



SKIF50N65-T7

Type	V_{CE}	I_C	$V_{CEsat}, T_{vj}=25^{\circ}C$	T_{vjmax}	Package
SKIF50N65-T7	650V	50A	1.58V	150°C	TO-247

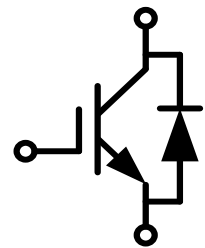
IGBT Discrete with Anti-Parallel Diode

Features

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

Applications

- Charging pile
- OBC
- UPS
- Inverter



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

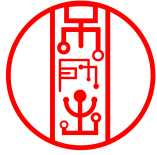
Ordering Information

Part Number	Package
SKIF50N65-T7	TO-247

IGBT

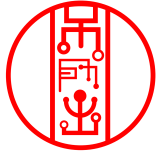
Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Collector-Emitter voltage	$T_{vj}=25^{\circ}C$	V_{CES}	650	V
Continuous DC collector current	$T_C=100^{\circ}C, T_{vj\ max}=175^{\circ}C$	$I_{C\ nom}$	50	A
Repetitive peak collector current	$t_p=1\ ms$	I_{CRM}	100	A
Gate charge	$V_{GE}=-15V...+15V$	QG	0.50	μC
Total power dissipation	$T_C = 25^{\circ}C, T_{vj\ max} = 175^{\circ}C$	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	$V_{GE}=15V, I_C=50A$ $V_{GE}=15V, I_C=50A$ $V_{GE}=15V, I_C=50A$ $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	V_{CEsat}		1.58 1.87 1.95	2.10	V
Gate-Emitter threshold voltage	$I_C=0.5mA, V_{GE}=V_{CE}$ $T_{vj}=25^{\circ}C$	$V_{GE(th)}$	4.2	5.0	5.8	
Transconductance	$V_{CE}=20V, I_C=50A$	G_{fs}		77		S
Input capacitance	$f=1\text{ MHz}, V_{CE}=25\text{ V}, V_{GE}=0\text{ V}$ $T_{vj}=25^{\circ}C$	C_{ies}		5.46		nF
Reverse transfer capacitance		C_{res}		0.1		
Collector-emitter cut-off current	$V_{CE}=650V, V_{GE}=0\text{ V}$ $T_{vj}=25^{\circ}C$	I_{CES}			1	mA
Gate-emitter leakage current	$V_{CE}=0\text{ V}, V_{GE}=20\text{ V}$ $T_{vj}=25^{\circ}C$	I_{GES}			200	nA
Turn-on delay time	$I_C=50A, V_{CE}=400V$ $V_{GE}=\pm 15V, R_G=8\Omega$ (inductive load) $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$t_{d\ on}$		33 21 19		ns
Rise time	$I_C=50A, V_{CE}=400V$ $V_{GE}=\pm 15V, R_G=8\Omega$ (inductive load) $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_r		75 67 65		
Turn-off delay time	$I_C=50A, V_{CE}=400V$ $V_{GE}=\pm 15V, R_G=8\Omega$ (inductive load) $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$t_{d\ off}$		21 32 38		
Fall time	$I_C=50A, V_{CE}=400V$ $V_{GE}=\pm 15V, R_G=8\Omega$ (inductive load) $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_f		41 62 62		
Turn-on energy loss per pulse	$I_C=50A, V_{CE}=400V$ $V_{GE}=\pm 15V, R_G=8\Omega$ (inductive load) $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{on}		2.37 2.88 3.10		mJ
Turn-off energy loss per pulse	$I_C=50A, V_{CE}=400V$ $V_{GE}=\pm 15V, R_G=8\Omega$ (inductive load) $T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	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	$^{\circ}C$



Diode

Maximum Ratings

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

Characteristic Values

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



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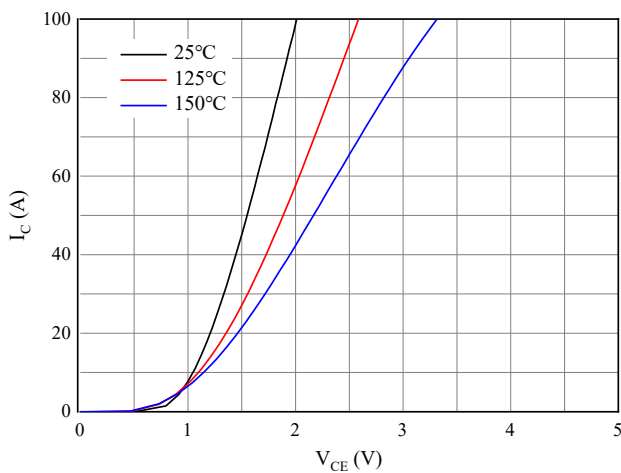


Figure 1. Typical output characteristics ($V_{GE}=15V$)

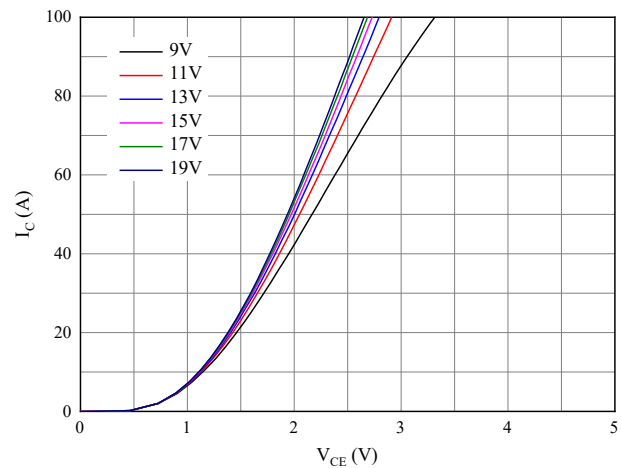


Figure 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)

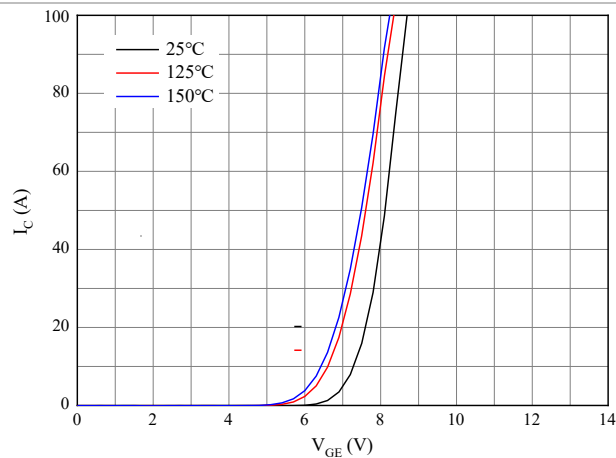


Figure 3. Typical transfer characteristic ($V_{CE}=20V$)

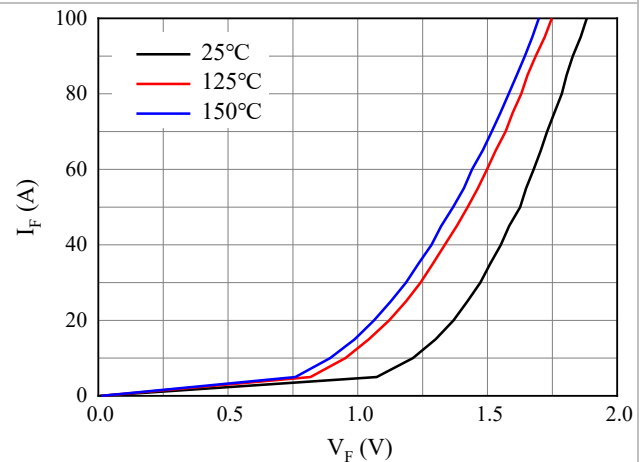


Figure 4. Forward characteristic of Diode

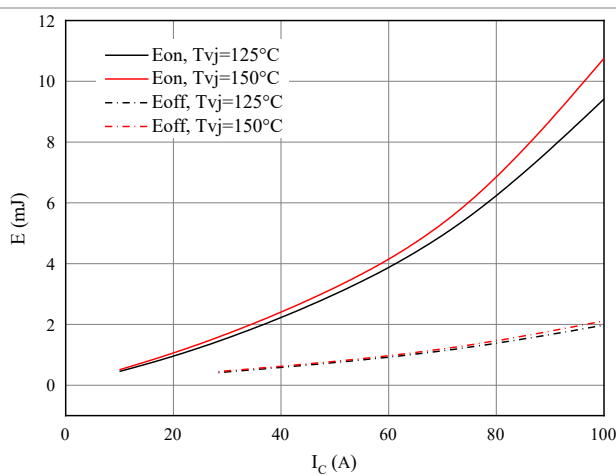


Figure 5. Switching losses of IGBT

$V_{GE}=\pm 15V$, $R_{Gon}=8\Omega$, $R_{Goff}=8\Omega$, $V_{CE}=400V$

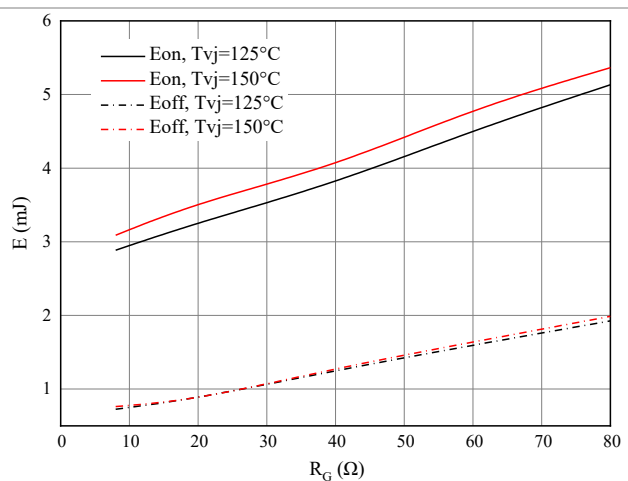


Figure 6. Switching losses of IGBT

$V_{GE}=\pm 15V$, $I_C=50A$, $V_{CE}=400V$

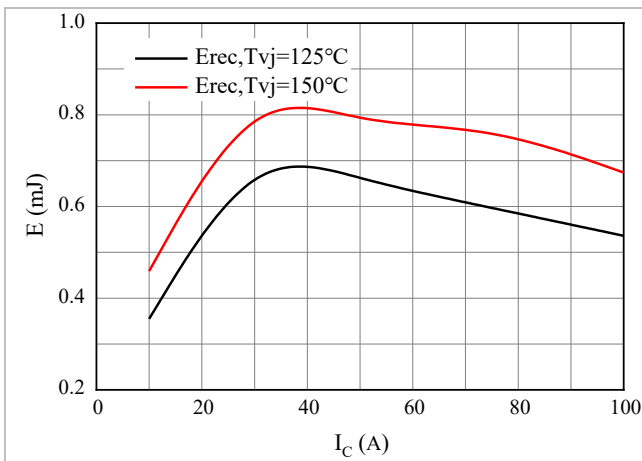
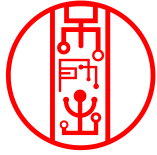


Figure 7. Switching losses of Diode

$R_{gon}=8\Omega$, $V_{CE}=400V$

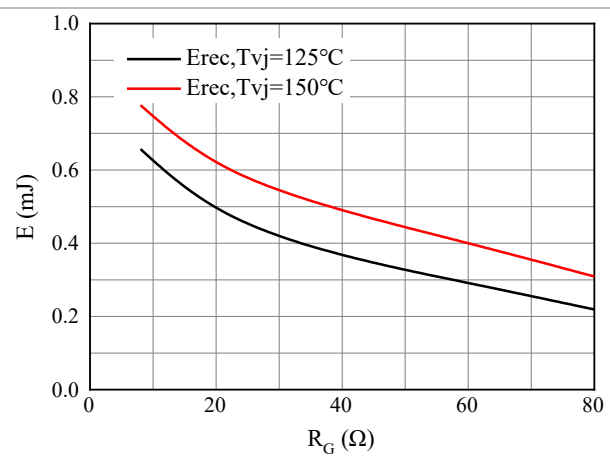


Figure 8. Switching losses of Diode

$I_F=50A$, $V_{CE}=400V$

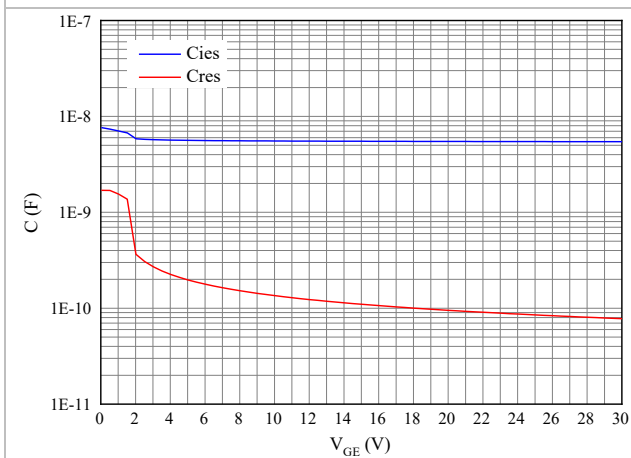
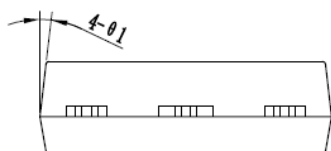
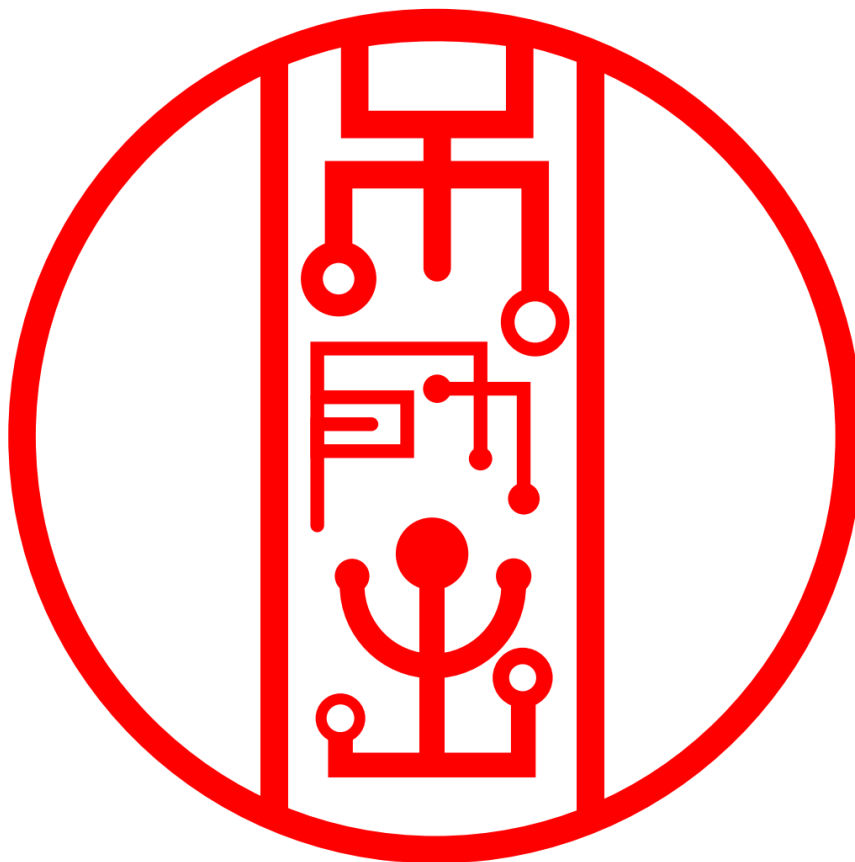


Figure 9. Capacitance characteristic



	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°