AIPP75N120S

Trench FS IGBT Discrete

Product Summary

$V_{(BR)CES}$	$V_{CE(SAT)MAX}$	I_C(100℃)
1200V	1.90V@15V	75A

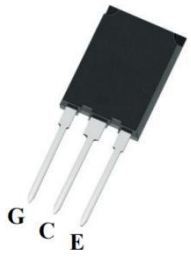
Feature

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

Application

- PC power
- Uninterruptible power supply
- Three-level Solar String Inverter

Package



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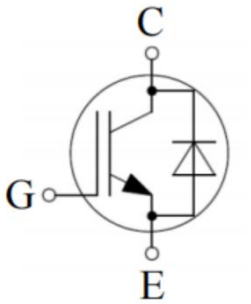
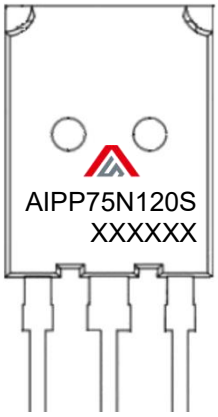
Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CES}	1200	V
Continuous Gate- Emitter Voltage	V_{GES}	±20	V
Transient Gate- Emitter Voltage （tp≤10us， D<0.010）	V_{GES}	±30	V
Collector Current	I_C	150	A
Collector Current(T_C =100℃)	I_C(100℃)	75	A
Pulsed Collector Current, tp limited by T_{jmax},V_{GE}=15V	I_{CM}	300	A
Diode Continuous Forward Current	I_F	150	A
Diode Continuous Forward Current(T_C =100℃)	I_F(100℃)	75	A
Diode Forward Current， tp limited by T_{jmax}	I_{Fpuls}	300	A
Turn off Safe Operating Area V_{CE}≤ 1200V,T_J≤150°C	-	300	A
Power Dissipation(T_J=175°C)	P_D	535	W
Thermal Resistance, Junction to case for Diode	$R_{\theta JC}$	0.35	℃/W
Thermal Resistance, Junction to case for IGBT	$R_{\theta JC}$	0.28	℃/W
Soldering Temperature,wave soldering 1.6mm(0.063in.) from case for 10s	T_L	260	℃
Junction Temperature	T_J	-40 ~ +175	℃
Storage Temperature Range	T_{STG}	-55 ~ +150	℃

Electrical characteristics of the IGBT (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=250uA	1200			V
Collector-Emitter Leakage Current	I_{CES}	V_{GE} = 0V,V_{CE}=1200V			0.25	mA
		V_{GE} = 0V,V_{CE}=1200V,Tj=150℃			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=75A,	1.50	1.65	1.90	V
		V_{GE}=15V,I_C=75A,Tj=125℃		2.05		
		V_{GE}=15V,I_C=75A,Tj=150℃		2.15		
Gate Threshold Voltage	$V_{GE(th)}$	V_{CE} =V_{GE},I_C=1.4mA	4.8	5.5	6.2	V
Dynamic characteristics						
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f =1MHz		5.51		nF
Reverse Transfer Capacitance	C_{res}			0.05		
Total Gate Charge	Q_g	V_{CC}=960V,V_{GE} =15V,I_C=75A		0.65		uC
Turn-on delay time	$t_{d(on)}$	V_{CC}=600V,V_{GE}=-5V~15V, I_C =75A,R_G=10Ω		52		nS
Turn-on rise time	t_r			58		
Turn-off delay time	$t_{d(off)}$			80		
Turn-off fall time	t_f			85		
Turn-on Switching Energy	E_{on}			5.25		mJ
Turn-off Switching Energy	E_{off}			1.87		
Turn-on delay time	$t_{d(on)}$	V_{CC}=600V,V_{GE}=-5V~15V, I_C =75A,R_G=10Ω,Tj=125℃		53		nS
Turn-on rise time	t_r			60		
Turn-off delay time	$t_{d(off)}$			90		
Turn-off fall time	t_f			100		
Turn-on Switching Energy	E_{on}			5.42		mJ
Turn-off Switching Energy	E_{off}			2.36		
Turn-on delay time	$t_{d(on)}$	V_{CC}=600V,V_{GE}=-5V~15V, I_C =75A,R_G=10Ω,Tj=150℃		54		nS
Turn-on rise time	t_r			62		
Turn-off delay time	$t_{d(off)}$			95		
Turn-off fall time	t_f			108		
Turn-on Switching Energy	E_{on}			5.51		mJ
Turn-off Switching Energy	E_{off}			2.49		

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=75A		2.4	3.0	V
		I_F=75A,Tj=125℃		2.1		
		I_F=75A,Tj=150℃		2.0		
Reverse Recovery Current	I_{rr}	I_F=75A,V_R=600V, di/dt=-500A/us		11		A
Reverse Recovery Charge	Q_{rr}			3.01		uC
Diode Reverse Recovery Time	t_{rr}			189		ns
Reverse Recovery Energy	E_{rec}			1.35		mJ
Reverse Recovery Current	I_{rr}	I_F=75A,V_R=600V, di/dt=-500A/us,Tj=125℃		15		A
Reverse Recovery Charge	Q_{rr}			6.74		uC
Diode Reverse Recovery Time	t_{rr}			235		ns
Reverse Recovery Energy	E_{rec}			2.92		mJ
Reverse Recovery Current	I_{rr}	I_F=75A,V_R=600V, di/dt=-500A/us,Tj=150℃		16		A
Reverse Recovery Charge	Q_{rr}			8.47		uC
Diode Reverse Recovery Time	t_{rr}			278		ns
Reverse Recovery Energy	E_{rec}			3.28		mJ

Typical Characteristics

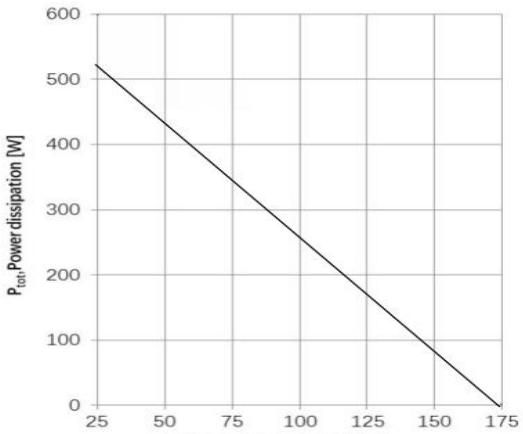


Fig1. Power dissipation as a function of case temperature (Tj≤175℃)

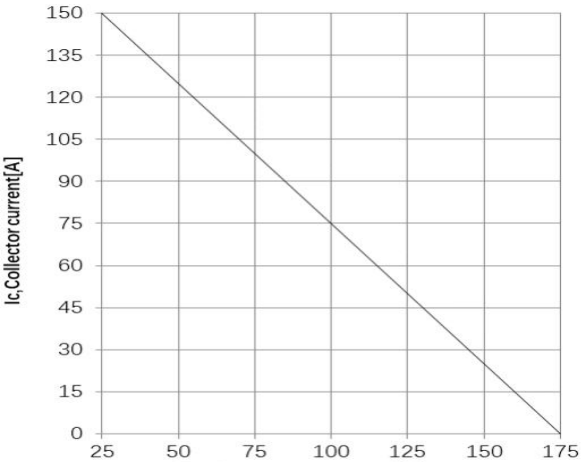


Fig2. Collector current as a function of case temperature(Vge≥15V, Tj≤175℃)

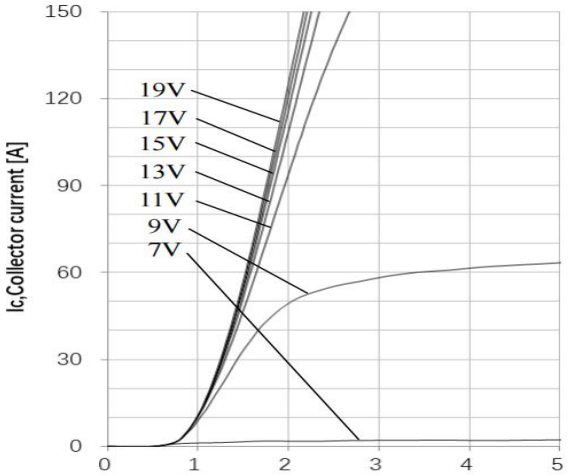


Fig3. Typical output characteristic (Tj=25℃)

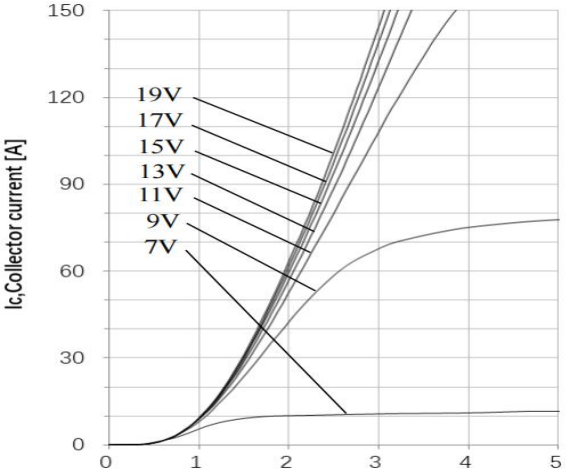


Fig4. Typical output characteristic (Tj=150℃)

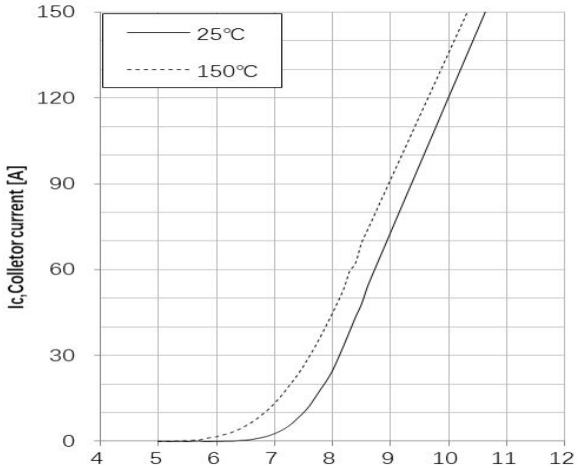


Fig5. Typical transfer characteristic (Vce=20V)

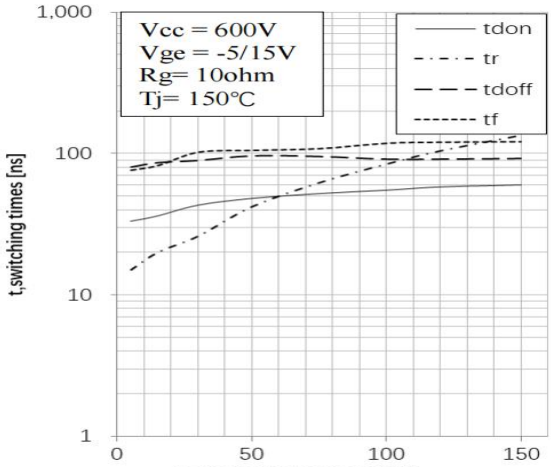


Fig6. Typical switching times as a function of collect current

Typical Characteristics

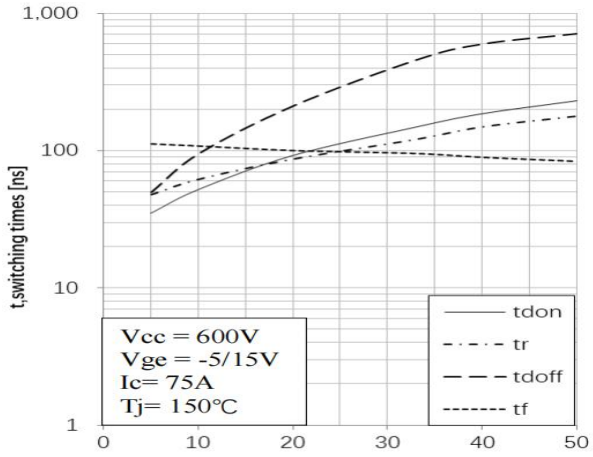


Fig7. Typical switching times as a fuction of gate resistance

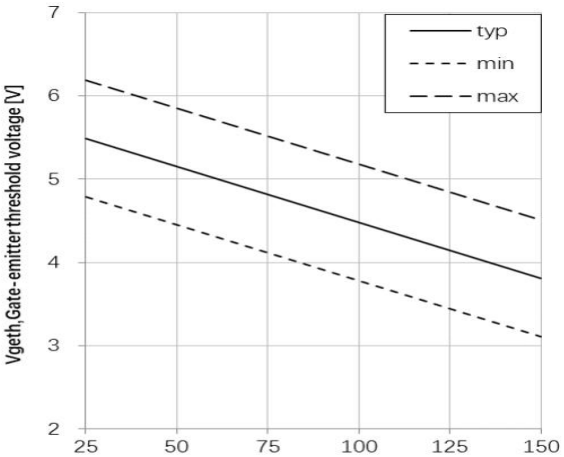


Fig8. Gate-emitter threshold voltage as a fuction of junction temperature

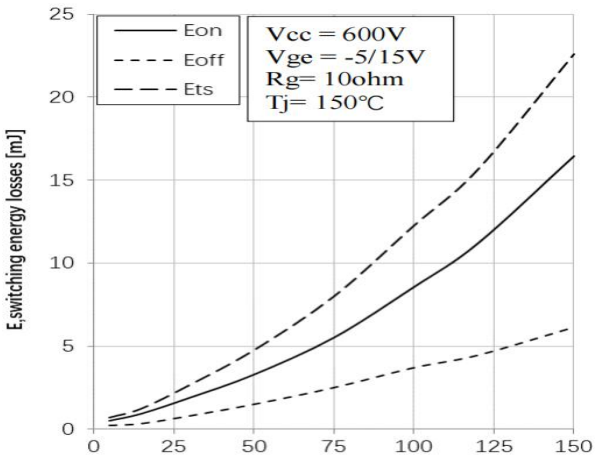


Fig9. Typical switching energy losses as a fuction of collect current

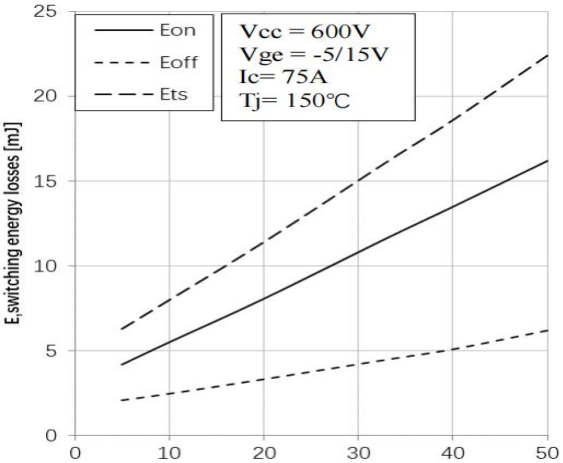


Fig10. Typical switching energy losses as a fuction of gate resistance

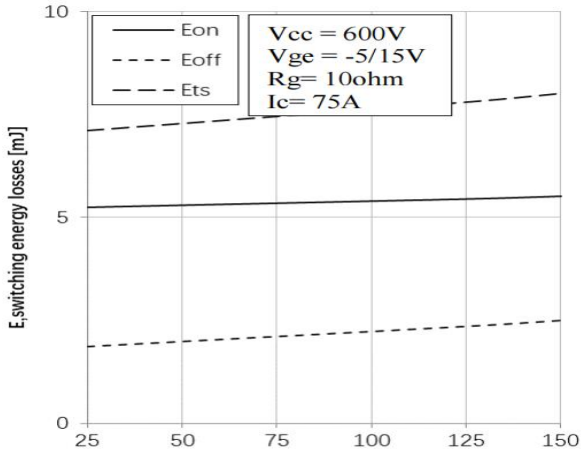


Fig11. Typical switching energy losses as a fuction of junction temperature

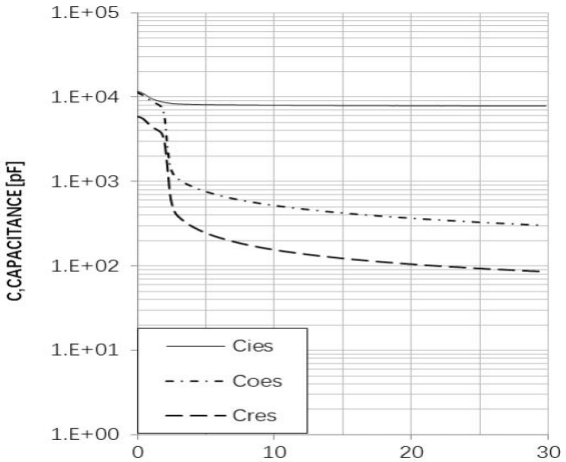


Fig12. Typical capacitance as a function of collector-emitter voltage

Typical Characteristics

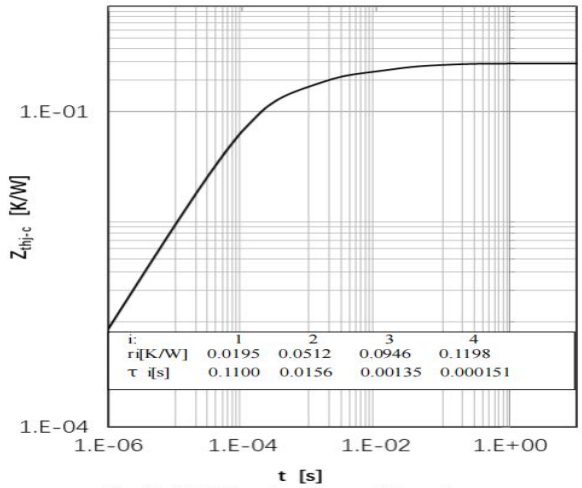


Fig 13. IGBT Transient Thermal Impedance

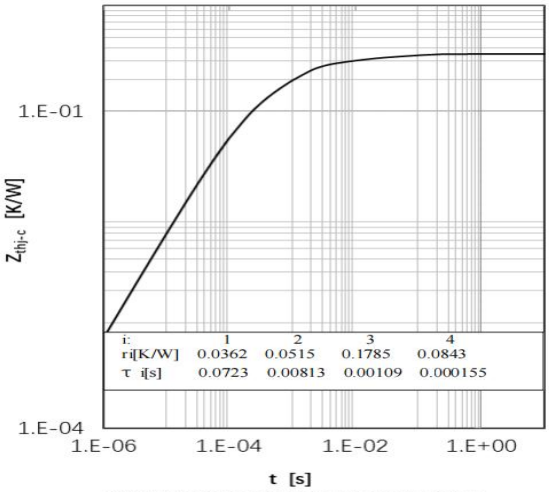


Fig 14. Diode Transient Thermal Impedance

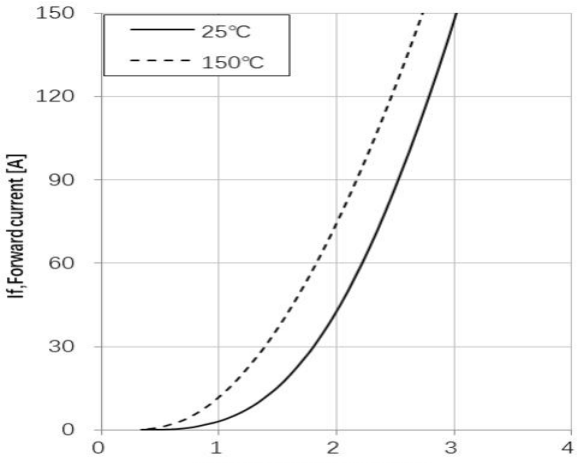
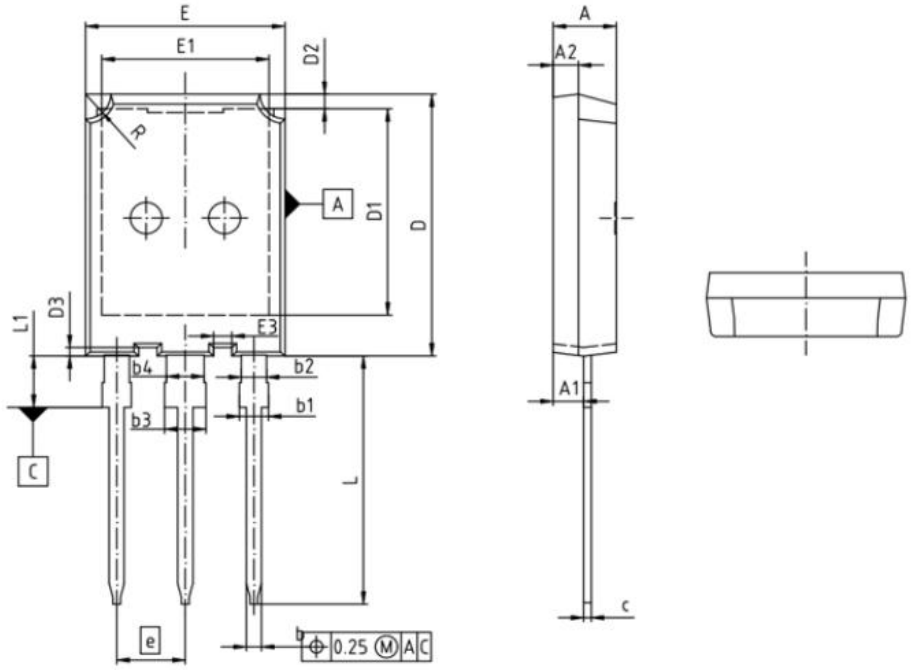


Fig15. Diode forawrd current as a function of foraward voltage

TO-247PLUS Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.900	5.100	0.193	0.201
A1	2.310	2.510	0.091	0.099
A2	1.900	2.100	0.075	0.083
b	1.160	1.260	0.046	0.050
b1	1.860	2.160	0.073	0.085
b2	1.960	2.060	0.077	0.081
c	0.580	0.640	0.023	0.025
D	20.900	21.100	0.823	0.831
D1	16.250	16.850	0.640	0.663
D2	1.050	1.350	0.041	0.053
D3	0.580	0.780	0.023	0.031
E	15.700	15.900	0.618	0.626
E1	13.100	13.500	0.516	0.531
E3	1.350	1.550	0.053	0.061
e	5.44		0.214	
L	19.780	20.080	0.779	0.791
L1	4.030	4.230	0.159	0.167
R	1.900	2.100	0.075	0.083