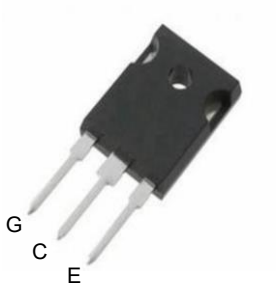
SSC65TR50GT2

Trench FSII Fast IGBT

➢ Features

V_{CES}	V_{GES}	I_C
650V	±20V	100A@25℃
		50A@100℃

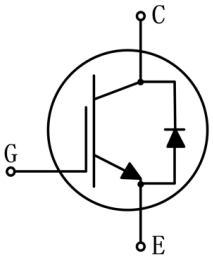
➢ Pin Configuration



TO247-3L (Top View)

➢ Description

- High efficiency for inverters.
- High ruggedness performance.
- RoHS compliant.
- 5μs short circuit capability.



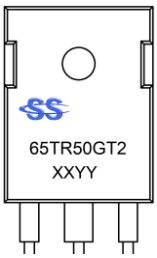
Pin Configuration

➢ Applications

- Welding Machines
- PFC Circuits

➢ Ordering Information

Device	Package	Shipping
SSC65TR50GT2	TO247-3L	30/Tube



Marking

(XXYY: Internal Traceability Code)

➢ Absolute Maximum Ratings(T_A=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℃	100	A
		T_C=100℃	50	
I_{Cpuls}	Pulsed Collector Current, t_p limited by T_{Jmax}		200	A
P_D	Power Dissipation	T_A=25℃	457	W
		T_A=100℃	230	
T_J	Operating Junction and Storage Temperature Range		-55~+150	℃
T_{STG}	Operating Junction and Storage Temperature Range		-55~+150	℃
tsc	Short circuit withstand time		5	μs

➢ Thermal Resistance Ratings(T_A=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Unit
$R_{\theta JA}$	Thermal resistance, junction to ambient	40	℃/W
$R_{\theta JC}$	Thermal resistance, junction to case for IGBT	0.28	
$R_{\theta JC}$	Thermal resistance, junction to case for Diode	0.45	

➢ Electronics Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Unit
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	V_{GE}=0V, Ic=0.25mA	650			V
I_{CES}	Collector-Emitter Leakage Current	V_{GE} =0V, V_{CE}=650V, T_J=25℃			50	uA
		V_{GE} =0V, V_{CE}=650V, T_J=150℃			1	mA
$I_{GES(F)}$	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=50A, V_{GE}=15V, T_J=25℃		1.75	2.1	V
		I_C=50A, V_{GE}=15V, T_J=125℃		2.0		V
		I_C=50A, V_{GE}=15V, T_J=150℃		2.1		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=1mA, V_{CE}=V_{GE}		4.8		V
G_{FS}	Transconductance	V_{CE}=20V, I_C=50A		19		S
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=1MHz, T_J=25℃		4587		pF
C_{oes}	Output Capacitance			99		
C_{res}	Reverse Transfer Capacitance			33		
$T_{D(ON)}$	Turn-on delay time	T_J=25℃, V_{CC}=400V, I_C=32A, V_{GE}=0/15V, R_g=15Ω Inductive Load		51		ns
T_r	Rise time			37		
$T_{D(OFF)}$	Turn-off delay time			244		
T_f	Fall time			13		
E_{on}	Turn-On Switching Loss			1.05		mJ
E_{off}	Turn-Off Switching Loss			0.30		
E_{ts}	Total Switching Loss			1.35		
$T_{D(ON)}$	Turn-on delay time	T_J=150℃, V_{CC}=400V, I_C=32A, V_{GE}=0/15V, R_g=15Ω Inductive Load		47		ns
T_r	Rise time			40		
$T_{D(OFF)}$	Turn-off delay time			273		
T_f	Fall time			20		
E_{on}	Turn-On Switching Loss			1.16		mJ
E_{off}	Turn-Off Switching Loss			0.46		
E_{ts}	Total Switching Loss			1.62		
Q_G	Total Gate Charge	V_{CC}=300V, I_C=50A, V_{GE}=0/15V		149		nC
Q_{GE}	Gate to Emitter Charge			29		
Q_{GC}	Gate to Collector Charge			27		

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VF	Diode forward voltage	IF=30A, T_{vj}=25℃		1.27		V
Trr	Diode reverse recovery time	VR=400V IF=30A diF/dt=400A/μs T_{vj}=25℃		130		ns
Irrm	Diode peak reverse recovery current			11		A
Qrr	Diode reverse recovery charge			0.6		nC

➢ Typical Performance Characteristics (Tvj=25℃ unless otherwise noted)

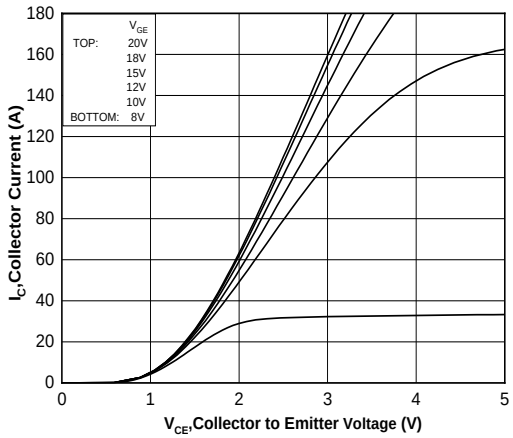


Figure 1. Output Characteristics(T_J=25℃)

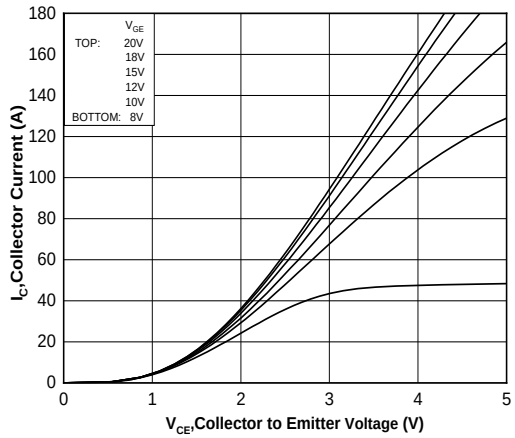


Figure 2. Output Characteristics(T_J=150℃)

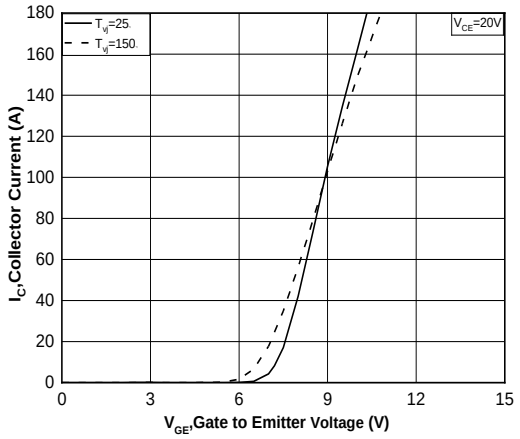


Figure 3. Typical transfer characteristic (T_J=25℃)

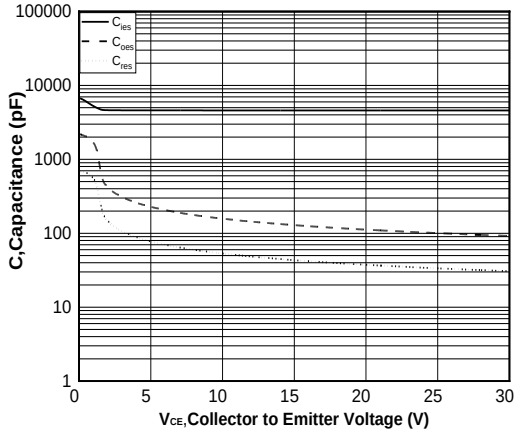


Figure 4. Capacitance characteristic (V_{GE}=0V, f=1MHz)

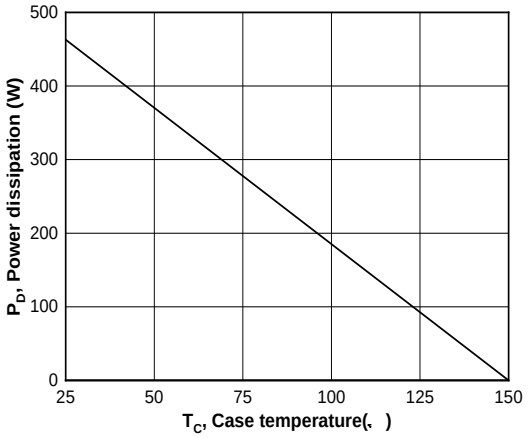


Figure 5. Power dissipation as a function of case temperature (T_J≤150℃)

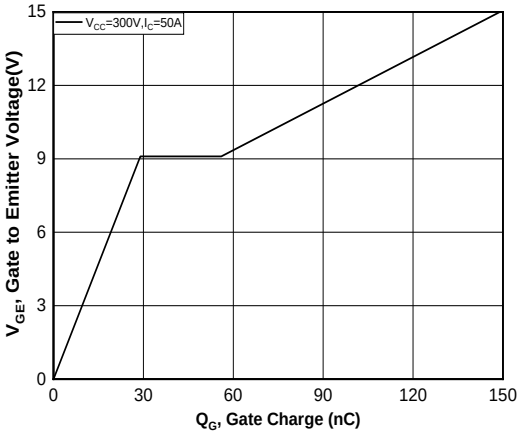


Figure 6. Typical gate charge (I_C=50A)

➢ Typical Performance Characteristics (Tvj=25℃ unless otherwise noted)

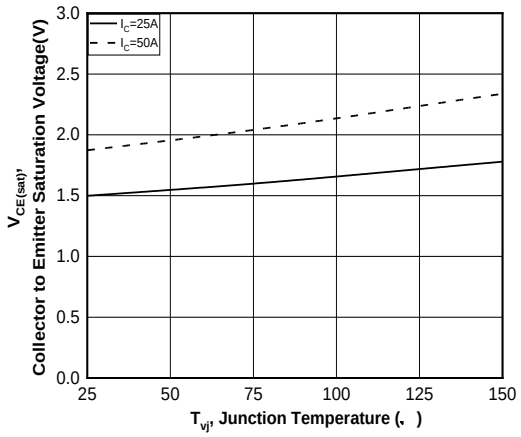


Figure 7. $V_{CE(SAT)}$ as a function of junction temperature (V_{GE}=15V)

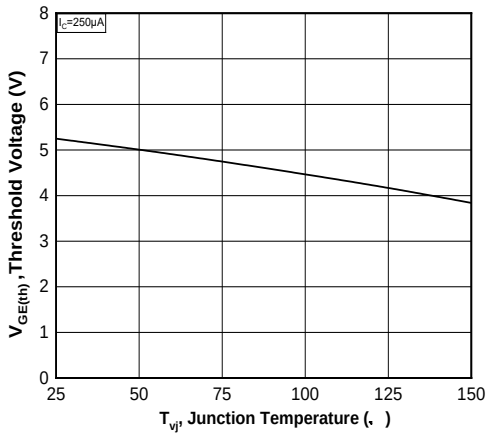


Figure 8. $V_{GE(TH)}$ as a function of junction temperature (I_{CE}=250μA)

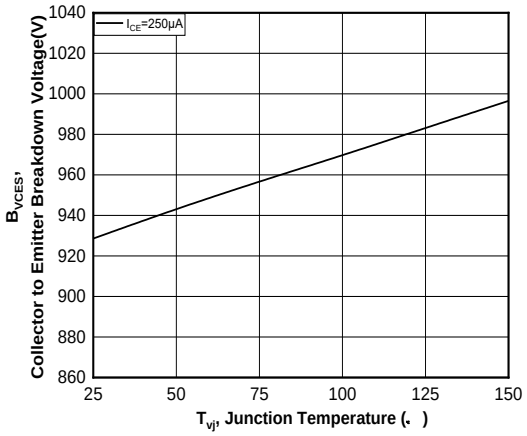


Figure 9. BV_{CES} as a function of junction temperature (I_{CE}=250μA)

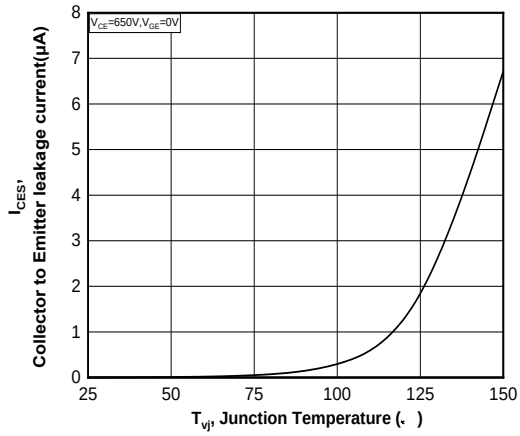


Figure 10. I_{CES} leakage current as a function of junction temperature

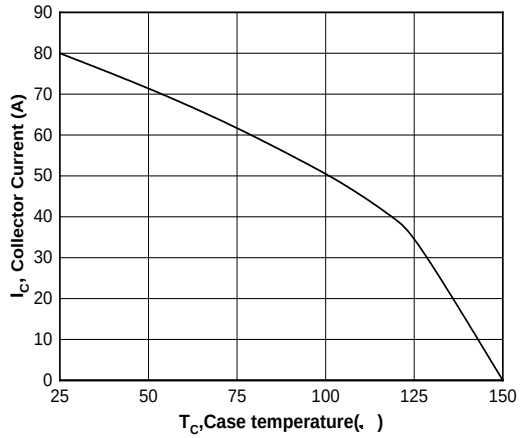


Figure 11. Collector current as a function of case temperature(V_{GE}≥15V,T_J≤150℃)

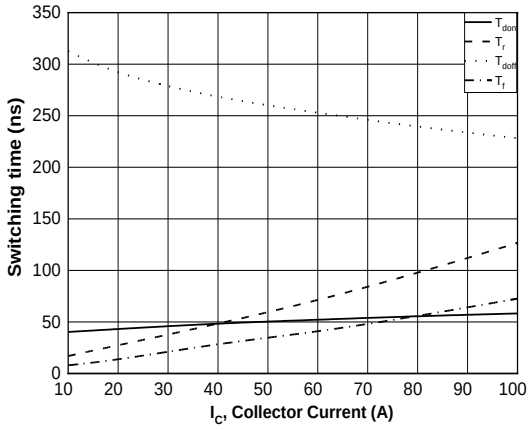


Figure 12. Typical switching times as a function of collector current(T_J=150℃, V_{CE}=400V, $RG_{(on)}$=$RG_{(off)}$=15Ω, V_{GE}=0/15V)

➢ Typical Performance Characteristics (Tvj=25℃ unless otherwise noted)

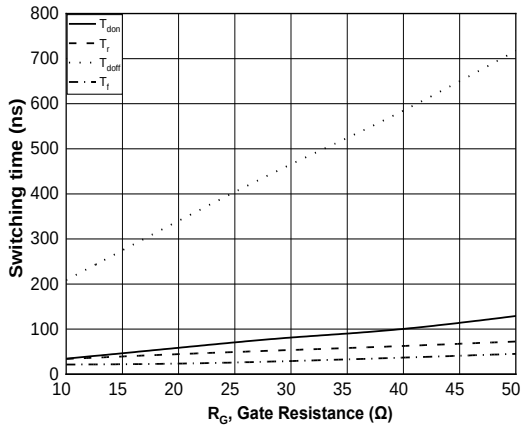


Figure 13. Typical switching times as a function of gate resistance(T_J=150℃, V_{CE}=400V, I_C=32A,V_{GE}=0/15V)

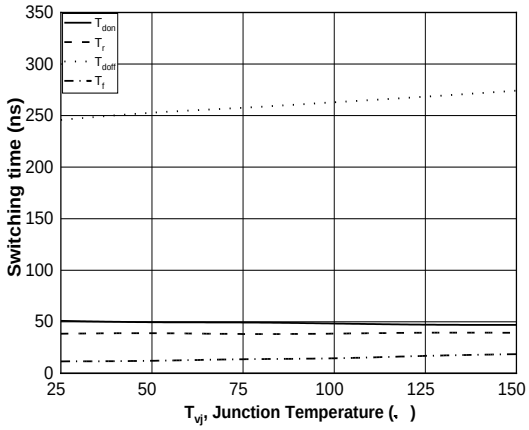


Figure 14. Typical switching times as a function of junction temperature

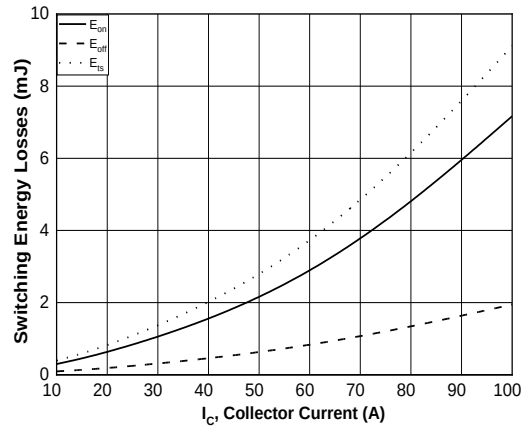


Figure 15. E_{on}, E_{off} as a function of I_C

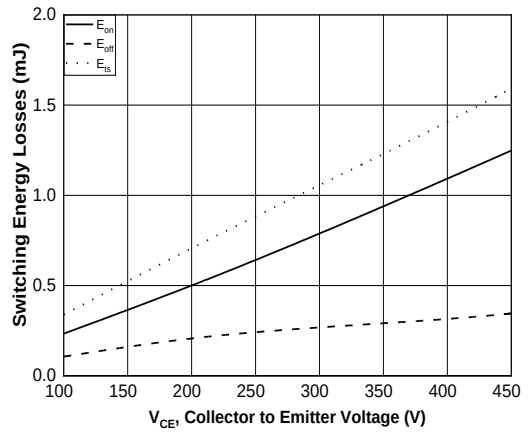


Figure 16. E_{on}, E_{off} as a function of V_{CE}

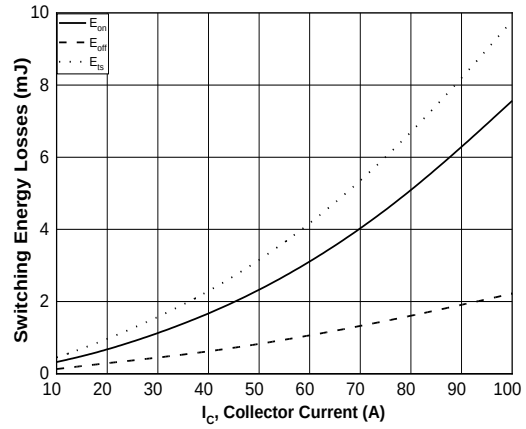


Figure 17. E_{on}, E_{off} as a function of I_C (T_J=150℃,V_{CE}=400V, $RG_{(on)}$=$RG_{(off)}$=15Ω, V_{GE}=0/15V)

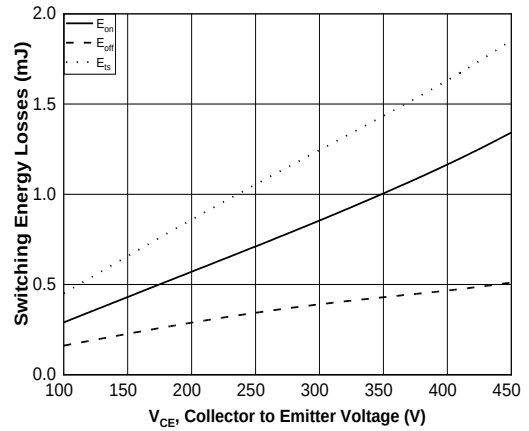


Figure 18. E_{on}, E_{off} as a function of V_{CE} (T_J=150℃, I_C=32A, $R_{G(on)}$=$R_{G(off)}$=15Ω, V_{GE}=0/15V)

➢ Typical Performance Characteristics (Tvj=25℃ unless otherwise noted)

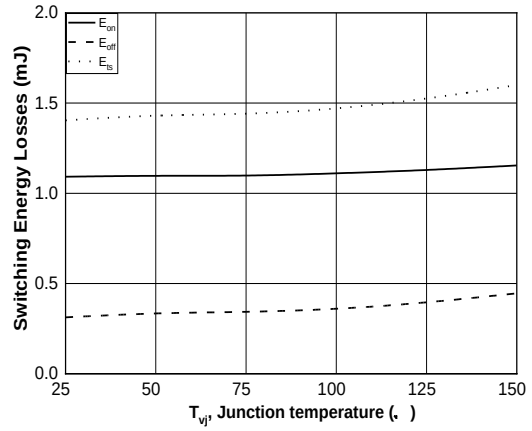


Figure 19. E_{on} E_{off} as a function of junction temperature

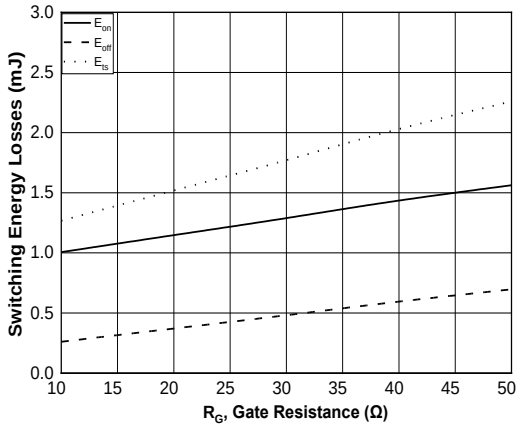


Figure 20. E_{on} E_{off} as a function of gate resistance

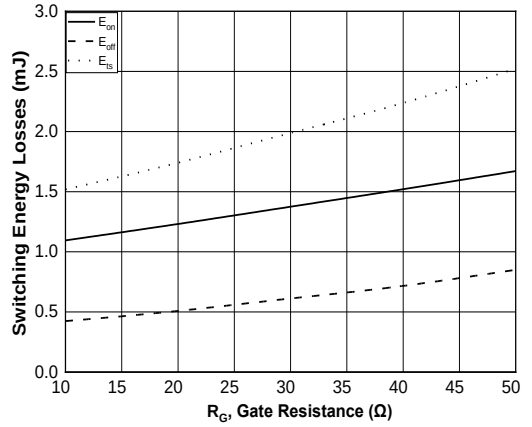


Figure 21. E_{on} E_{off} as a function of gate resistance (T_J=150℃, V_{CE}=400V, I_C=32A, V_{GE}=0/15V)

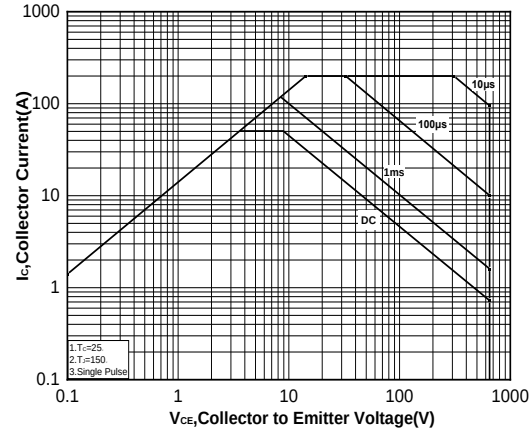


Figure 22. Forward bias safe operating area

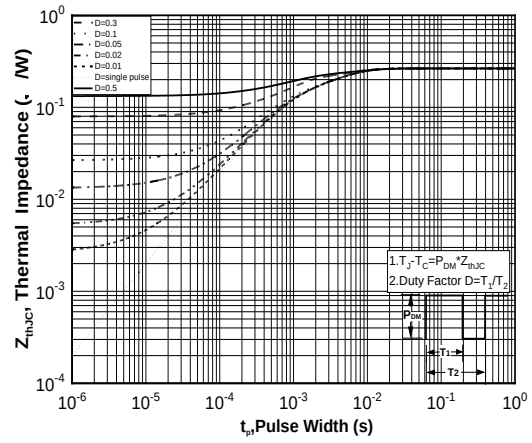
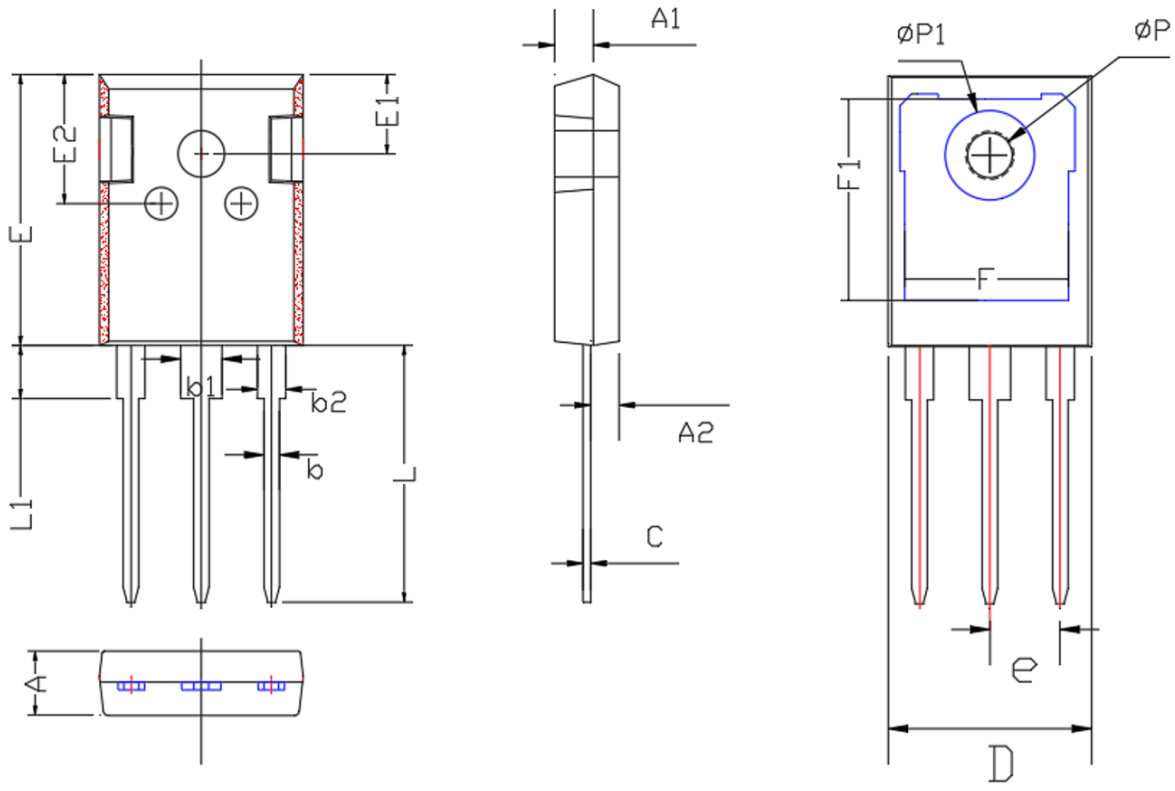


Figure 23. Transient thermal resistance

➢ Package Information

TO247-3L



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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