

Product Summary

$V_{(BR)CES}$	$V_{CE(SAT)MAX}$	$I_C(100^{\circ}C)$
1200V	2.2V@15V	10A

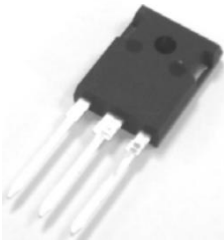
Feature

- Low $V_{CE(sat)}$ Trench-FS IGBT technology
- Positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD
- High short circuit capability

Application

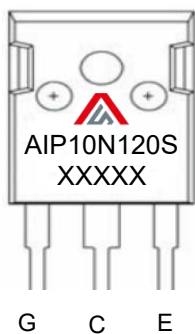
- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

Package

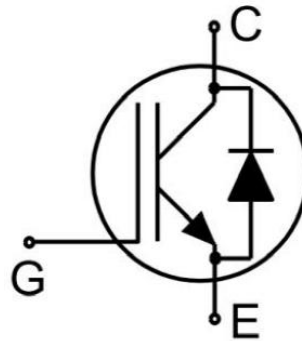


TO-247AB

Marking



Circuit diagram



Absolute maximum ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CES}	1200	V
Continuous Gate- Emitter Voltage	V _{GES}	±20	V
Collector Current	I _C	20	A
Collector Current(T _C =100°C)	I _C (100°C)	10	A
Pulsed Collector Current, tp limited by T _{Jmax} , V _{GE} =15V	I _{CM}	40	A
Diode Continuous Forward Current	I _F	20	A
Diode Continuous Forward Current(T _C =100°C)	I _F (100°C)	10	A
Diode Forward Pulsed Current,tp limited by T _{Jmax}	I _{Fpuls}	40	A
Turn off Safe Operating Area V _{CE} ≤1200V, T _J ≤150°C	-	40	A
Power Dissipation(T _J =175°C)	P _D	157	W
Thermal Resistance, Junction to case for Diode	R _{θJC}	1.7	°C/W
Thermal Resistance, Junction to case for IGBT	R _{θJC}	0.95	°C/W
Short circuit withstand time V _{GE} =15V, V _{CC} =900V, V _{CEM} ≤1200V	t _{sc}	10	us
Maximum Temperature for Soldering,wave soldering 1.6mm (0.063in.) from case for 10s	T _L	260	°C
Junction Temperature Range	T _J	-40 ~ +175	°C
Storage Temperature Range	T _{STG}	-55 ~ +150	°C

Electrical characteristics of the IGBT (T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Collector-Emitter Breakdown Voltage	V _{(BR)CES}	V _{GE} = 0V, I _{CE} =250uA	1200			V
Collector-Emitter Leakage Current	I _{CES}	V _{GE} = 0V, V _{CE} =1200V			0.25	mA
		V _{GE} = 0V, V _{CE} =1200V, T _J =150°C			5	
Gate to Emitter Leakage Current	I _{GES}	V _{GE} =±20V, V _{CE} = 0V			400	nA
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _{GE} =15V, I _C =10A		1.85	2.2	V
		V _{GE} =15V, I _C =10A, T _J =125°C		2.15		
		V _{GE} =15V, I _C =10A, T _J =150°C		2.25		
Gate Threshold Voltage	V _{GE(th)}	V _{CE} =V _{GE} , I _C =500uA	5.0	5.8	6.6	V
Dynamic characteristics						
Input Capacitance	C _{ies}	V _{CE} =25V, V _{GE} =0V, f =1MHz		0.75		nF
Reverse Transfer Capacitance	C _{res}			0.035		
Total Gate Charge	Q _g	V _{CC} =960V, V _{GE} =15V, I _C =10A		0.08		uC
Short Circuit Collector Current	I _{C(SC)}	V _{GE} =15V, V _{CC} =900V, t _{sc} ≤10us, T _J ≤150°C		50		A
Turn-on delay time	t _{d(on)}	V _{CC} =600V, V _{GE} =-15V~15V, I _C =10A, R _G =47Ω,		85		nS
Turn-on rise time	t _r			50		
Turn-off delay time	t _{d(off)}			262		
Turn-off fall time	t _f			140		
Turn-on Switching Energy	E _{on}			0.98		
Turn-off Switching Energy	E _{off}		0.48			
Turn-on delay time	t _{d(on)}	V _{CC} =600V, V _{GE} =-15~15V, I _C =10A, R _G =47Ω, T _J =125°C		90		nS
Turn-on rise time	t _r			60		
Turn-off delay time	t _{d(off)}			285		
Turn-off fall time	t _f			150		
Turn-on Switching Energy	E _{on}			1.33		
Turn-off Switching Energy	E _{off}		0.9			
Turn-on delay time	t _{d(on)}	V _{CC} =600V, V _{GE} =-15~15V, I _C =10A, R _G =47Ω, T _J =150°C		95		nS
Turn-on rise time	t _r			65		
Turn-off delay time	t _{d(off)}			308		
Turn-off fall time	t _f			160		
Turn-on Switching Energy	E _{on}			1.68		
Turn-off Switching Energy	E _{off}		1.05			

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	$I_F=10A$		2.0		V
		$I_F=10A, T_j=125^\circ C$		2.1		
		$I_F=10A, T_j=150^\circ C$		2.1		
Reverse Recovery Current	I_{rr}	$I_F=10A, V_R=600V, -di/dt=500A/us$		12.5		A
Reverse Recovery Charge	Q_{rr}			0.9		μC
Reverse Recovery Energy	E_{rec}			0.25		mJ
Reverse Recovery Current	I_{rr}	$I_F=10A, V_R=600V, -di/dt=500A/us, T_j=125^\circ C$		14.4		A
Reverse Recovery Charge	Q_{rr}			1.7		μC
Reverse Recovery Energy	E_{rec}			0.5		mJ
Reverse Recovery Current	I_{rr}	$I_F=10A, V_R=600V, -di/dt=500A/us, T_j=150^\circ C$		15.3		A
Reverse Recovery Charge	Q_{rr}			2.0		μC
Reverse Recovery Energy	E_{rec}			0.58		mJ

Typical Characteristics

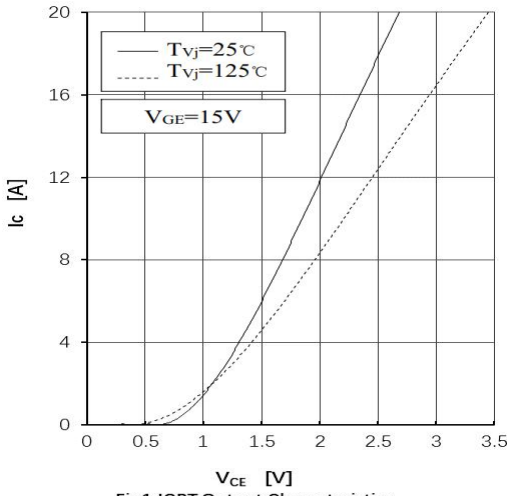


Fig1.IGBT Output Characteristics

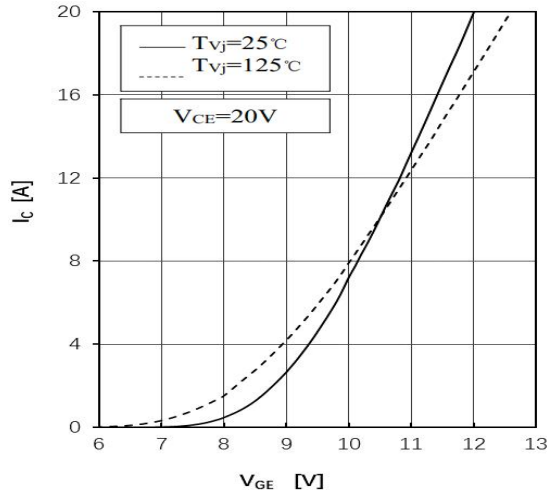


Fig2.IGBT Transfer Characteristics

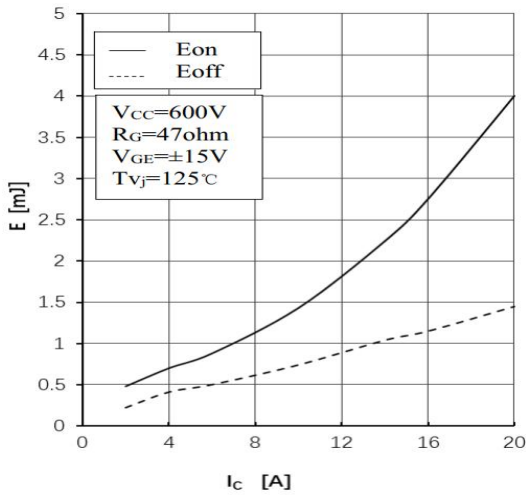


Fig3.IGBT Switching Loss vs.Ic

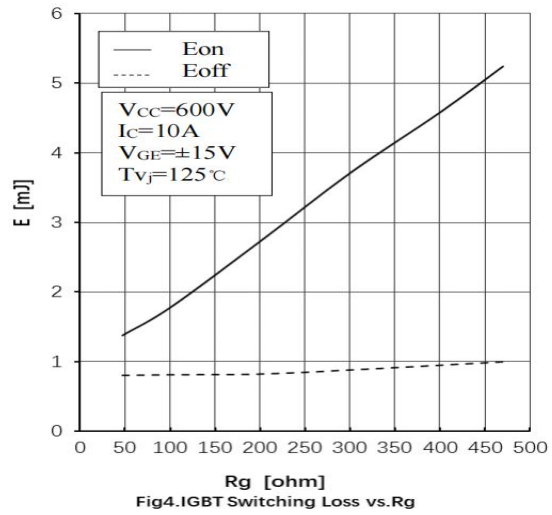


Fig4.IGBT Switching Loss vs.Rg

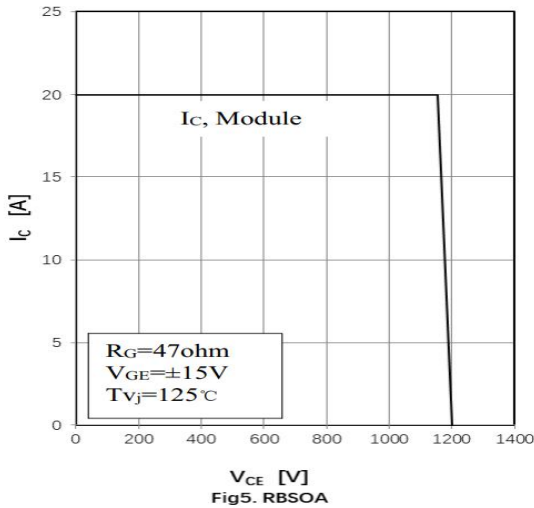


Fig5. RBSOA

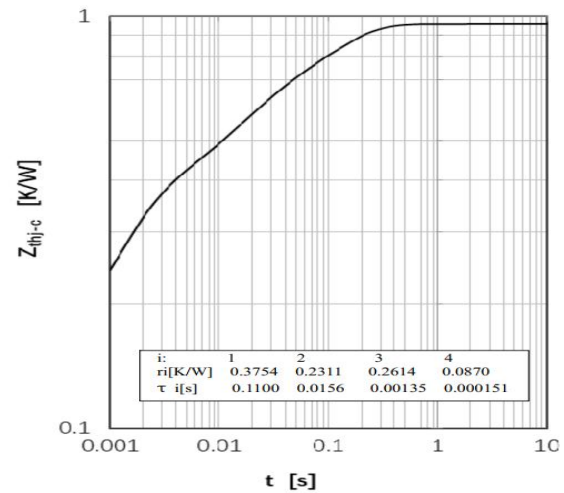


Fig 6. IGBT Transient Thermal Impedance

Typical Characteristics

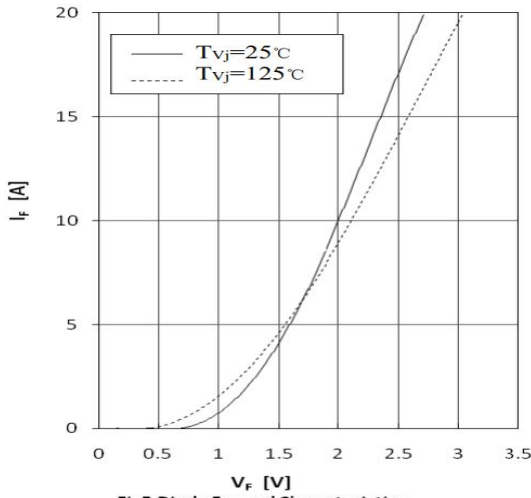


Fig7. Diode Forward Characteristics

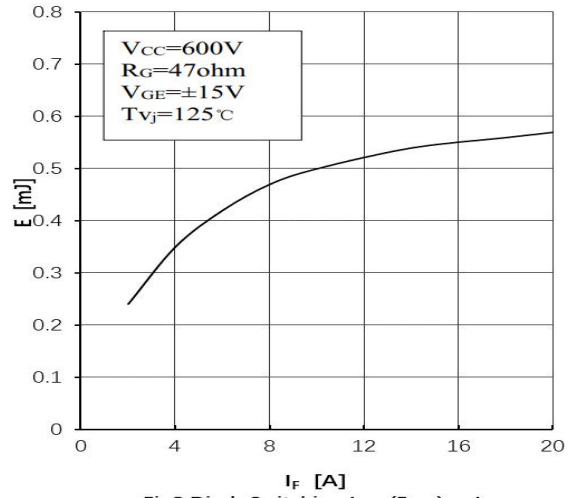


Fig8. Diode Switching Loss(Erec) vs. I_F

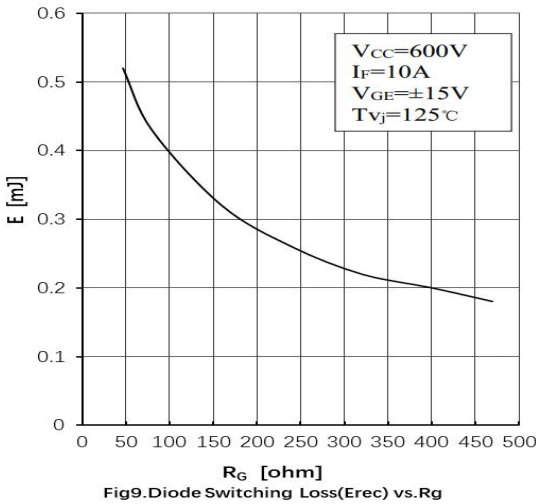


Fig9. Diode Switching Loss(Erec) vs. R_g

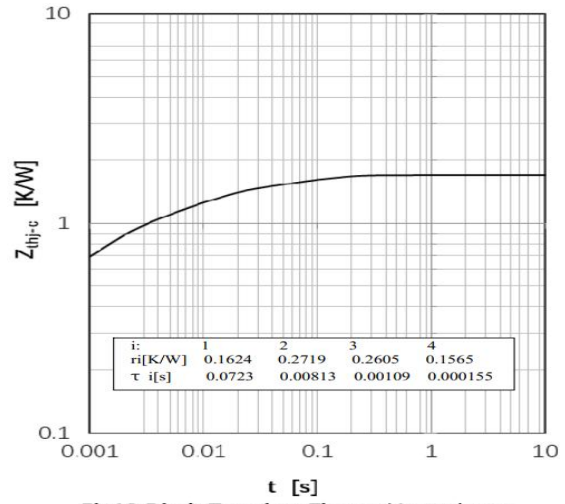
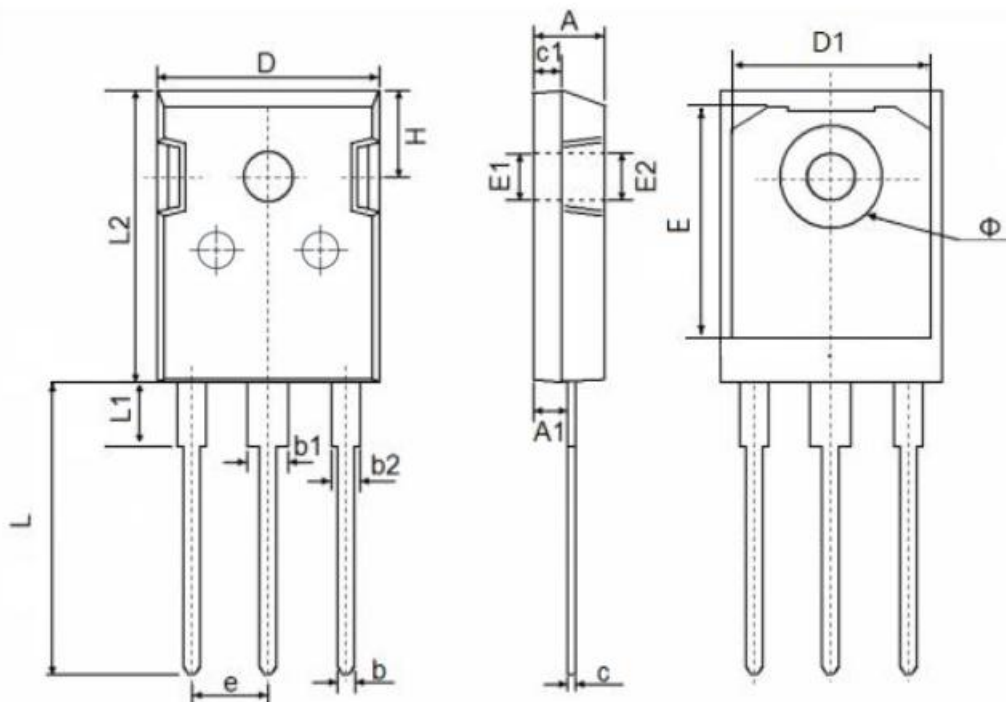


Fig10. Diode Transient Thermal Impedance

TO-247AB Package Information





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.800	5.250	0.189	0.207
A1	2.100	2.600	0.083	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.400	0.110	0.134
b2	1.800	2.420	0.071	0.095
c	0.500	0.700	0.020	0.028
c1	1.500	2.500	0.059	0.098
D	15.500	16.200	0.610	0.638
D1	13.000	14.200	0.512	0.559
E	16.250	17.650	0.640	0.695
E1	3.650	5.500	0.144	0.220
E2	3.650	5.500	0.144	0.220
L	19.400	20.400	0.764	0.803
L1	3.900	4.500	0.154	0.177
L2	20.800	21.300	0.819	0.836
Φ	7.190 REF.		0.283 REF.	
e	5.440 BSC		0.214 BSC	
H	5.300	6.300	0.209	0.248