SKIF50N65-T7

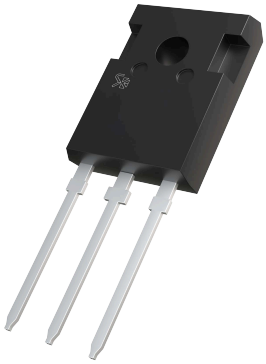
IGBT Discrete with Anti-Parallel Diode

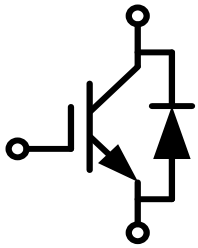
Features

- 650V gooved gate/fiel temination pocess
- Low switching loss
- Positive tempeatue coefficient

Applications

- Charging pile
- OBC
- UPS
- Inverter





V_{CES} =650V，$I_{C\ nom}$ =75A / I_{CRM} =150A

Ordering Information

Part Number	Package
SKIF50N65-T7	TO-247

IGBT

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Collector-Emitter voltage	T_{vj}=25°C	V_{CES}	650	V
Continuous DC collector current	T_C=100°C, $T_{vj\ max}$=175°C	$I_{C\ nom}$	50	A
Repetitive peak collector current	t_P=1 ms	I_{CRM}	100	A
Gate charge	VGE=-15V…+15V	QG	0.50	μC
Total power dissipation	T_C = 25°C, $T_{vj\ max}$ = 175°C	P_{tot}	275	W
Gate emitter voltage		V_{GE}	±20	V

Characteristic Values

Parameter	Conditions		Symbol	Value			Unit
				Min.	Typ.	Max.	
Collector-Emitter saturation voltage	V_{GE}=15V, I_C=50A V_{GE}=15V, I_C=50A V_{GE}=15V, I_C=50A	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	V_{CEsat}		1.58 1.87 1.95	2.10	V
Gate-Emitter threshold voltage	I_C=0.5mA, V_{GE}= V_{CE}	T_{vj}=25°C	$V_{GE(th)}$	4.2	5.0	5.8	
Transconductance	V_{CE}=20V，I_C=50A		G_{fs}		77		S
Input capacitance	f=1 MHz, V_{CE}=25 V, V_{GE}=0 V	T_{vj}=25°C	C_{ies}		5.46		nF
Reverse transfer capacitance			C_{res}		0.1		
Collector-emitter cut-off current	V_{CE}=650V , V_{GE}= 0 V	T_{vj}=25°C	I_{CES}			1	mA
Gate-emitter leakage current	V_{CE}=0 V, V_{GE}= 20 V	T_{vj}=25°C	I_{GES}			200	nA
Turn-on delay time	I_C=50A,V_{CE}=400V V_{GE}=±15V,R_G=8Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	$t_{d\ on}$		33 21 19		ns
Rise time	I_C=50A,V_{CE}=400V V_{GE}=±15V,R_G=8Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	t_r		75 67 65		
Turn-off delay time	I_C=50A,V_{CE}=400V V_{GE}=±15V,R_G=8Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	$t_{d\ off}$		21 32 38		
Fall time	I_C=50A,V_{CE}=400V V_{GE}=±15V,R_G=8Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	t_f		41 62 62		
Turn-on energy loss per pulse	I_C=50A,V_{CE}=400V V_{GE}=±15V,R_G=8Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	E_{on}		2.37 2.88 3.10		mJ
Turn-off energy loss per pulse	I_C=50A,V_{CE}=400V V_{GE}=±15V,R_G=8Ω (inductive load)	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	E_{off}		0.60 0.73 0.76		
IGBT thermal resistance, junction			R_{thJC}		0.38		K/W
Temperature under switching conditions			$T_{vj\ op}$	-40		175	°C

Diode

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Repetitive peak reverse voltage	T_{vj}=25°C	V_{RRM}	650	V
Continuous DC forward current	T_C=100°C, $T_{vj\ max}$=175°C	I_F	50	A
Repetitive peak forward current	t_p=1ms	I_{FRM}	100	A

Characteristic Values

Parameter	Conditions		Symbol	Value			Unit
				Min.	Typ.	Max.	
Forward voltage	I_F=50A, V_{GE}=0V I_F=50A, V_{GE}=0V I_F=50A, V_{GE}=0V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	V_F		1.63 1.42 1.37	2.1	V
Peak reverse recovery current	I_F=50A, -di_F/dt=411A/µs(T_{vj}=150°C) V_R=400V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	I_{RM}		21 29 32		A
Reverse Recovered charge	I_F=50A, -di_F/dt=411A/µs(T_{vj}=150°C) V_R=400V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	Q_{rr}		1.48 3.26 3.95		µC
Reverse Recovery Time	I_F=50A, -di_F/dt=411A/µs(T_{vj}=150°C) V_R=400V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	t_{rr}		133 199 218		ns
Reverse recovered energy	I_F=50A, -di_F/dt=411A/µs(T_{vj}=150°C) V_R=400V, V_{GE}=-15V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C	E_{rec}		0.34 0.66 0.78		mJ
Diode thermal resistance junction			R_{thJC}		0.45		K/W
Temperature under switching conditions			$T_{vj\ op}$	-40		175	°C

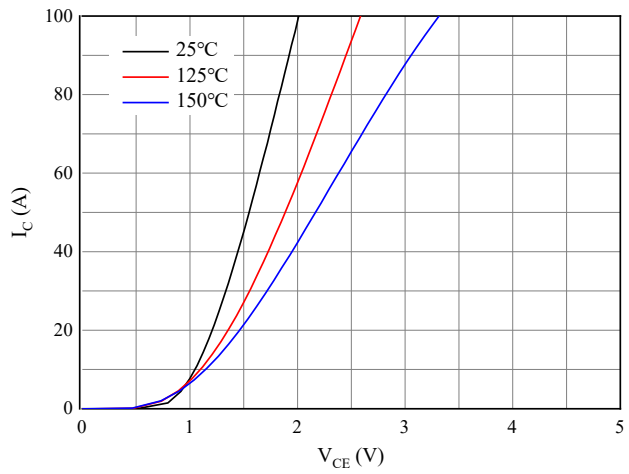


Figure 1. Typical output characteristics (V_{GE}=15V)

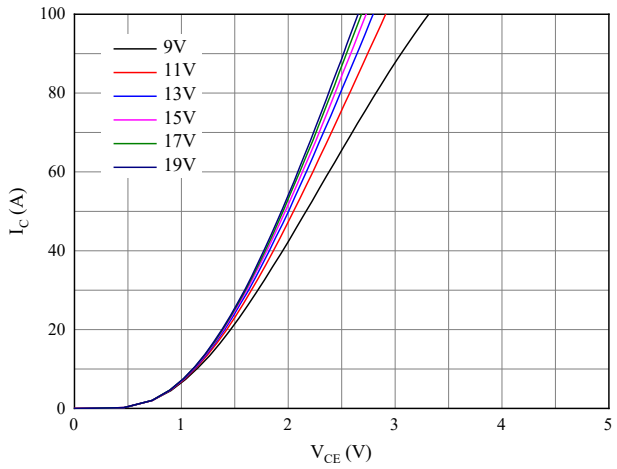


Figure 2. Typical output characteristics (T_{vj}=150℃)

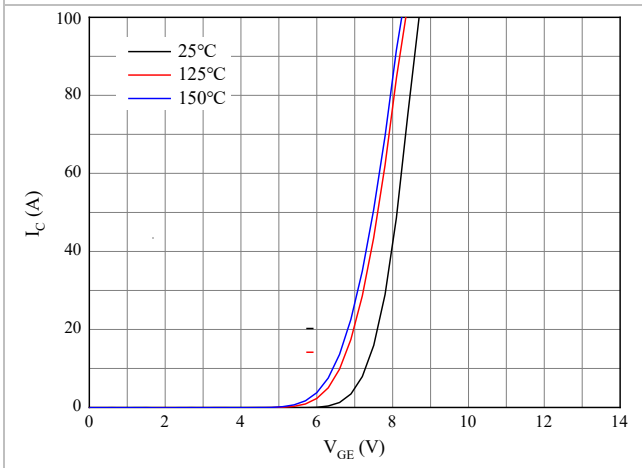


Figure 3. Typical transfer characteristic(V_{CE}=20V)

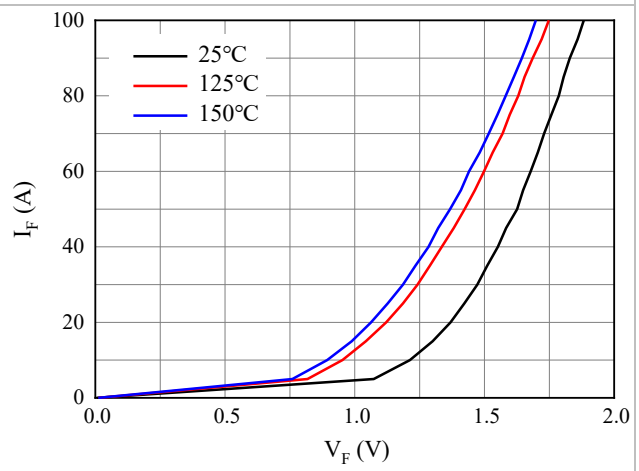


Figure 4. Forward characteristic of Diode

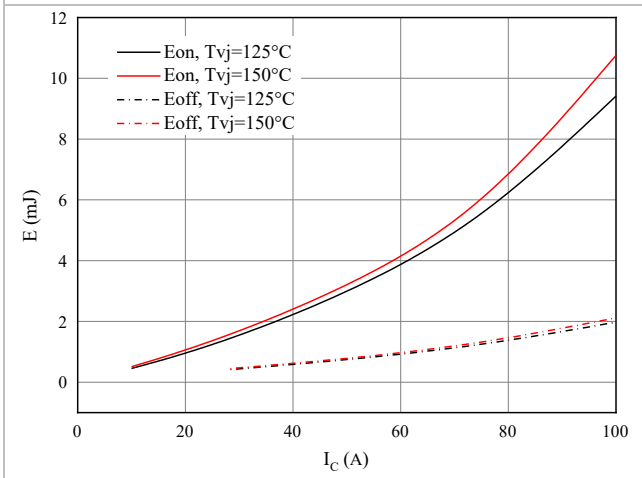


Figure 5. Switching losses of IGBT

VGE=±15V, RGon=8Ω, Rgoff=8Ω, VCE=400V

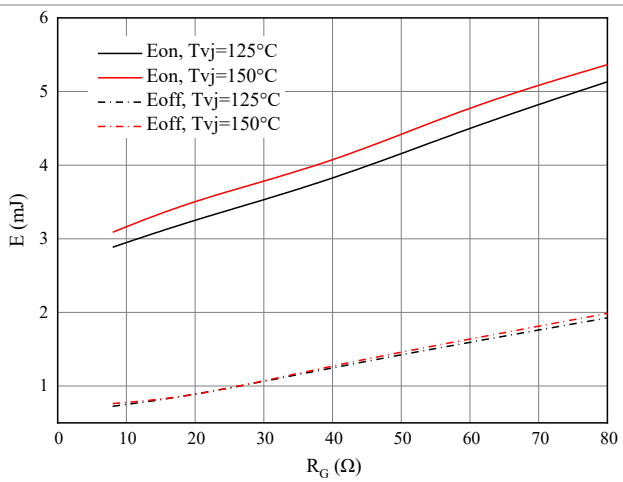


Figure 6. Switching losses of IGBT

VGE=±15V, IC=50A, VCE=400V

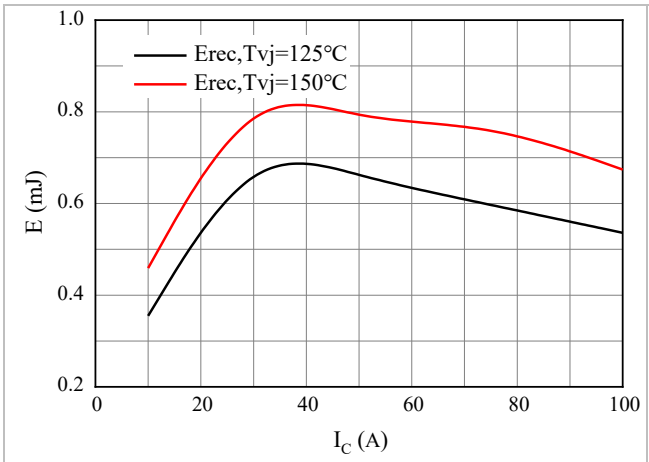


Figure 7. Switching losses of Diode

Rgon=8Ω, VCE=400V

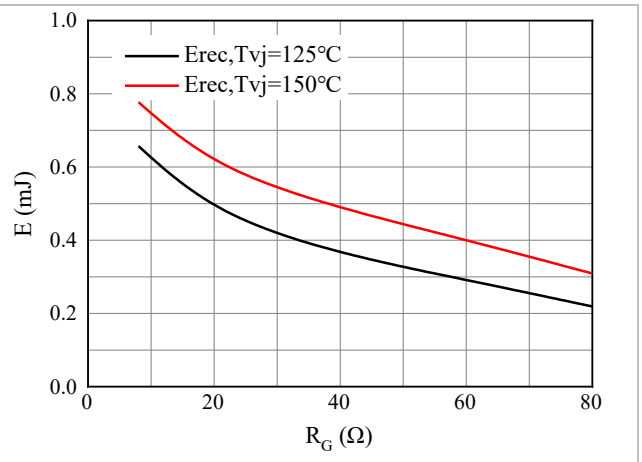


Figure 8. Switching losses of Diode

IF=50A, VCE=400V

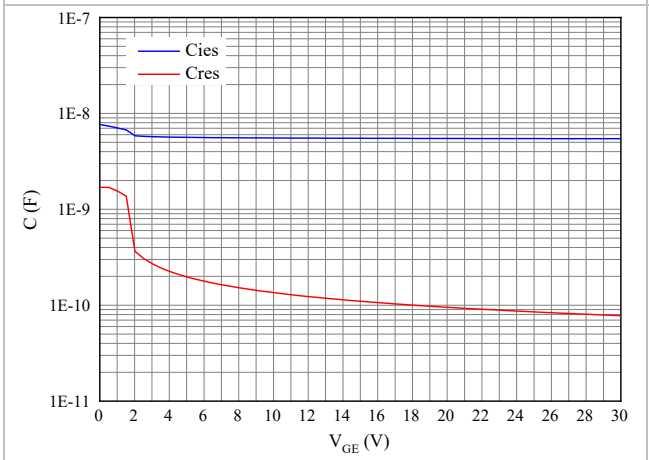
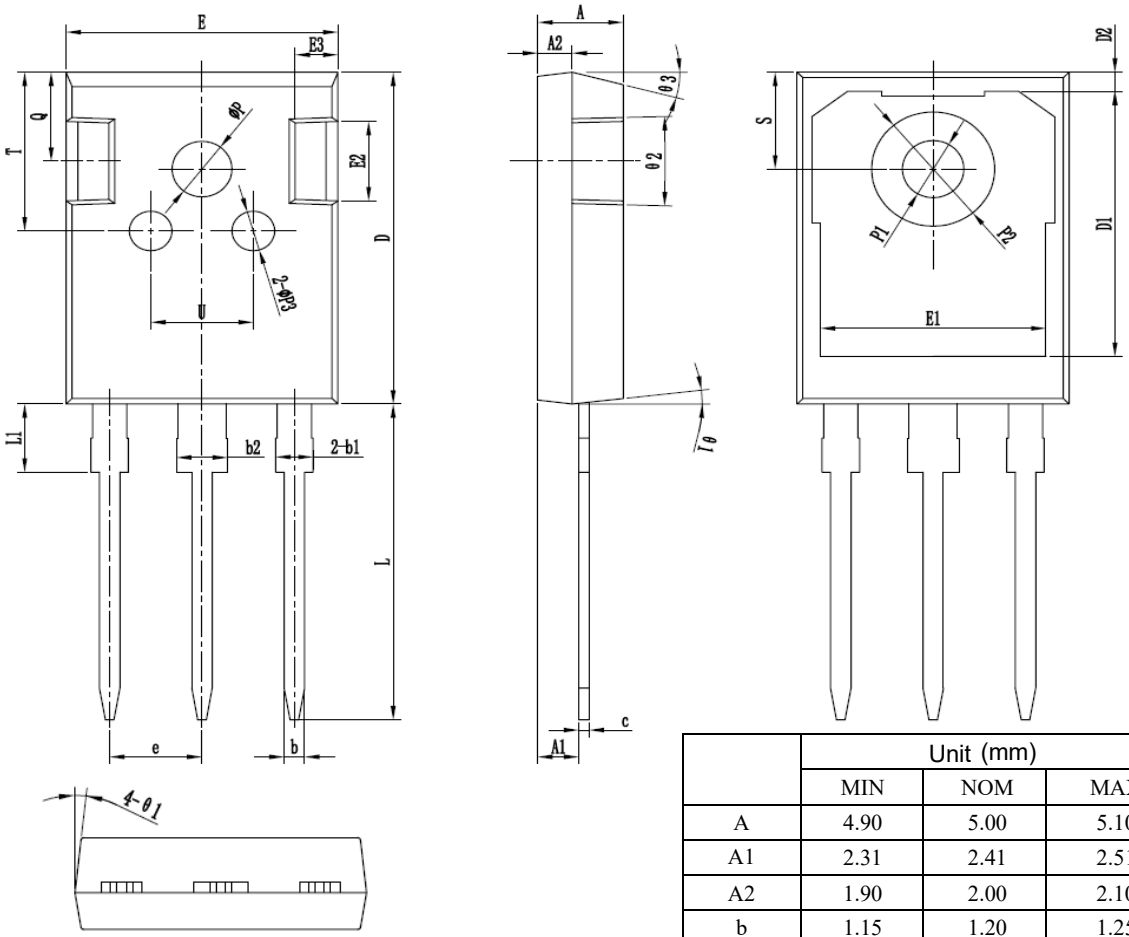


Figure 9. Capacitance characteristic

SKIF50N65-T7

TO-247



	Unit (mm)		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
b	1.15	1.20	1.25
b1	1.95	2.10	2.25
b2	2.95	3.10	3.25
c	0.55	0.60	0.65
D	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.05	1.20	1.35
E	15.70	15.80	15.90
E1	13.10	13.25	13.40
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	5.40	5.44	5.48
L	19.80	19.92	20.10
L1	-	-	4.30
ΦP	3.70	3.80	3.90
ΦP1	3.50	3.60	3.70
ΦP2	3.70	3.70	3.90
ΦP3	7.00	7.20	7.40
Q	5.60	5.80	6.00
S	6.05	6.15	6.25
J	9.80	10.00	10.20
U	6.00	6.20	6.40
θ1	5°	7°	9°
θ2	1°	3°	5°
θ3	13°	15°	17°