

Product Summary

$V_{(BR)CES}$	$V_{CE(SAT)MAX}$	$I_C(100^\circ C)$
1200V	2.35V@15V	15A

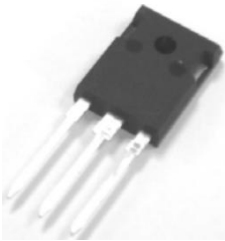
Feature

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

Application

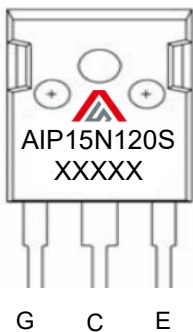
- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

Package

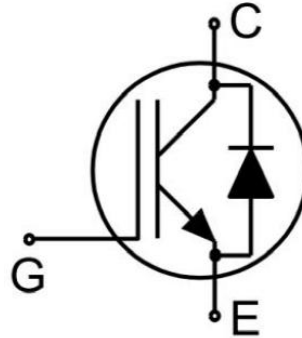


TO-247AB

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	30	A
Collector Current(T _C =100°C)	I _C (100°C)	15	A
Pulsed Collector Current, tp limited by T _{Jmax} , V _{GE} =15V	I _{CM}	60	A
Diode Continuous Forward Current	I _F	30	A
Diode Continuous Forward Current(T _C =100°C)	I _F (100°C)	15	A
Diode Forward Pulsed Current,tp limited by T _{Jmax}	I _{Fpuls}	60	A
Turn off Safe Operating Area V _{CE} ≤1200V, T _J ≤150°C	-	60	A
Power Dissipation(T _J =175°C)	P _D	200	W
Thermal Resistance, Junction to case for Diode	R _{θJC}	1.35	°C/W
Thermal Resistance, Junction to case for IGBT	R _{θJC}	0.75	°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			100	nA	
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _{GE} =15V, I _C =15A		1.85	2.35	V	
		V _{GE} =15V, I _C =15A, T _J =125°C		2.20			
		V _{GE} =15V, I _C =15A, T _J =150°C		2.30			
Gate Threshold Voltage	V _{GE(th)}	V _{CE} =V _{GE} , I _C =0.5mA	5.1	5.8	6.4	V	
Dynamic characteristics							
Input Capacitance	C _{ies}	V _{CE} =25V, V _{GE} =0V, f =1MHz		1.2		nF	
Reverse Transfer Capacitance	C _{res}			0.04			
Total Gate Charge	Q _g	V _{CC} =960V, V _{GE} =15V, I _C =15A		0.14		uC	
Short Circuit Collector Current	I _{C(SC)}	V _{GE} =15V, V _{CC} =900V, t _{sc} ≤10us, T _J ≤150°C		60		A	
Turn-on delay time	t _{d(on)}	V _{CC} =600V, V _{GE} = -15V~15V, I _C =15A, R _G =33Ω		45		nS	
Turn-on rise time	t _r			52			
Turn-off delay time	t _{d(off)}			128			
Turn-off fall time	t _f			186			
Turn-on Switching Energy	E _{on}			1.5			mJ
Turn-off Switching Energy	E _{off}			0.9			
Turn-on delay time	t _{d(on)}	V _{CC} =600V, V _{GE} = -15V~15V, I _C =15A, R _G =33Ω, T _J =125°C		50		nS	
Turn-on rise time	t _r			55			
Turn-off delay time	t _{d(off)}			160			
Turn-off fall time	t _f			135			
Turn-on Switching Energy	E _{on}			2.2			mJ
Turn-off Switching Energy	E _{off}			1.3			
Turn-on delay time	t _{d(on)}	V _{CC} =600V, V _{GE} = -15V~15V, I _C =15A, R _G =33Ω, T _J =150°C		52		nS	
Turn-on rise time	t _r			58			
Turn-off delay time	t _{d(off)}			170			
Turn-off fall time	t _f			138			
Turn-on Switching Energy	E _{on}			2.4			mJ
Turn-off Switching Energy	E _{off}			1.45			

Electrical characteristics of the Diode ($T_j=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_F	$I_F=15\text{A}$		2.0	2.4	V
		$I_F=15\text{A}, T_j=125^\circ\text{C}$		1.8		
		$I_F=15\text{A}, T_j=150^\circ\text{C}$		1.7		
Reverse Recovery Current	I_{rr}	$I_F=15\text{A}, V_R=600\text{V},$ $-di/dt=240\text{A}/\mu\text{s}$		7.5		A
Reverse Recovery Charge	Q_{rr}			1.8		μC
Reverse recovery Energy	E_{rec}			0.6		mJ
Reverse Recovery Current	I_{rr}	$I_F=15\text{A}, V_R=600\text{V},$ $-di/dt=240\text{A}/\mu\text{s}, T_j=125^\circ\text{C}$		9		A
Reverse Recovery Charge	Q_{rr}			2.4		μC
Reverse recovery Energy	E_{rec}			0.9		mJ
Reverse Recovery Current	I_{rr}	$I_F=15\text{A}, V_R=600\text{V},$ $-di/dt=240\text{A}/\mu\text{s}, T_j=150^\circ\text{C}$		9.5		A
Reverse Recovery Charge	Q_{rr}			2.6		μC
Reverse recovery Energy	E_{rec}			1.0		mJ

Typical Characteristics

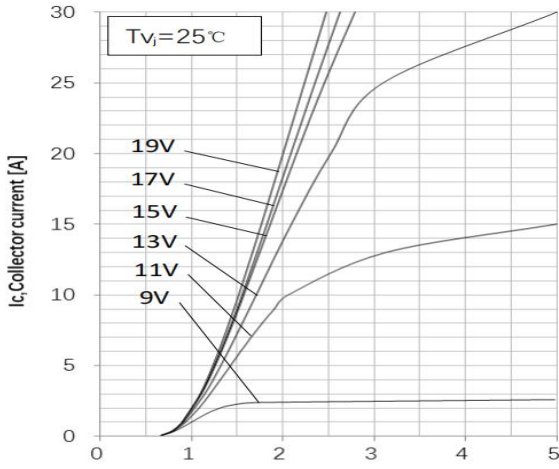


Fig1. Typical output characteristic

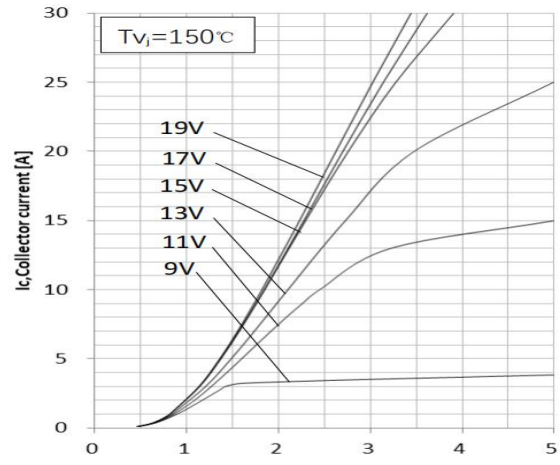


Fig2. Typical output characteristic

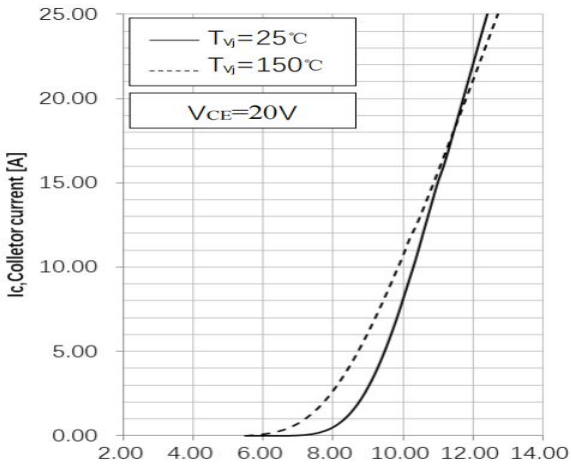


Fig3. Typical transfer characteristic

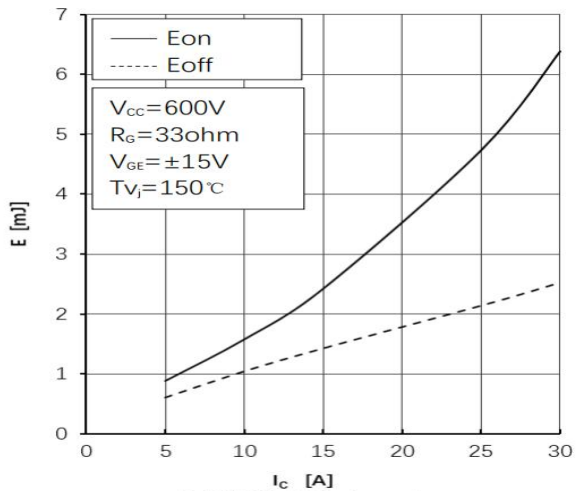


Fig4. IGBT Switching Loss vs. Ic

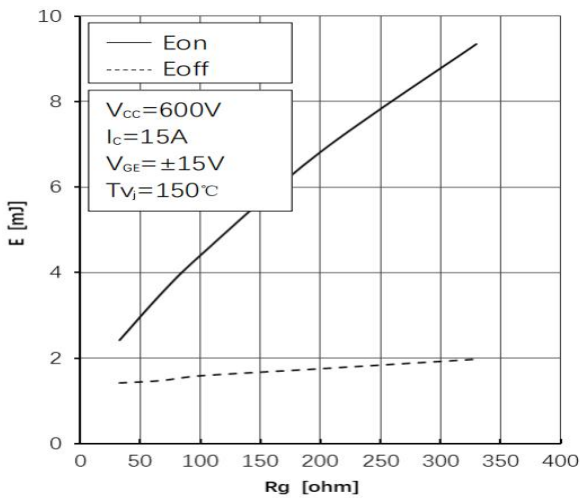


Fig5. IGBT Switching Loss vs. Rg

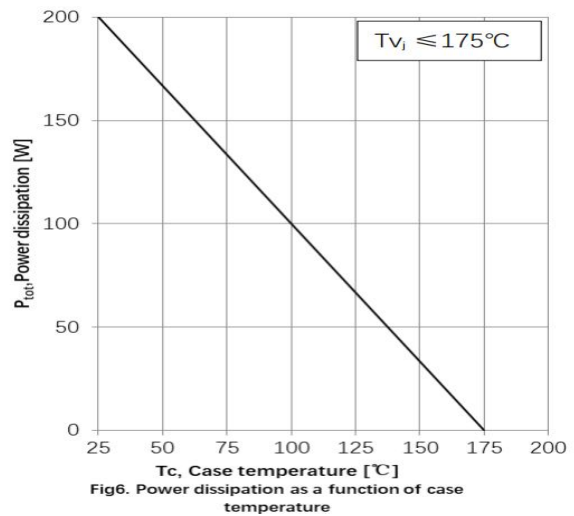


Fig6. Power dissipation as a function of case temperature

Typical Characteristics

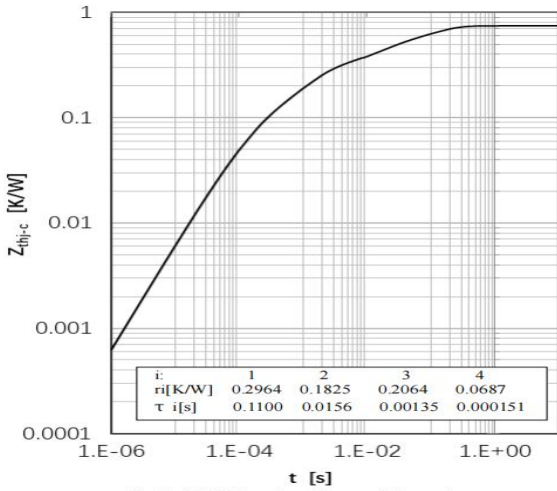


Fig 7. IGBT Transient Thermal Impedance

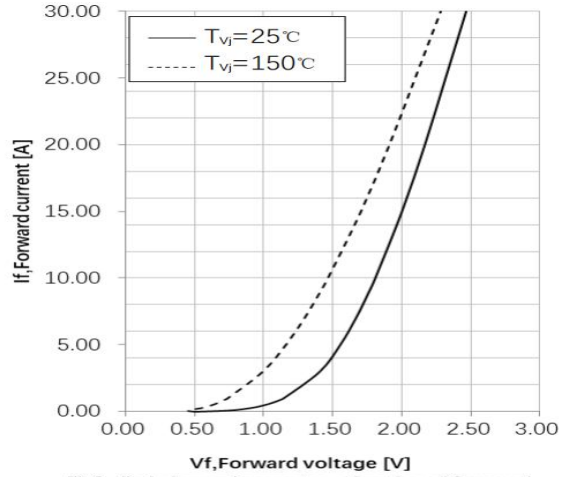


Fig8. diode forward current as a function of forward voltage

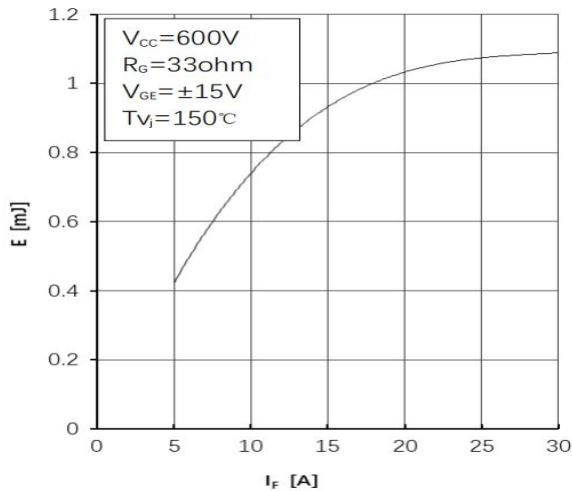


Fig9. Diode Switching Loss (Erec) vs. If

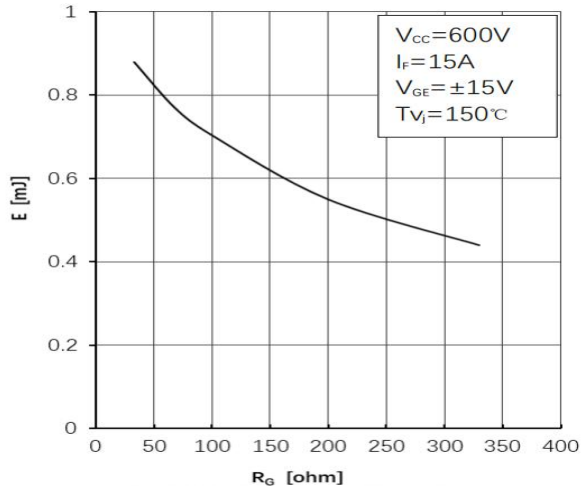


Fig10. Diode Switching Loss (Erec) vs. Rg

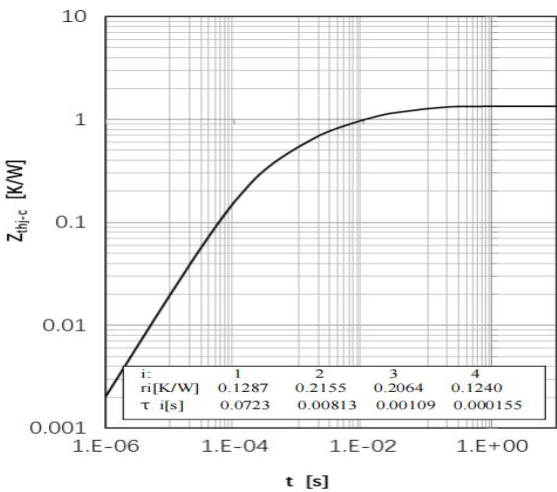
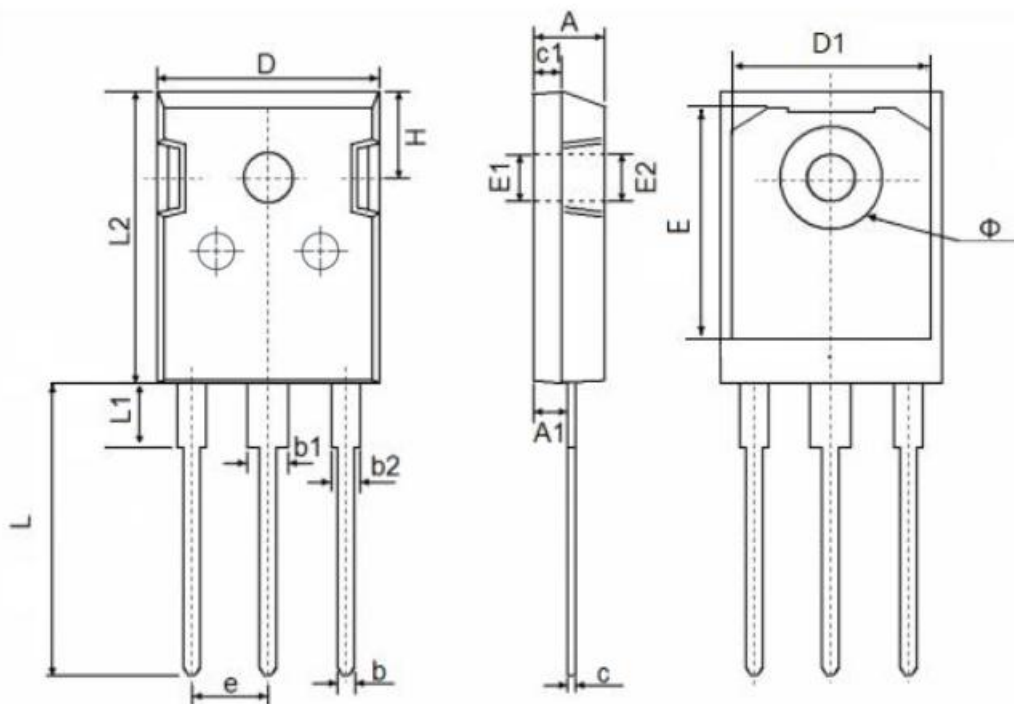


Fig11. Diode Transient Thermal Impedance

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