃		2.1		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C = 1mA, V_{CE} = V_{GE}	5.2	5.8	6.4	V
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz, T_{vj}= 25℃		1820		pF
C_{oes}	Output Capacitance			70		
C_{res}	Reverse Transfer Capacitance			14		
$T_{D(ON)}$	Turn-on delay time	T_{vj}=25℃, V_{CC}=400V, I_C=20A, V_{GE}=0/15V, R_g=10Ω, Inductive Load		14.6		ns
T_r	Rise time			21		
$T_{D(OFF)}$	Turn-off delay time			119		
T_f	Fall time			78		
E_{on}	Turn-On Switching Loss			0.55		mJ
E_{off}	Turn-Off Switching Loss			0.45		
E_{ts}	Total Switching Loss			1		
$T_{D(ON)}$	Turn-on delay time	T_{vj}=175℃, V_{CC}=400V, I_C=20A, V_{GE}=0/15V, R_g=10Ω, Inductive Load		14.6		ns
T_r	Rise time			21		
$T_{D(OFF)}$	Turn-off delay time			138		
T_f	Fall time			135		
E_{on}	Turn-On Switching Loss			0.82		mJ
E_{off}	Turn-Off Switching Loss			0.7		
E_{ts}	Total Switching Loss			1.52		
Q_G	Total Gate Charge	V_{CC} = 520V, I_C = 20A, V_{GE} = 0/15V		75		nC

➢ Electrical characteristics of Diode (Tvj=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VF	Diode forward voltage	IF=20A, T_{vj}=25℃		1.8		V
		IF=20A, T_{vj}=175℃		1.4		V
Trr	Diode reverse recovery time	VR=400V IF=20A diF/dt=500A/μs, T_{vj}=25℃		66		ns
Irm	Diode peak reverse recovery current			13.5		A
Qrr	Diode reverse recovery charge			553		nC
Trr	Diode reverse recovery time	VR=400V IF=20A diF/dt=500A/μs, T_{vj}=175℃		100		ns
Irm	Diode peak reverse recovery current			22.1		A
Qrr	Diode reverse recovery charge			1430		nC

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

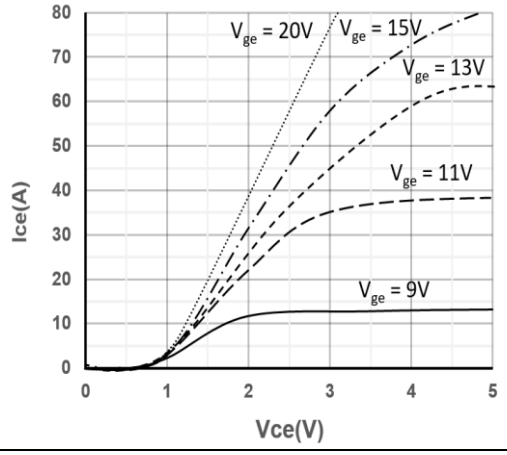


Figure 1. Output Characteristics(T_{vj}=25℃)

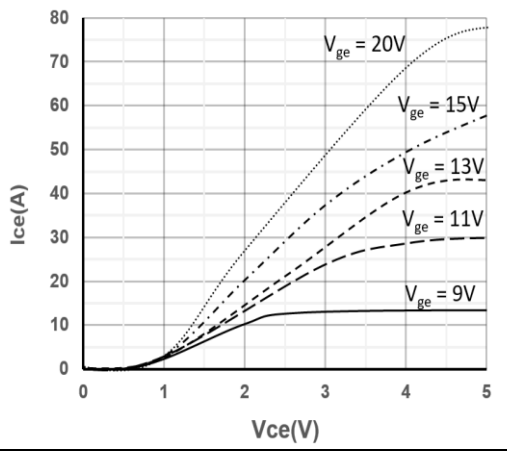


Figure 2. Output Characteristics(T_{vj}=150℃)

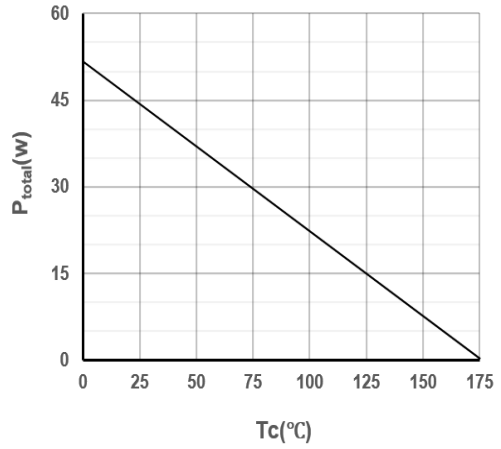


Figure 3. Power dissipation as a function of TC

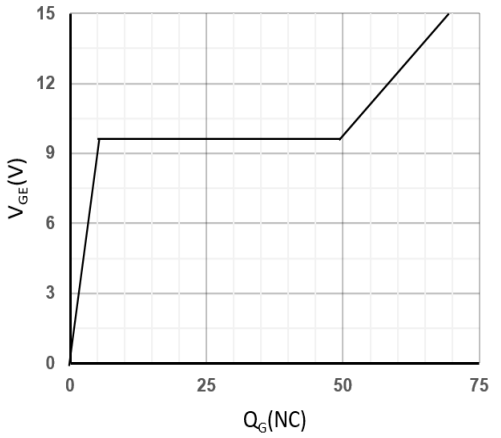


Figure 4. Typical Gate charge

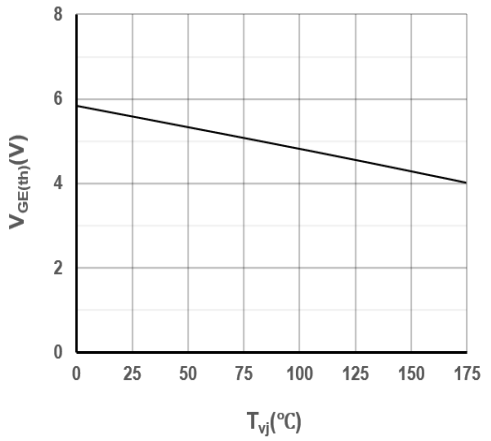


Figure 5. Typical VGE(th) as a function of Tvj (IC=1mA)

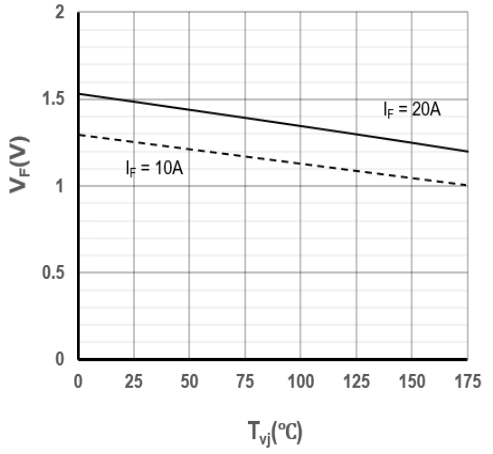


Figure 6. Typical VF as a function of Tvj

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

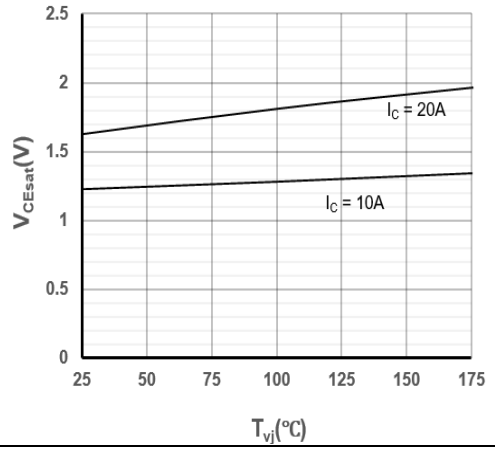


Figure 7. Typical V_{CEsat} as a function of Tvj

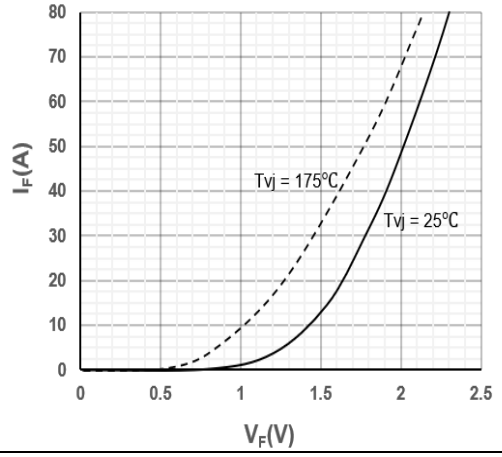


Figure 8. Typical IF as a function of VF

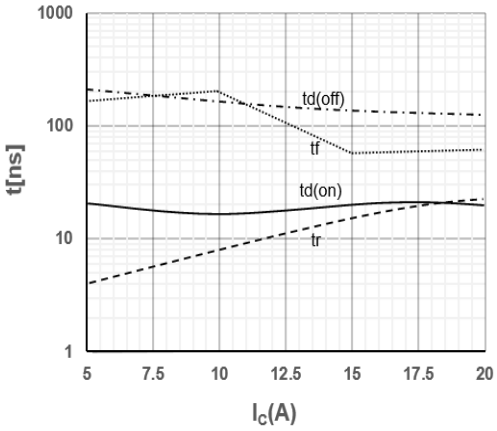


Figure 9. Typical switching time as a function of IC

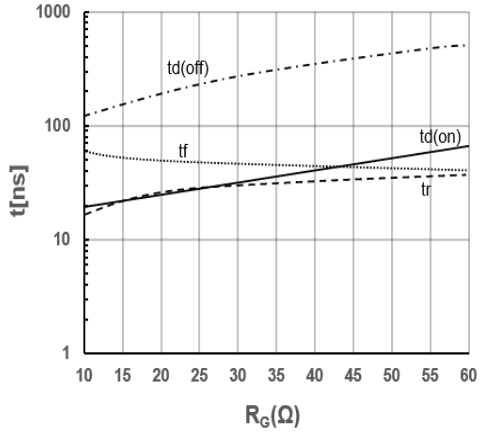


Figure 10. Typical switching times as a function of RG

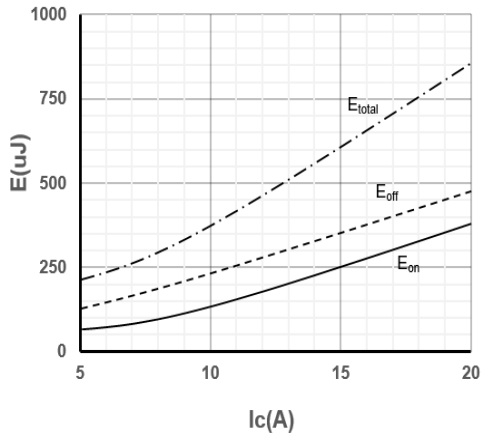


Figure 11. Typical switching energy losses as a function of IC

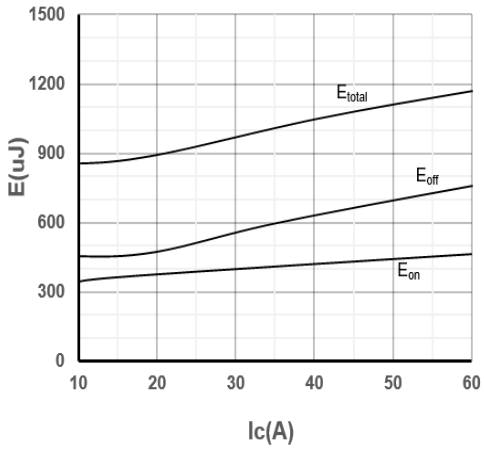


Figure 12. Typical switching times as a function of RG

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

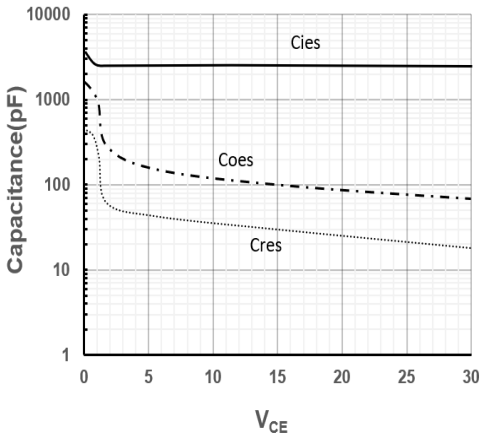
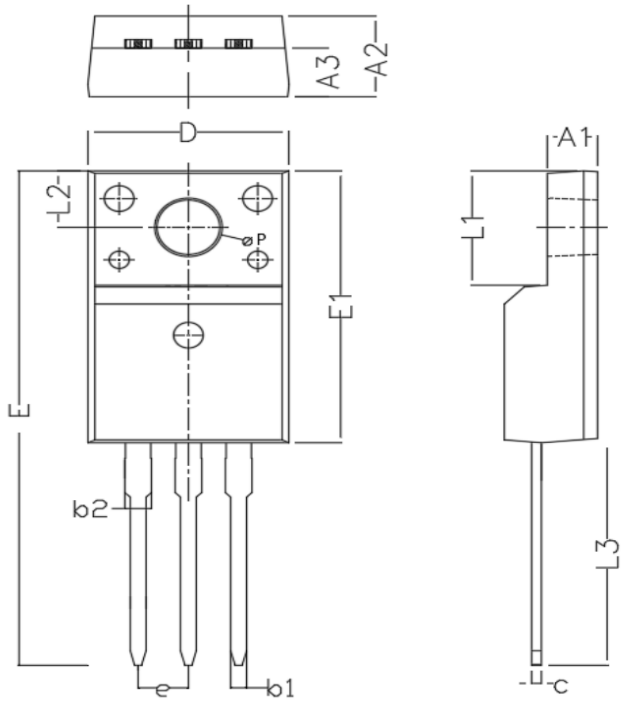


Figure 13. Typical capacitance as a function of VCE (f=1Mhz, VGE=0V)

➢ 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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