AIP25N120AS

Trench FS IGBT Discrete

Product Summary

$V_{(BR)CES}$	$V_{CE(SAT)TYP}$	I_C(100℃)
1200V	1.7V@15V	25A

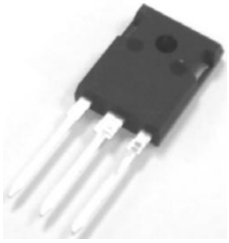
Feature

- Trench and field-stop technology
- High speed switching
- Low collector to emitter saturation voltage
- Easy parallel switching capability
- Short circuit withstands time 10μs
- High ruggedness performance

Application

- Motor drives
- General inverter

Package



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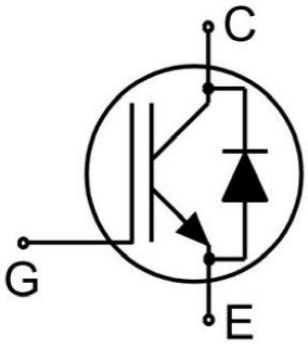
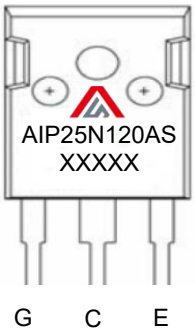
Circuit diagram



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
Collector Current	I_C	50	A
Collector Current(T_C =100℃)	I_C(100℃)	25	A
Pulsed Collector Current, tp limited by T_{jmax}	I_{CM}	100	A
Diode Continuous Forward Current(T_C =100℃)	I_F(100℃)	25	A
Diode Forward Pulsed Current,tp limited by T_{jmax}	I_{Fpuls}	100	A
Power Dissipation	P_D	428	W
Thermal Resistance, Junction to case for Diode	$R_{\theta JC}$	0.9	℃/W
Thermal Resistance, Junction to case for IGBT	$R_{\theta JC}$	0.35	℃/W
Short circuit withstand time	t_{sc}	10	us
Junction Temperature Range	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_{CE} =250uA	1200			V
Collector-Emitter Leakage Current	I_{CES}	V_{GE} = 0V,V_{CE}=1200V			100	uA
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=25A		1.7		V
		V_{GE}=15V,I_C=25A,Tj=175℃		2.3		
Gate Threshold Voltage	$V_{GE(th)}$	V_{CE} =V_{GE},I_C=1mA	5.8	6.1	6.3	V
Dynamic characteristics						
Input Capacitance	C_{ies}	V_{CE}=30V,V_{GE}=0V, f =1MHz		2080		pF
Output Capacitance	C_{oes}			105		
Reverse Transfer Capacitance	C_{res}			20		
Total Gate Charge	Q_g	V_{CC}=960V,V_{GE} =15V,I_C=25A		133		nC
Turn-on delay time	$t_{d(on)}$	V_{CC}=600V,V_{GE}= 0V/15V, I_C =25A,R_G=10Ω, Inductive load		31		nS
Turn-on rise time	t_r			62		
Turn-off delay time	$t_{d(off)}$			184		
Turn-off fall time	t_f			59		
Turn-on Switching Energy	E_{on}			2.0		mJ
Turn-off Switching Energy	E_{off}			0.9		
Total Switching Energy	E_{ts}			2.9		
Turn-on delay time	$t_{d(on)}$	V_{CC}=600V,V_{GE}= 0V/15V, I_C =25A,R_G=10Ω, Inductive load,Tj=175℃		33		nS
Turn-on rise time	t_r			67		
Turn-off delay time	$t_{d(off)}$			206		
Turn-off fall time	t_f			87		
Turn-on Switching Energy	E_{on}			3.1		mJ
Turn-off Switching Energy	E_{off}			1.3		
Total Switching Energy	E_{ts}			4.4		

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=25A		2.0		V
		I_F=25A,Tj=175℃		1.6		
Reverse Recovery Time	t_{rr}	I_F=25A,V_R=600V, di/dt=-250A/us		309		nS
Reverse Recovery Current	I_{rr}			7		A
Reverse Recovery Charge	Q_{rr}			1038		nC
Reverse Recovery Time	t_{rr}	I_F=25A,V_R=600V, di/dt=-250A/us,Tj=175℃		480		nS
Reverse Recovery Current	I_{rr}			11		A
Reverse Recovery Charge	Q_{rr}			3000		nC

Typical Characteristics

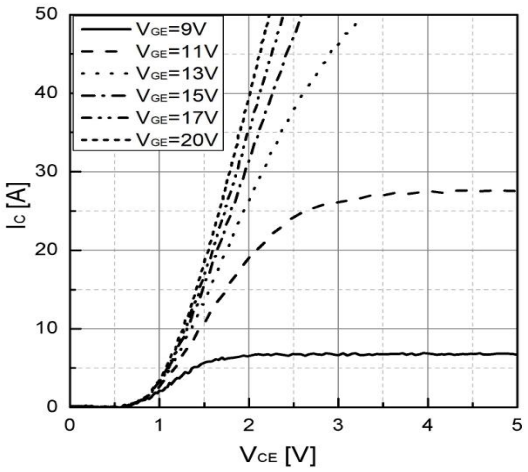


Fig 1. Typical output characteristic (T_{vj}=25℃)

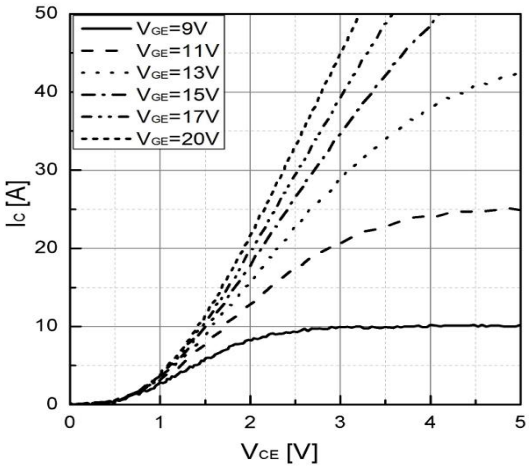


Fig 2. Typical output characteristic(T_{vj}=175℃)

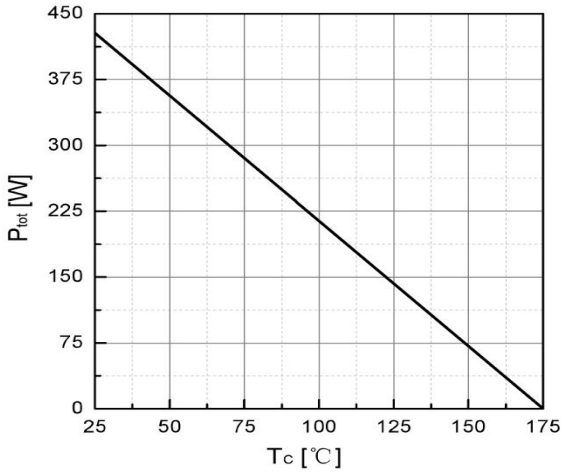


Fig 3. Power dissipation as a function of T_C

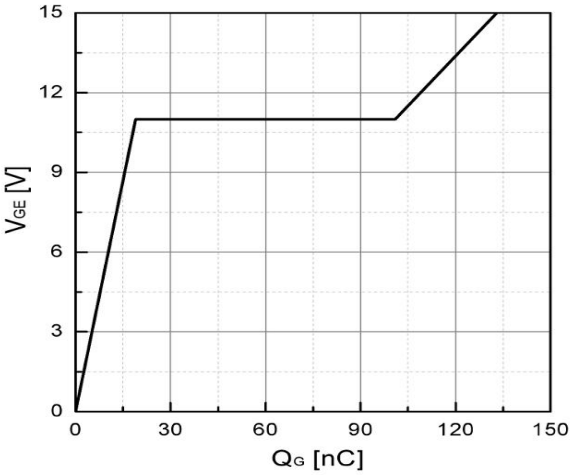


Fig 4. Typical Gate charge

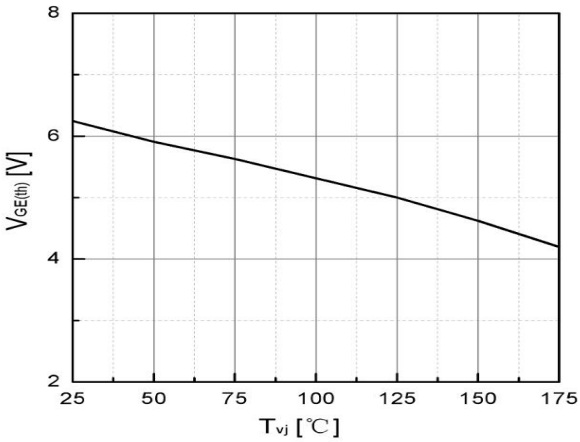


Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj} (I_C=1mA)

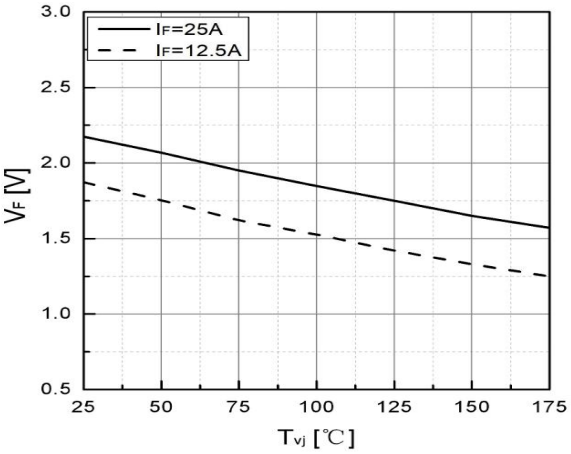


Fig 6. Typical V_F as a function of T_{vj}

Typical Characteristics

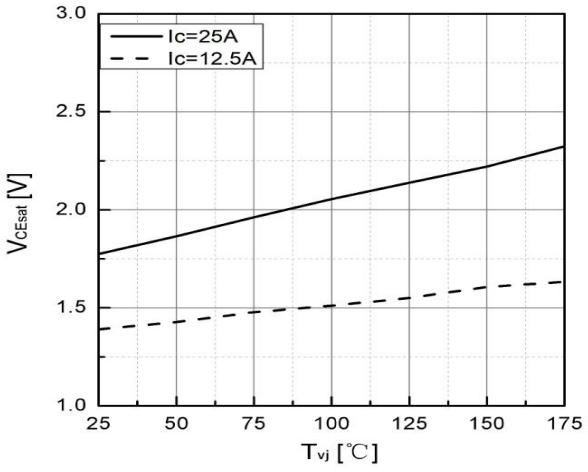


Fig 7. Typical V_{CEsat} as a function of T_{vj}

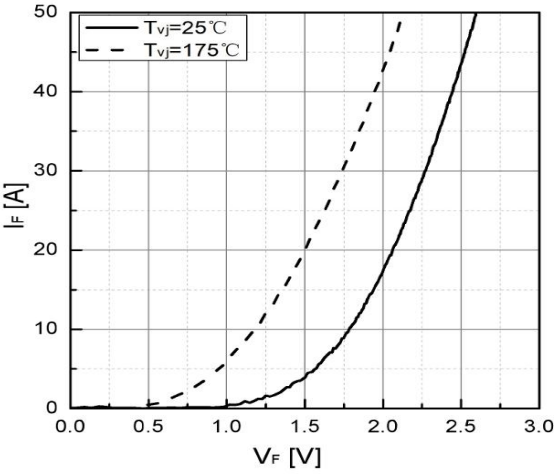


Fig 8. Typical I_F as a function of V_F

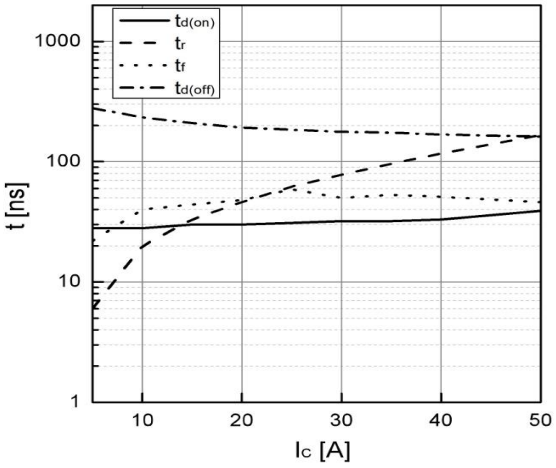


Fig 9. Typical switching time as a function of I_C

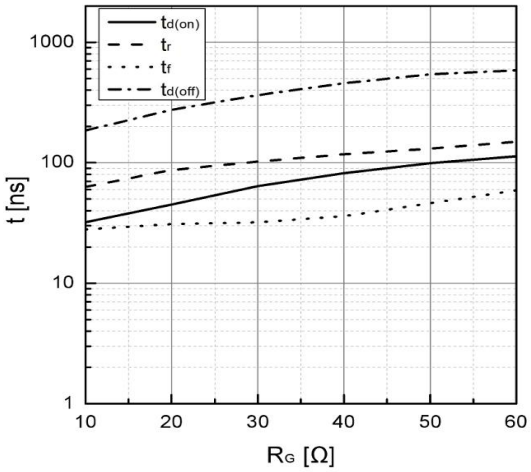


Fig 10. Typical switching times as a function of R_G

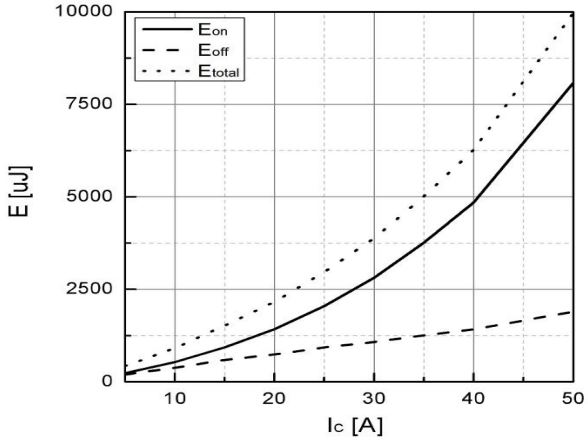


Fig 11. Typical switching energy losses as a function of I_C

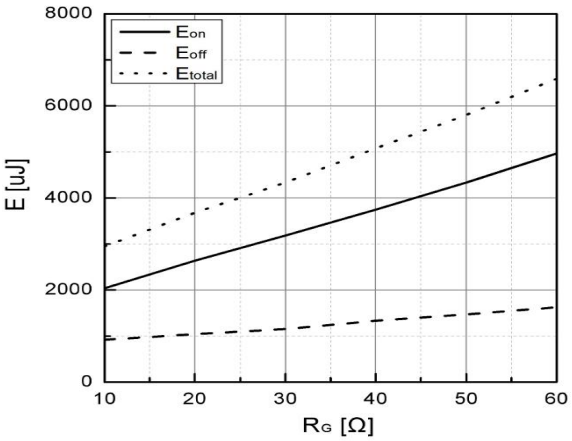


Fig 12. Typical switching energy losses as a function of R_G

Typical Characteristics

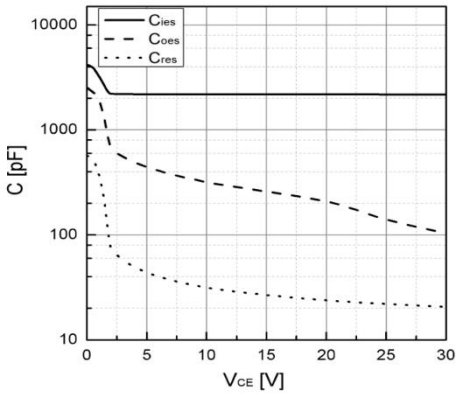


Fig 13. Typical capacitance as a function of V_{CE} (f=1Mhz, V_{GE}=0V)

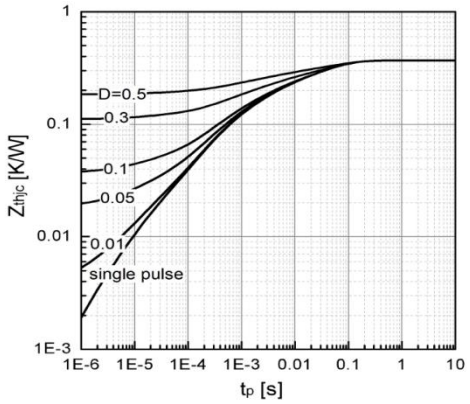
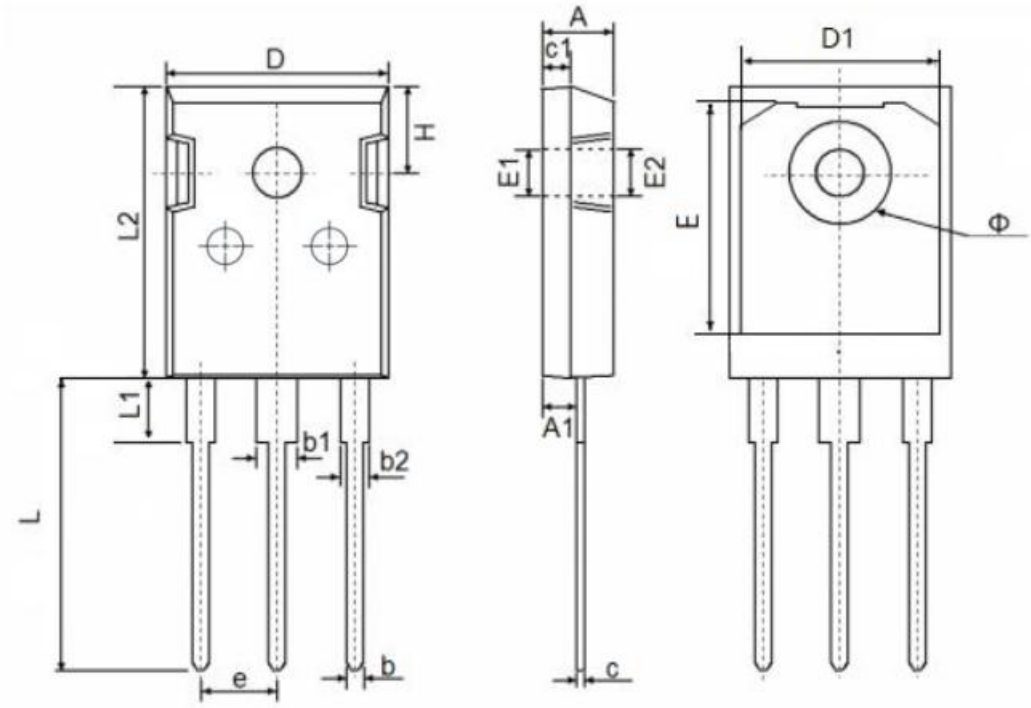


Fig 14. Transient thermal impedance of IGBT

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	0.410	0.790	0.016	0.031
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