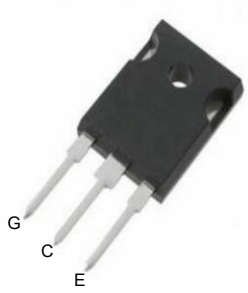
SSCG40R120GT2

Trench FSII Fast IGBT

➢ Features

V_{CES}	V_{GES}	I_C
1200V	±20V	80A@25℃
		40A@100℃

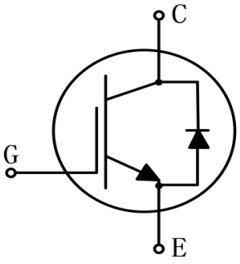
➢ Pin Configuration



TO-247-3L (Top View)

➢ Description

- Trench and field-stop technology
- High speed switching
- Low collector to emitter saturation voltage
- Easy parallel switching capability
- Short circuit withstands time 10μs
- High ruggedness performance



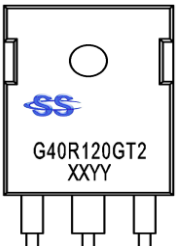
Pin Configuration

➢ Applications

- General inverter
- Motor drives

➢ Ordering Information

Device	Package	Shipping
SSCG40R120GT2	TO-247-3L	30/Tube



Marking

(XXYY: Internal Traceability Code)

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

Symbol	Parameter		Ratings	Unit
V_{CES}	Collector-Emitter Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Collector Current	T_C=25℃	80	A
		T_C=100℃	40	
I_{Cpuls}	Pulsed Collector Current, t_p limited by T_{vJmax}		160	A
P_D	Power Dissipation [a]	T_C=25℃	625	W
		T_C=100℃	312	
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		40	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case for IGBT		0.24	
$R_{\theta JC}$	Thermal Resistance, Junction to Case for Diode		0.49	

➢ 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	1200			V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=1200V, T_{vj}=25℃			250	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=40A, V_{GE}=15V, T_{vj}=25℃		1.7		V
		I_C=40A, V_{GE}=15V, T_{vj}=175℃		2.3		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C = 1mA, V_{CE} = V_{GE}	5.0	6.0	7.0	V
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz		3210		pF
C_{oes}	Output Capacitance			198		
C_{res}	Reverse Transfer Capacitance			29		
$T_{D(ON)}$	Turn-on delay time	T_{vj}=25℃, V_{CC}=600V, I_C=40A, V_{GE}=0/15V, R_g=10Ω, Inductive Load		42		ns
T_r	Rise time			101		
$T_{D(OFF)}$	Turn-off delay time			266		
T_f	Fall time			70		
E_{on}	Turn-On Switching Loss			4.0		mJ
E_{off}	Turn-Off Switching Loss			1.8		
E_{ts}	Total Switching Loss			5.8		
$T_{D(ON)}$	Turn-on delay time	T_{vj}=175℃, V_{CC}=600V, I_C=40A, V_{GE}=0/15V, R_g=10Ω, Inductive Load		42		ns
T_r	Rise time			108		
$T_{D(OFF)}$	Turn-off delay time			290		
T_f	Fall time			127		
E_{on}	Turn-On Switching Loss			6.0		mJ
E_{off}	Turn-Off Switching Loss			2.7		
E_{ts}	Total Switching Loss			8.7		
Q_G	Total Gate Charge	V_{CC} = 960V, I_C = 40A, V_{GE} = 0/15V		191		nC

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VF	Diode forward voltage	IF=40A, T_{vj}=25℃		2.0		V
		IF=40A, T_{vj}=175℃		1.6		V
Trr	Diode reverse recovery time	VR=600V IF=40A diF/dt=750A/μs T_{vj}=25℃		175		ns
Irrm	Diode peak reverse recovery current			24		A
Qrr	Diode reverse recovery charge			2000		nC
Trr	Diode reverse recovery time	VR=600V IF=40A diF/dt=750A/μs T_{vj}=175℃		285		ns
Irrm	Diode peak reverse recovery current			37		A
Qrr	Diode reverse recovery charge			5500		nC

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

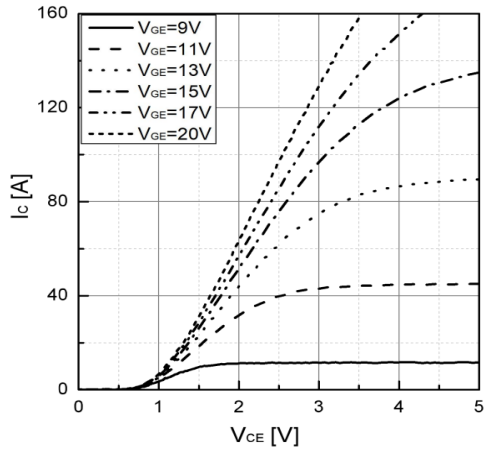


Fig 1. Typical output characteristic (T_{vj}=25℃)

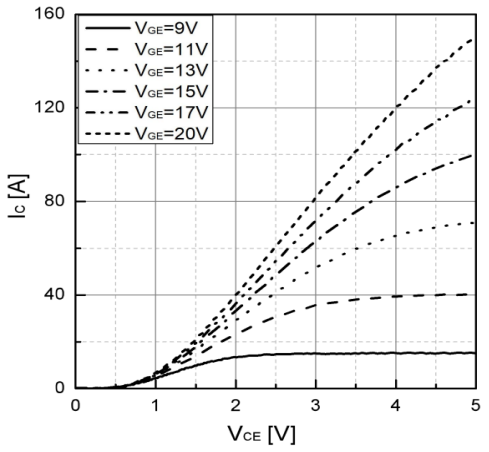


Fig 2. Typical output characteristic(T_{vj}=175℃)

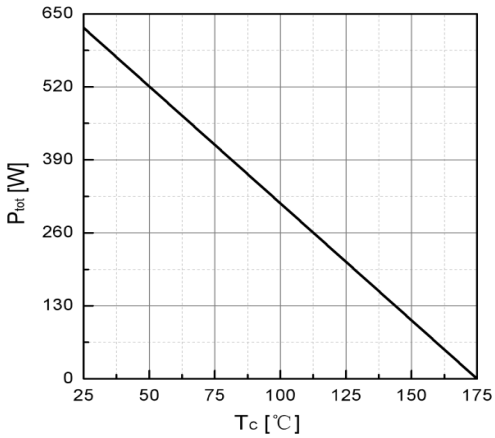


Fig 3. Power dissipation as a function of TC

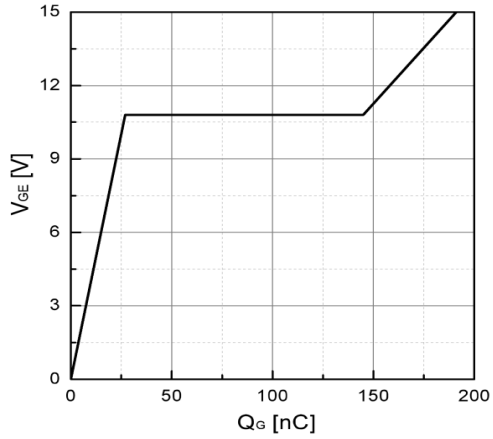


Fig 4. Typical Gate charge

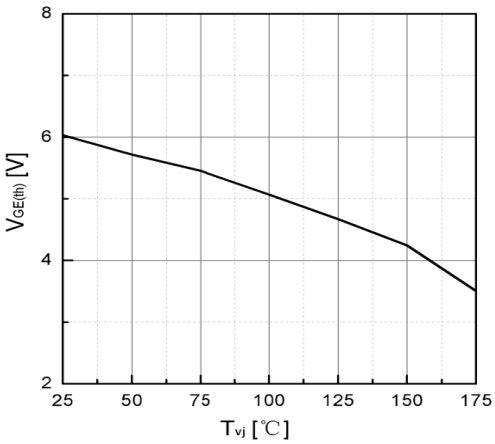


Fig 5. Typical VGE(th) as a function of T_{vj} (IC=1mA)

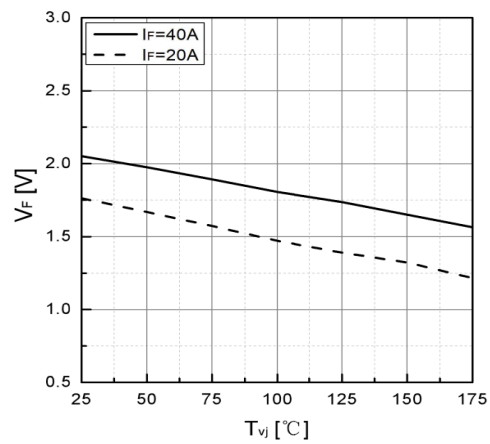


Fig 6. Typical VF as a function of T_{vj}

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

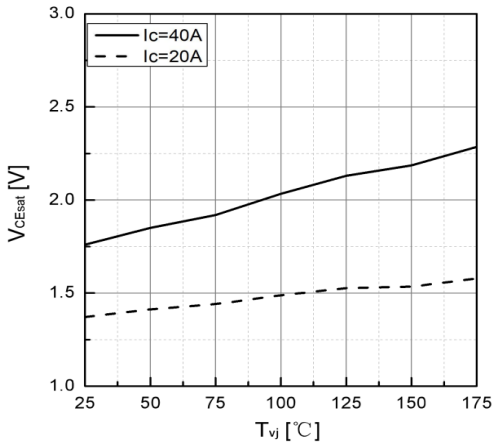


Fig 7. Typical VCEsat as a function of T_{vj}

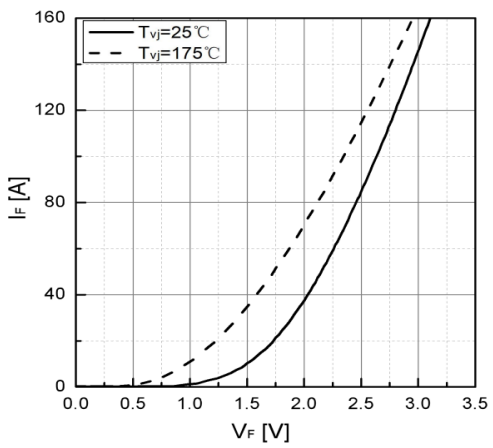


Fig 8. Typical IF as a function of VF

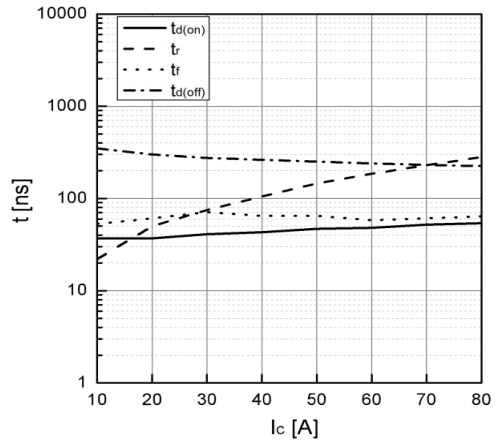


Fig 9. Typical switching time as a function of IC

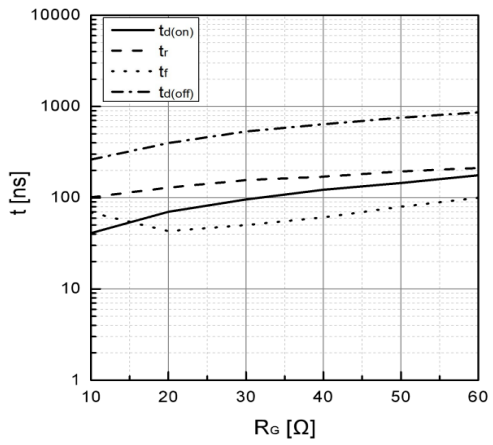


Fig 10. Typical switching times as a function of RG

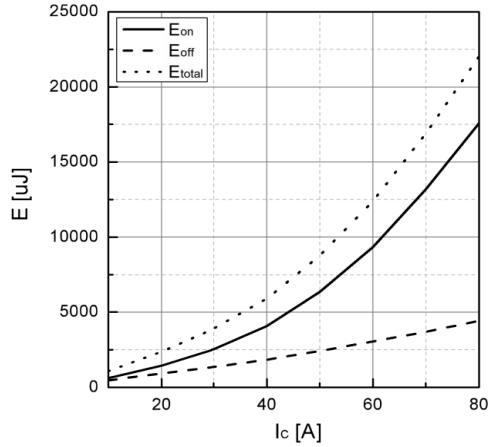


Fig 11. Typical switching energy losses as a function of IC

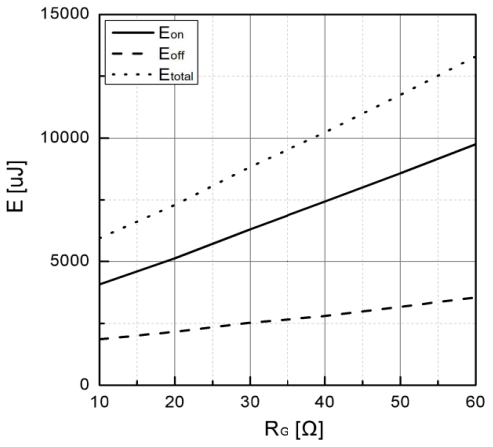


Fig 12. Typical switching energy losses as a function of RG

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

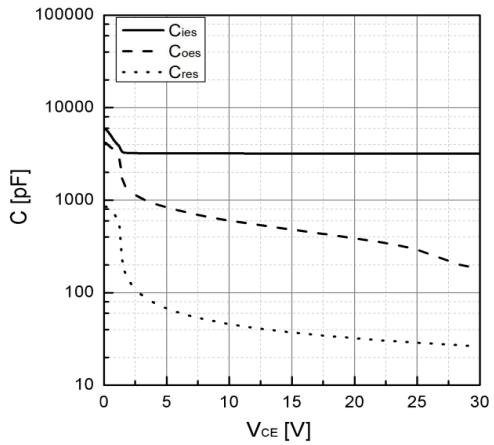


Fig 13. Typical capacitance as a function of VCE(f=1Mhz, VGE=0V)

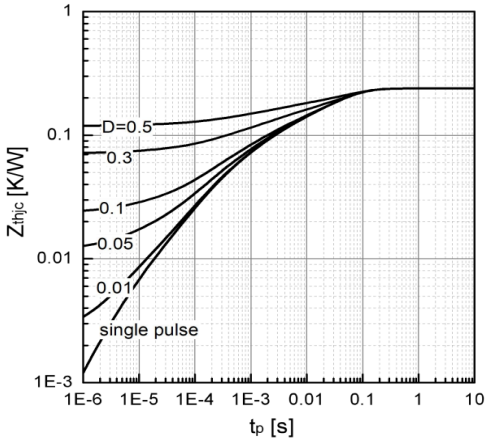


Fig 14. Transient thermal impedance, IGBT

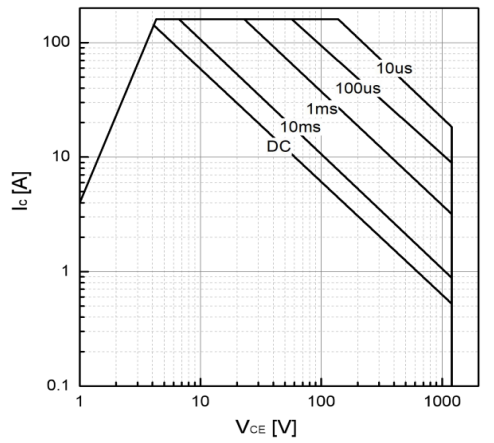
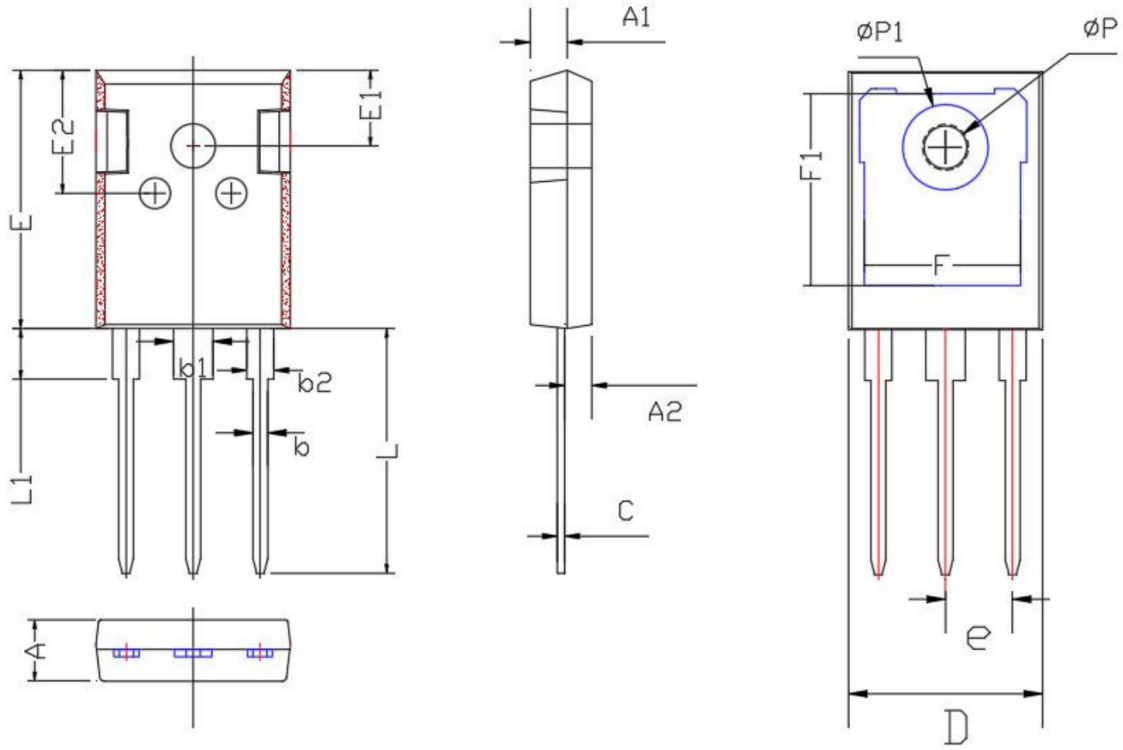


Fig 15. Safe operating area

➢ Package Information

TO247



Symbol	MILL IMETER			Symbol	MILL IMETER		
	Min	Nom	Max		Min	Nom	Max
A	4.80	5.00	5.20	E1	5.60	5.80	6.20
A1	3.30	3.50	3.70	E2	9.8	10.0	10.2
A2	2.20	2.40	2.60	e	5.25	5.45	5.65
b	1.00	1.20	1.40	F	13.1	13.4	13.7
b1	2.90	3.10	3.30	F1	16.25	16.55	16.85
b2	1.90	2.10	2.30	L	19.5	20.0	20.5
c	0.50	0.60	0.71	L1	4.00	4.20	4.40
D	15.2	15.7	16.2	P	3.30	3.50	3.80
E	20.8	21	21.2	P1	6.80	7.10	7.40

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