



SSC65TR15GT6

Trench FSII Fast IGBT

➤ Features

V_{CES}	V_{GES}	I_c
650V	$\pm 20V$	30A@25°C
		15A@100°C

➤ 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.

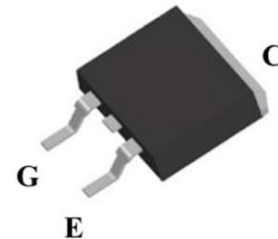
➤ Applications

- Home appliances
- Motordrives
- General inverter

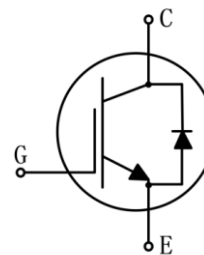
➤ Ordering Information

Device	Package	Shipping
SSC65TR15GT6	TO263-3L	800/Reel

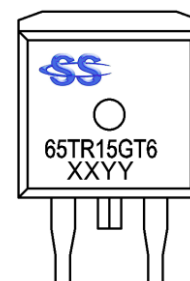
➤ Pin Configuration



TO263-3L (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	$T_C=25^{\circ}\text{C}$	30	A
		$T_C=100^{\circ}\text{C}$	15	
I_{Cpuls}	Pulsed Collector Current, t_p limited by T_{vjmax}		60	A
P_D	Power Dissipation ^a	$T_C=25^{\circ}\text{C}$	150	W
		$T_C=100^{\circ}\text{C}$	75	
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		40	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case for IGBT		1.0	
$R_{\theta JC}$	Thermal Resistance, Junction to Case for Diode		1.5	

Note:

a. The maximum current rating is package limited.



➤ **Electrical Characteristics of IGBT ($T_{vj}=25^{\circ}\text{C}$ 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	$V_{GE}=0V, V_{CE}=650V, T_{vj}=25^{\circ}\text{C}$			50	μA
$I_{GES(F)}$	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	$I_C=15A, V_{GE}=15V, T_{vj}=25^{\circ}\text{C}$		1.6		V
		$I_C=15A, V_{GE}=15V, T_{vj}=150^{\circ}\text{C}$		1.9		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C = 1mA, V_{CE} = V_{GE}$	5.4	5.6	5.9	V
C_{ies}	Input Capacitance	$V_{CE} = 30V, V_{GE} = 0V,$ $f = 1MHz$		1055		pF
C_{oes}	Output Capacitance			57		
C_{res}	Reverse Transfer Capacitance			15		
$T_{D(ON)}$	Turn-on delay time	$T_{vj}=25^{\circ}\text{C}, V_{CC}=400V, I_C=15A,$ $V_{GE}=0/15V, R_g=10\Omega,$ Inductive Load		17		ns
T_r	Rise time			14		
$T_{D(OFF)}$	Turn-off delay time			104		
T_f	Fall time			46		
E_{on}	Turn-On Switching Loss			0.30		mJ
E_{off}	Turn-Off Switching Loss			0.27		
E_{ts}	Total Switching Loss			0.57		
$T_{D(ON)}$	Turn-on delay time	$T_{vj}=150^{\circ}\text{C}, V_{CC}=400V,$ $I_C=15A,$ $V_{GE}=0/15V, R_g=10\Omega,$ Inductive Load		16		ns
T_r	Rise time			15		
$T_{D(OFF)}$	Turn-off delay time			119		
T_f	Fall time			81		
E_{on}	Turn-On Switching Loss			0.38		mJ
E_{off}	Turn-Off Switching Loss			0.40		
E_{ts}	Total Switching Loss			0.78		
Q_G	Total Gate Charge	$V_{CC} = 520V, I_C = 15A,$ $V_{GE} = 0/15V$		55		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=15A, $T_{vj}=25^{\circ}\text{C}$		1.4		V
		IF=15A, $T_{vj}=150^{\circ}\text{C}$		1.2		V
Trr	Diode reverse recovery time	VR=400V IF=15A diF/dt=600A/ μs $T_{vj}=25^{\circ}\text{C}$		55		ns
Irrm	Diode peak reverse recovery current			9.5		A
Qrr	Diode reverse recovery charge			220		nC
Trr	Diode reverse recovery time	VR=400V IF=15A diF/dt=600A/ μs $T_{vj}=150^{\circ}\text{C}$		75		ns
Irrm	Diode peak reverse recovery current			15		A
Qrr	Diode reverse recovery charge			450		nC

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

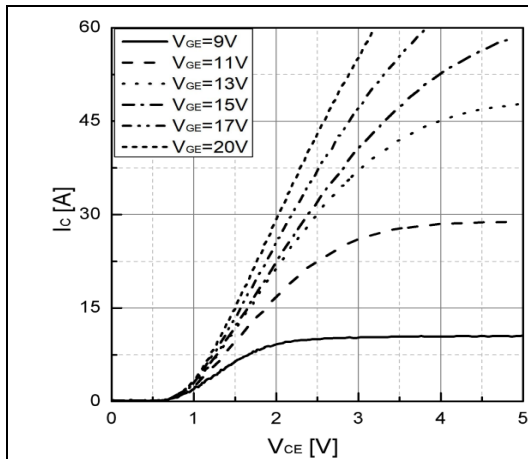


Fig 1. Typical output characteristic ($T_{vj}=25^{\circ}\text{C}$)

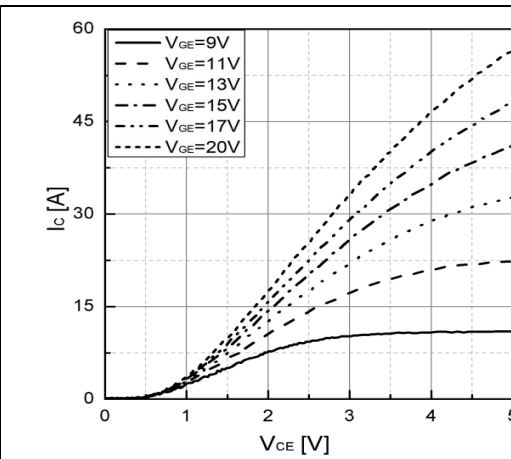


Fig 2. Typical output characteristic ($T_{vj}=150^{\circ}\text{C}$)

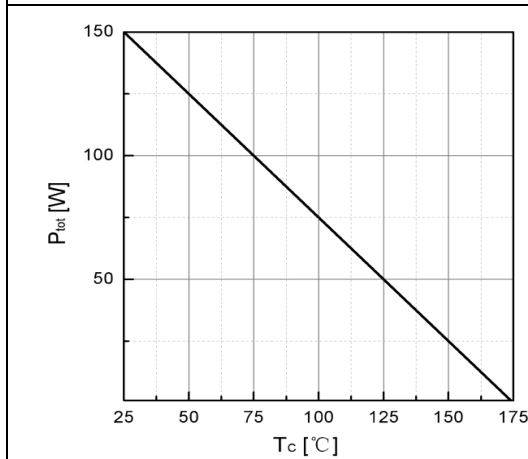


Fig 3. Power dissipation as a function of TC

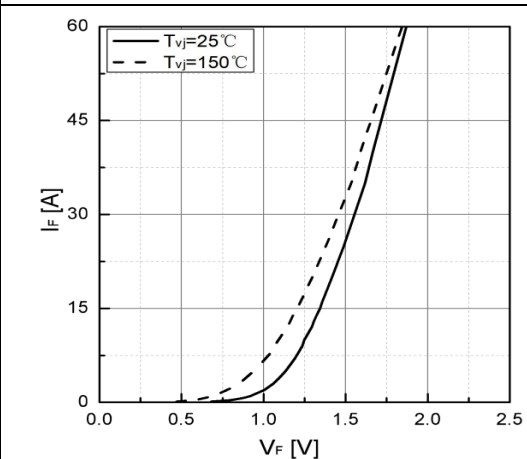
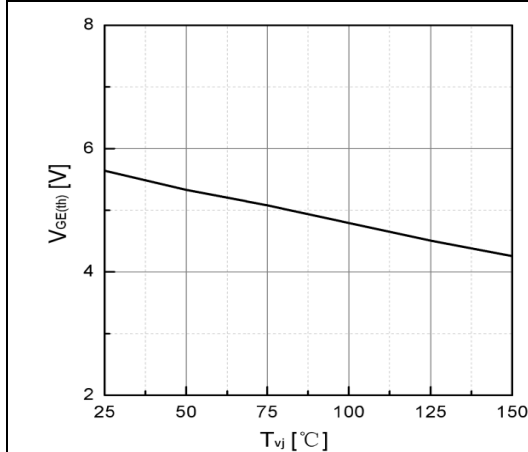


Fig 4. Typical I_F as a function of V_F



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

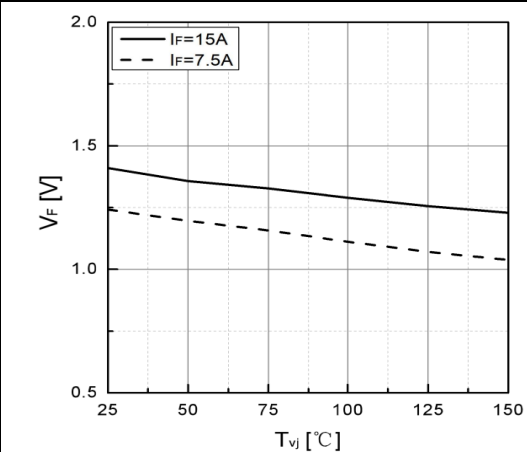


Fig 6. Typical V_F as a function of T_{vj}

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

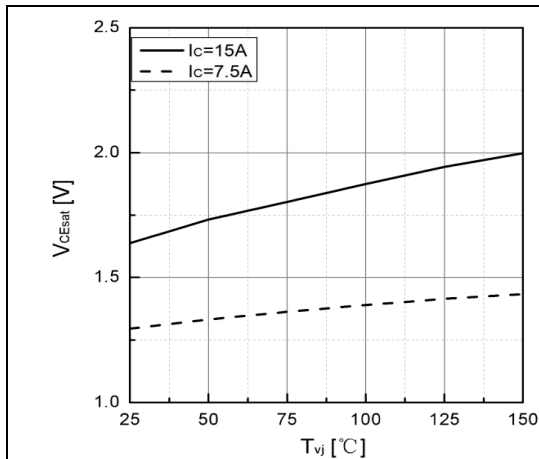


Fig 7. Typical V_{CEsat} as a function of T_{vj}

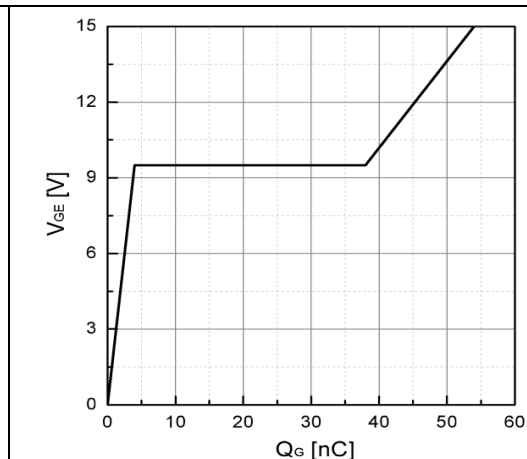
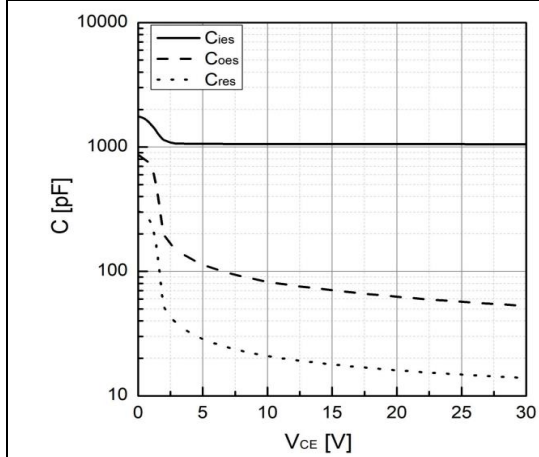
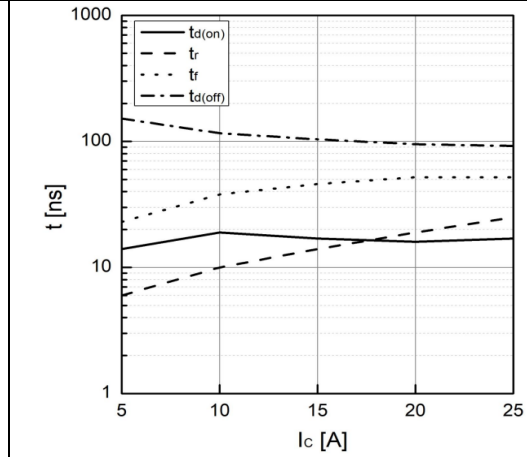


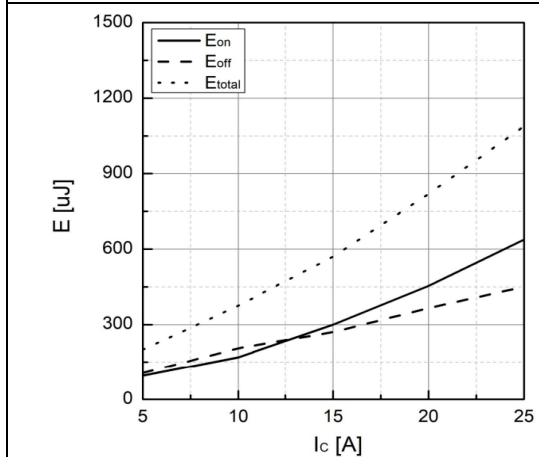
Fig 8. Typical Gate charge



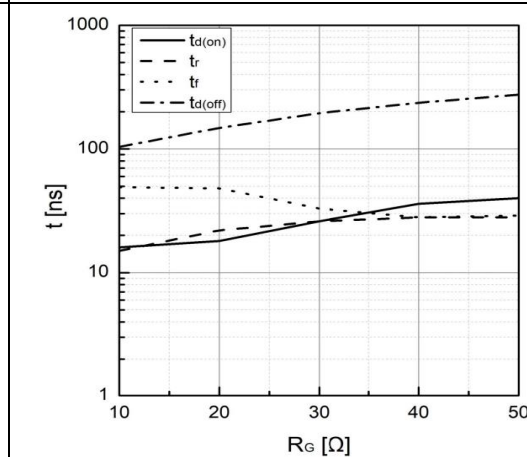
**Fig 9. Typical capacitance as a function of V_{CE}
($f=1\text{MHz}$, $V_{GE}=0\text{V}$)**



**Fig 10. Typical switching times as a function
of I_C**



**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)

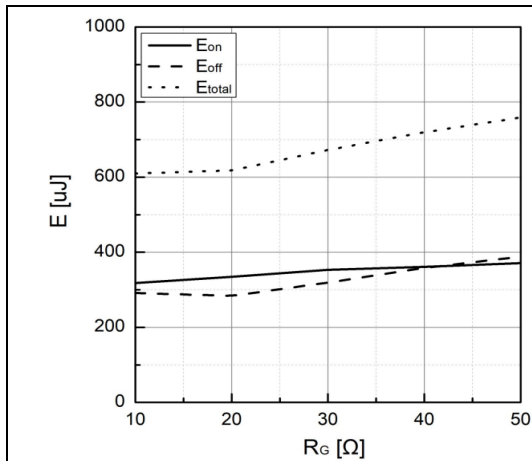


Fig 13. Typical switching energy losses as a function of R_G

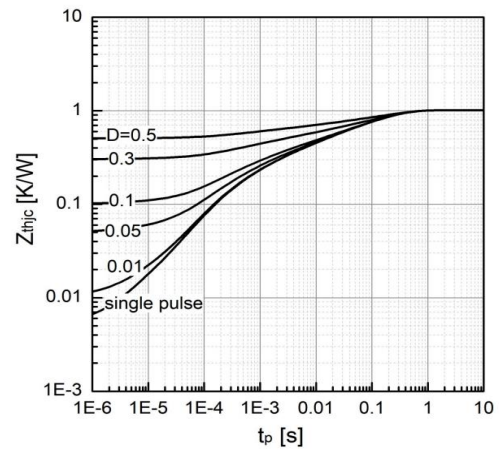
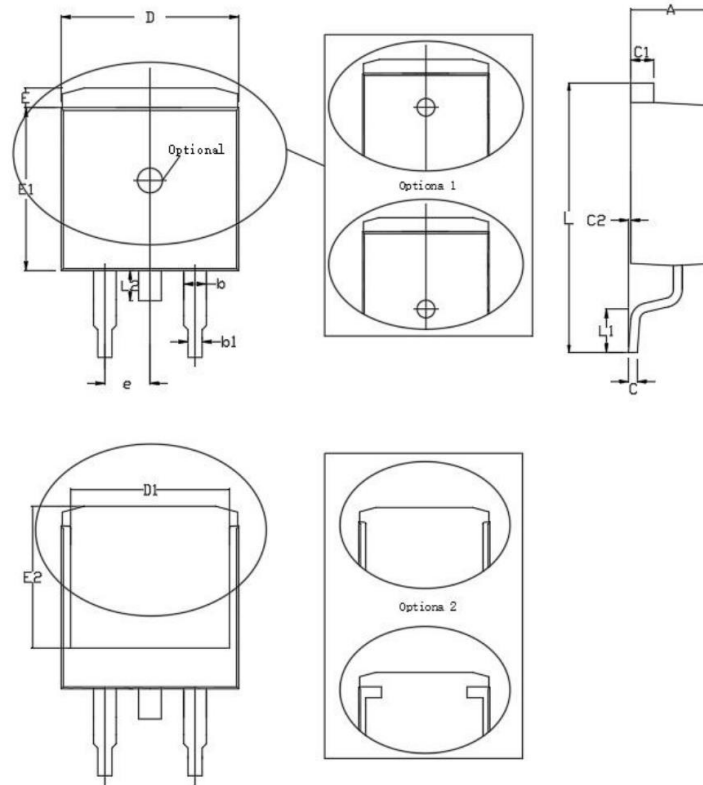


Fig 14. Transient thermal impedance, IGBT

➤ Package Information

TO263



Symbol	MILL IMETER			Symbol	MILL IMETER		
	Min	Nom	Max		Min	Nom	Max
A	4.40	4.55	4.70	E	1.02	1.27	1.67
b	1.17	1.28	1.37	E1	8.38	9.15	9.65
b1	0.51	0.80	0.91	E2	6.85	8.00	8.40
C	0.38	0.47	0.74	e	2.54BSC		
C1	1.14	1.30	1.65	L	14.61	15.24	15.88
C2	0.02	0.10	0.20	L1	1.50	/	2.60
D	9.65	10.00	10.70	L2	1.30	1.50	1.75
D1	6.25	7.40	8.37				



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