AIF10N65S

Trench FSII Fast IGBT

Product Summary

$V_{(BR)CES}$	$V_{CE(SAT)MAX}$	I_C
650V	1.7V@15V	10A

Feature

- High speed smooth switching device for hard & soft switching
- Positive temperature coefficient
- High ruggedness, temperature stable

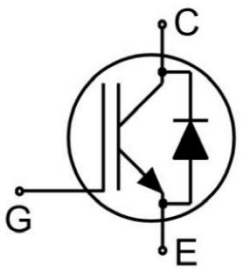
Application

- Soft switching applications
- Air conditioning
- Motor drive inverter

Package

ITO-220AB

Circuit diagram



Marking

Absolute maximum ratings (Tc=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CES}	650	V
Continuous Gate-Emitter Voltage	V_{GE}	±20	V
Transient Gate-Emitter Voltage((tp≤10μs,D<0.01)	V_{GE}	±30	V
DC Collector Current, limited by T_{jmax}	I_C	15	A
DC Collector Current, limited by T_{jmax}(T_C =100℃)	I_C(100℃)	8	A
Diode Forward Current, limited by T_{jmax}	I_F	15	A
Diode Forward Current, limited by T_{jmax}(T_C =100℃)	I_F(100℃)	8	A
Turn off Safe Operating Area V_{CE}≤ 600V, T_j≤ 150°C		40	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	40	A
Short Circuit Withstand Time, V_{GE}= 15V, V_{CE}≤ 400V	T_{SC}	5	μs
Diode Pulsed Current, tp limited by T_{jmax}	I_{Fpuls}	40	A
Power Dissipation	P_{tot}	31	W
Thermal Resistance, Junction to case for Diode	$R_{\theta JC}$	6	℃/W
Thermal Resistance, Junction to case for IGBT	$R_{\theta JC}$	4.8	℃/W
Soldering Temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	℃
Junction Temperature	T_J	175	℃
Storage Temperature Range	T_{STG}	-55 ~ +150	℃

Electrical characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	V_{GE} = 0V, I_C =250μA	650			V
Gate Threshold Voltage	$V_{GE(th)}$	V_{CE} =V_{GE},I_C=1mA	4.4	5.2	6.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V,I_C=10A		1.40	1.70	V
		V_{GE}=15V,I_C=10A,Tj=125℃		1.55		
		V_{GE}=15V,I_C=10A,Tj=150℃		1.60		
Zero Gate Voltage Collector Curren	I_{CES}	V_{CE}=650V,V_{GE} =0V			0.25	mA
		V_{CE}=650V,V_{GE} =0V,Tj=150℃			1.00	
Gate to Emitter Leakage Current	I_{GES}	V_{CE} =0V, V_{GE} =±20V			±200	nA
Dynamic characteristics						
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz		0.89		nF
Output Capacitance	C_{oes}			0.04		
Reverse Transfer Capacitance	C_{res}			0.01		
Gate Charge	Q_g	V_{CC}=300V,V_{GE} =15V,I_C=10A		0.059		μC
Short circuit collector current	$I_{C(SC)}$	V_{GE}=15V,t_{SC}≤5us,V_{CC}=400V, $T_{j,start}$=25°C		110		A

Switching Characteristic, Inductive Load

Turn-on Delay Time	$t_{d(on)}$	V_{CC}=300V,V_{GE}=-5V~15V, I_C =10A,R_G=51Ω		10		nS
Rise Time	t_r			26		
Turn-off Delay Time	$t_{d(off)}$			68		
Fall time	t_f			135		
Turn-off Energy	E_{off}			0.17		mJ
Turn-on Energy	E_{on}			0.36		

Turn-on Delay Time	$t_{d(on)}$	V_{CC}=300V,V_{GE}=-5V~15V, I_C =10A,R_G=51Ω,Tj=125℃		14		nS
Rise Time	t_r			35		
Turn-off Delay Time	$t_{d(off)}$			68		
Fall time	t_f			162		
Turn-off Energy	E_{off}			0.29		mJ
Turn-on Energy	E_{on}			0.42		
Turn-on Delay Time	$t_{d(on)}$	V_{CC}=300V,V_{GE}=-5V~15V, I_C =10A,R_G=51Ω,Tj=150℃		16		nS
Rise Time	t_r			41		
Turn-off Delay Time	$t_{d(off)}$			69		
Fall time	t_f			181		
Turn-off Energy	E_{off}			0.33		mJ
Turn-on Energy	E_{on}			0.46		

Electrical characteristics of the Diode (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	I_F=10A,Tj=25℃		1.7	2.2	V
		I_F=10A,Tj=125℃		1.5		
		I_F=10A,Tj=150℃		1.4		
Reverse Recovery Current	I_{rr}	I_F=10A,V_R=300V, -di/dt= 365A/μs		6		A
Diode reverse recovery Time	t_{rr}			176		nS
Reverse Recovery Charge	Q_{rr}			0.12		uC
Reverse recovery Energy	E_{rec}			0.05		mJ
Reverse Recovery Current	I_{rr}	I_F=10A,V_R=300V, -di/dt= 365A/μs,Tj=125℃		7		A
Diode reverse recovery Time	t_{rr}			189		nS
Reverse Recovery Charge	Q_{rr}			0.48		uC
Reverse recovery Energy	E_{rec}			0.09		mJ
Reverse Recovery Current	I_{rr}	I_F=10A,V_R=300V, -di/dt= 365A/μs,Tj=150℃		8		A
Diode reverse recovery Time	t_{rr}			195		nS
Reverse Recovery Charge	Q_{rr}			0.62		uC
Reverse recovery Energy	E_{rec}			0.11		mJ

Typical Characteristics

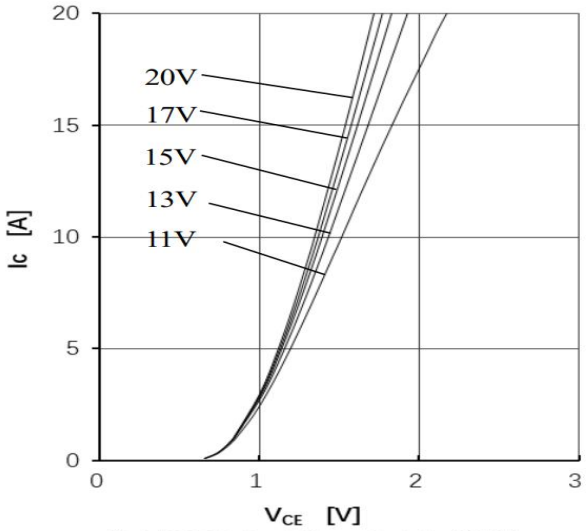


Fig1.IGBT Output Characteristics(25°C)

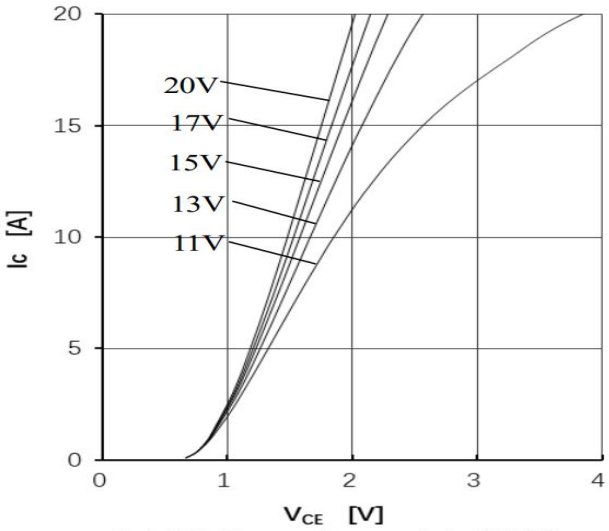


Fig2.IGBT Output Characteristics(150°C)

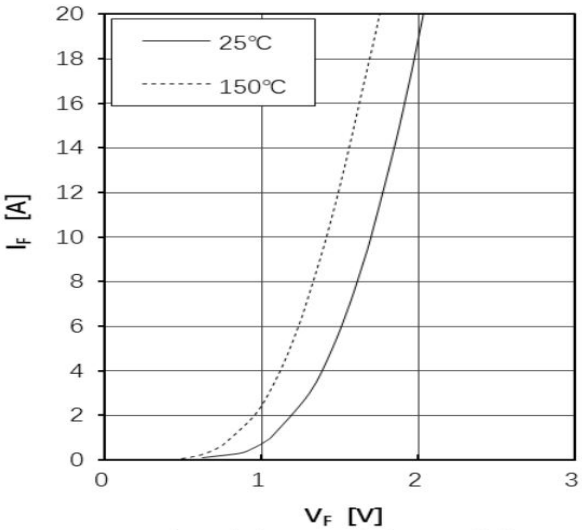


Fig3.Diode Foward Characteristics

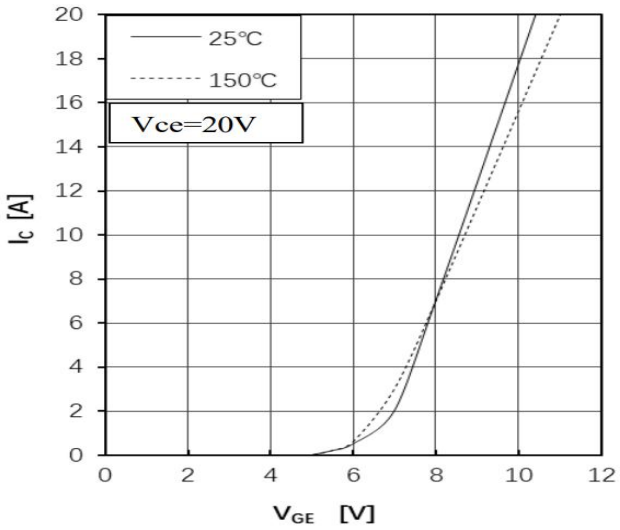


Fig4.IGBT Transfer Characteristics

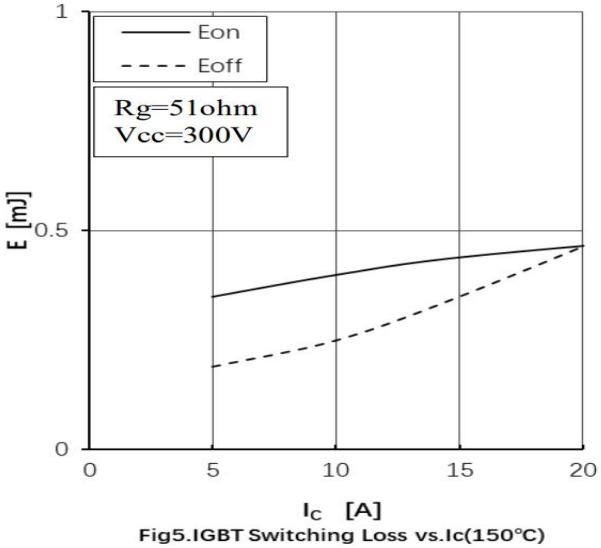


Fig5.IGBT Switching Loss vs.Ic(150°C)

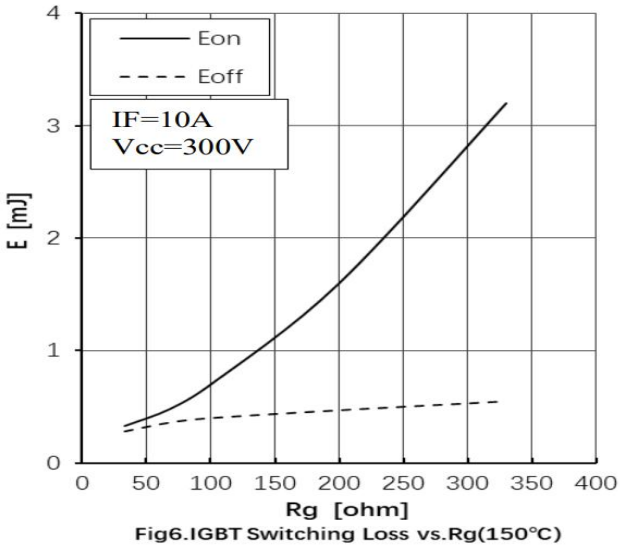


Fig6.IGBT Switching Loss vs.Rg(150°C)

Typical Characteristics

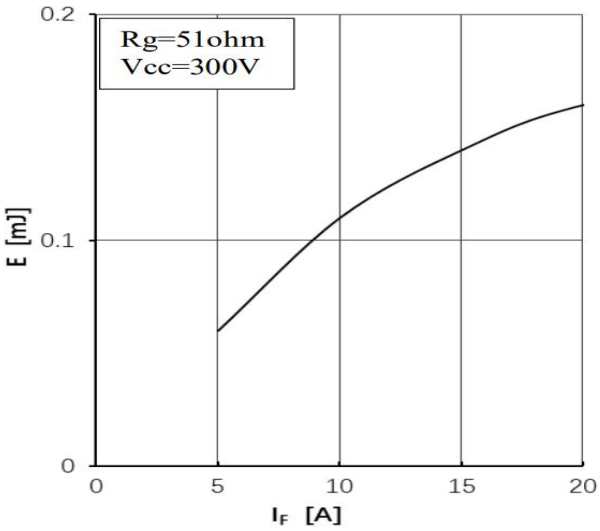


Fig7.Diode Switching Loss(Erec) vs.I_F(150°C)

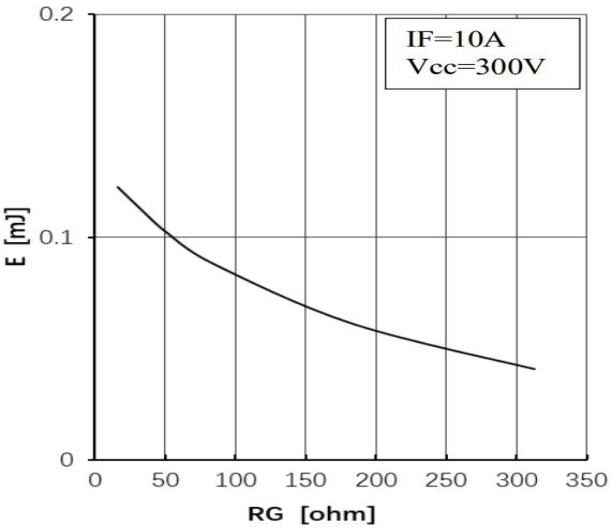


Fig8.Diode Switching Loss(Erec)vs.Rg(150°C)

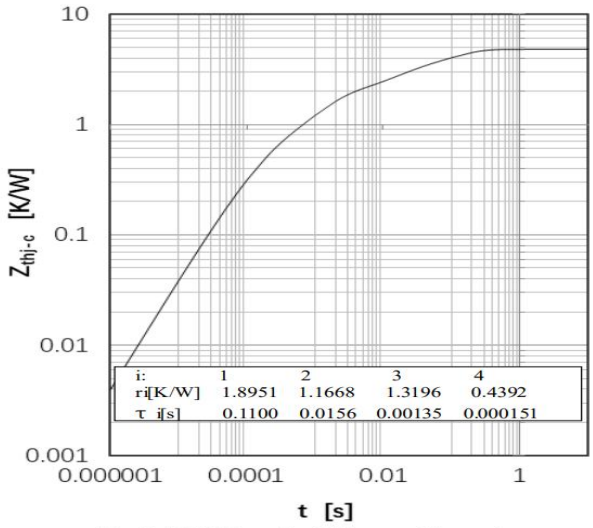


Fig 9. IGBT Transient Thermal Impedance

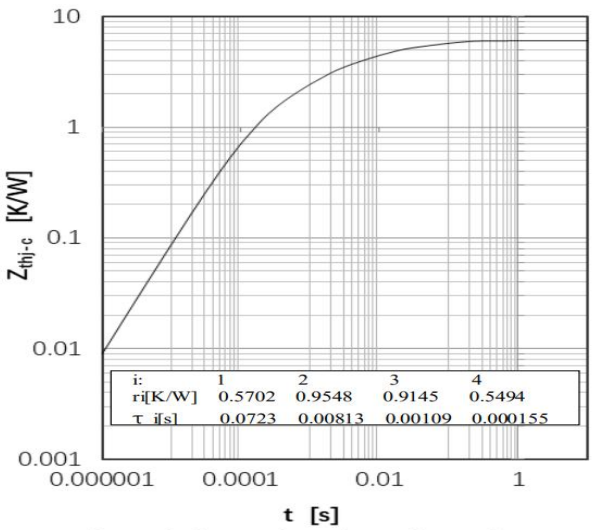
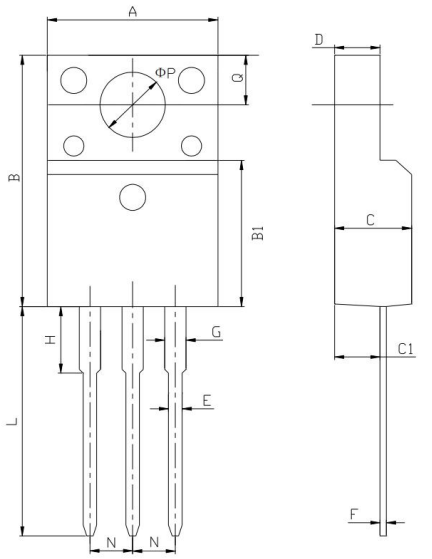


Fig10.Diode Transient Thermal Impedance

ITO-220AB Package Information



TOP VIEW SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	9.700	10.300	0.382	0.406
B	15.500	16.100	0.610	0.634
B1	8.990	9.390	0.354	0.370
C	4.400	4.900	0.173	0.193
C1	2.600	2.950	0.102	0.116
D	2.340	2.740	0.092	0.108
E	0.700	0.900	0.028	0.035
F	0.400	0.600	0.016	0.024
G	1.120	1.420	0.044	0.056
H	2.700	3.600	0.106	0.142
L	12.600	13.600	0.496	0.535
N	2.340	2.740	0.092	0.108
Q	3.150	3.550	0.124	0.140
ΦP	3.000	3.300	0.118	0.130