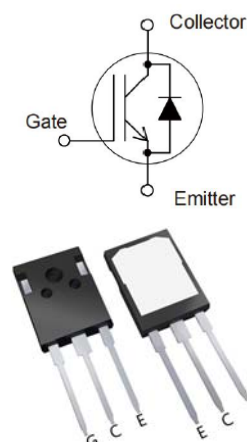


1200V 150A CoolFAST™ 7 Technology IGBT**Features:**

- Low switching power loss
- Low switching surge and noise
- Advanced field stop technology
- Low EMI
- Maximum junction temperature 175°C
- Qualified according to JEDEC for target applications
- Pb-free lead plating, halogen-free mold compound, RoHS compliant

Applications:

- Industrial UPS
- Welding machine
- Solar converters
- EV charger

**Key Performance and Package Parameters**

Type	V _{CE}	I _C	V _{CEsat} , T _{vj} =25°C	T _{vjmax}	T _{sc}	Marking	Package
PCA5N120GS7L	1200V	150A	2.0V	175°C	10μs	PCA5N120GS7L	TO-247PLUS-3L

Maximum Ratings and Characteristics**Absolute Maximum Ratings at T_{vj}= 25°C (unless otherwise specified)**

Parameter	Symbols	Value	Units
Collector-emitter voltage	V _{CEs}	1200	V
DC collector current, limited by T _{vjmax} T _c = 25°C T _c = 100°C	I _C	175 150	A
Pulsed collector current, t _p limited by T _{vjmax}	I _{Cpuls}	600	A
Diode forward current, limited by T _{vjmax} T _c = 25°C T _c = 100°C	I _F	180 150	A
Short circuit withstand time, V _{GE} = 15V, V _{CE} ≤ 400V	T _{SC}	10	μs
Gate-emitter voltage Transient gate-emitter voltage (t _p ≤10μs, D <0.010)	V _{GES}	±20 ±30	V
Operating junction temperature	T _{vj}	-40 ~ +175	°C
Storage temperature	T _{stg}	-55 ~ +175	°C

Thermal Resistance

Parameter	Symbols	Value			Unit
		Min	Typ	Max	
Rth Characteristics					
Thermal resistance, junction-ambient	Rth(j-a)	-	-	50	°C /W
Thermal resistance, IGBT junction-case	Rth(j-c)	-	-	0.2	
Thermal resistance, diodes junction-case	Rth(i-c)	-	-	0.3	

Electrical Characteristics at $T_{vj}= 25^{\circ}\text{C}$ (unless otherwise specified)

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
Static Characteristic						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=0.25mA$	1200	-	-	V
Collector-emitter saturation voltage	V_{CEsat}	$V_{GE}= 15V, I_C=150A$	-	2.0	2.4	V
		$T_{vj}= 25^{\circ}C$	-	2.2	-	
Diode forward voltage	V_F	$I_F= 150A$	-	3.5	4.0	V
		$T_{vj}= 175^{\circ}C$	-	6.8	-	
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE}= V_{GE}, I_C= 150mA$	6.0	6.6	7.2	V
Zero gate voltage collector current	I_{CES}	$V_{CE}=1200V, V_{GE}= 0V$	-	-	200	μA
Gate-emitter leakage current	I_{GES}	$V_{CE}= 0V, V_{GE}= \pm 20V$	-	-	± 200	nA

Electrical Characteristics at $T_{vj}= 25^{\circ}\text{C}$ (unless otherwise specified)

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
Dynamic Characteristic						
Input capacitance	Cies	VCE= 25V, VGE= 0V f= 1MHz	-	40	-	pF
Output capacitance	Coes		-	330	-	pF
Reverse transfer capacitance	Cres		-	195	-	pF
Gate charge	QG	VCC= 960V, IC= 150A, VGE= 15V	-	1450	-	nC

Switching Characteristics at $T_{vj}= 25^{\circ}\text{C}$

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
IGBT Characteristics						
Turn-on delay time	td(on)	Vcc= 600V Ic= 150A VGE= 15V RG= 10Ω Inductive load	-	350	-	ns
Rise time	tr		-	140	-	ns
Turn-off delay time	td(off)		-	360	-	ns
Fall time	tf		-	160	-	ns
Turn-on energy	Eon		-	14.5	-	mJ
Turn-off energy	Eoff		-	7.9	-	mJ
Total switching energy	Ets		-	22.4	-	mJ

Switching Characteristics at $T_{vj}= 25^{\circ}\text{C}$

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
Diode Characteristics						
Diode reverse recovery time	t_{rr}	$V_{CC} = 600V$ $I_F = 150A$ $di_F/dt = 803A/\mu s$	-	63	-	ns
Diode reverse recovery charge	Q_{rr}		-	0.31	-	μC
Diode peak reverse recovery current	I_{rrm}		-	11	-	A

Typical Characteristics

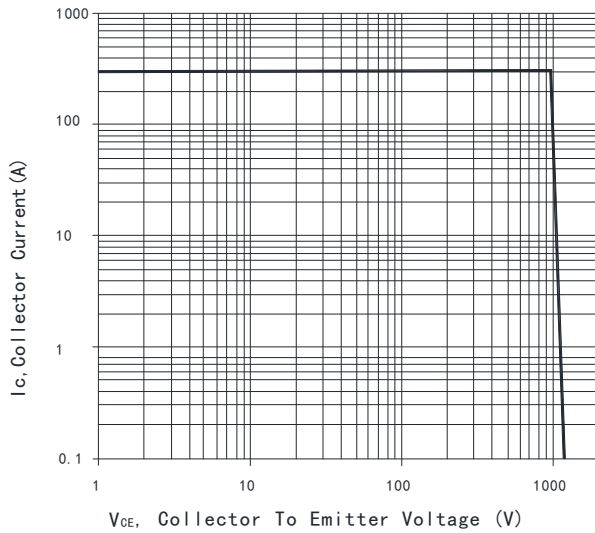


Fig. 1 Reverse bias safe operating area
($D= 0$, $T_C= 25^\circ\text{C}$, $T_{vj}\leq 150^\circ\text{C}$; $V_{GE}= 15\text{V}$)

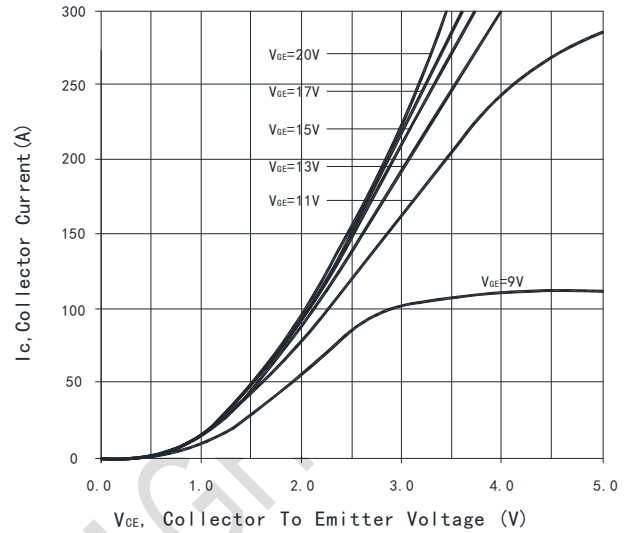


Fig. 2 Typical output characteristic ($T_{vj}= 150^\circ\text{C}$)

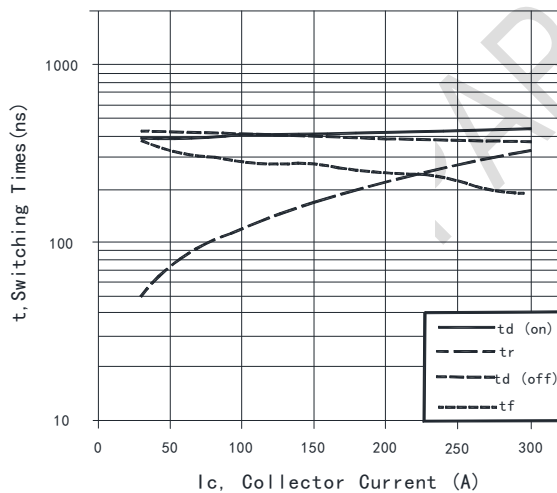


Fig. 3 Typical switching times vs. collector current (Ind. load, $T_{vj}= 150^\circ\text{C}$, $V_{CE}= 600\text{V}$, $V_{GE}= 15/0\text{V}$, $R_G=10\Omega$)

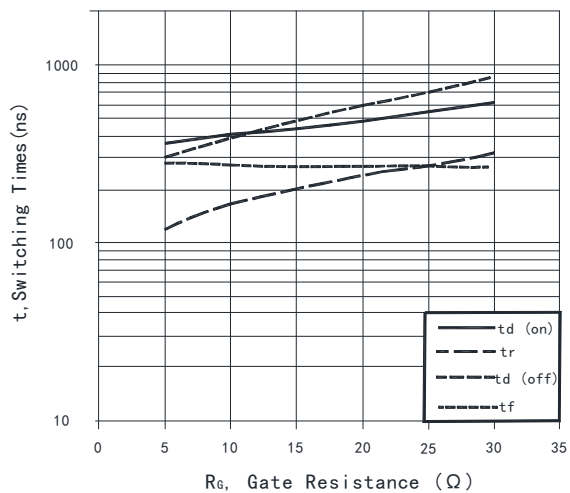


Fig. 4 Typical switching times vs. gate resistor (Ind. Load, $T_{vj}= 150^\circ\text{C}$, $V_{CE}= 600\text{V}$, $V_{GE}= 15/0\text{V}$, $I_C= 150\text{A}$)

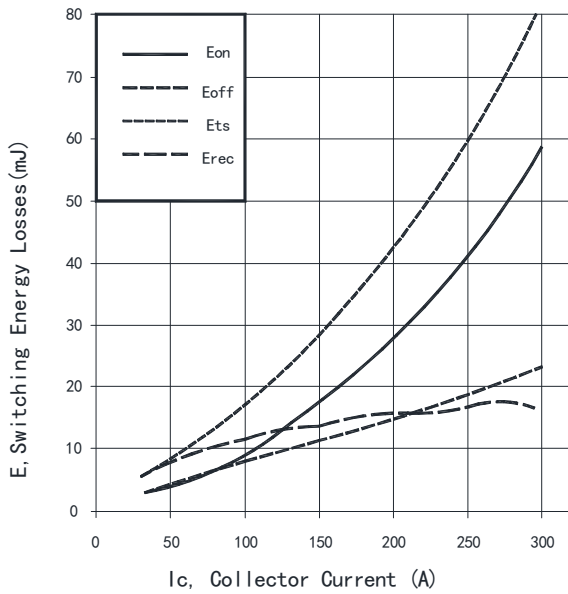


Fig. 5 Typical switching energy losses vs. collector current (Ind. load, T_{vj}= 150°C, V_{CE}= 600V, V_{GE}=15/0V, R_G=10Ω)

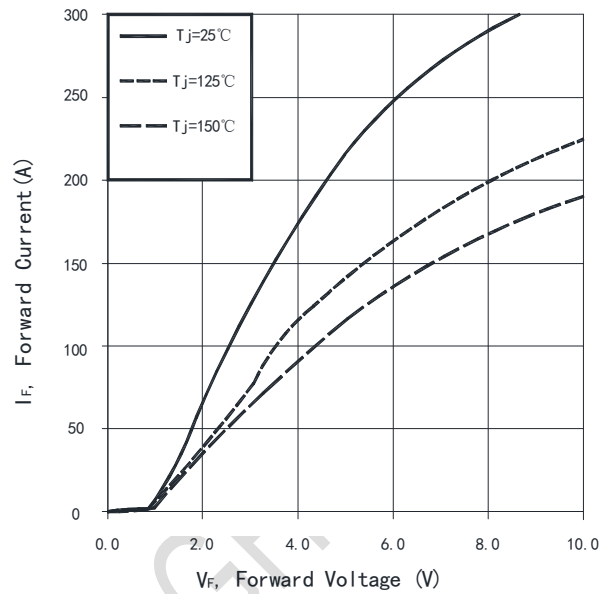
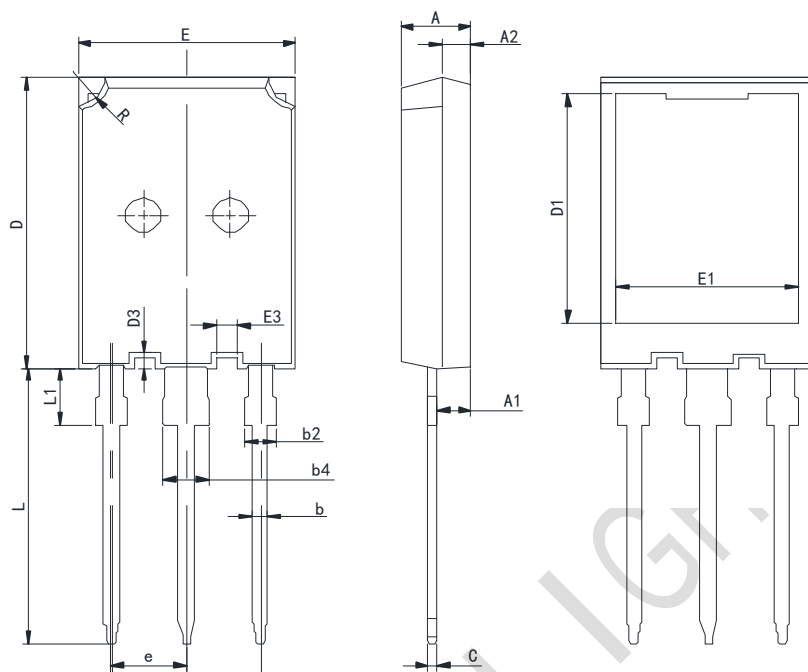


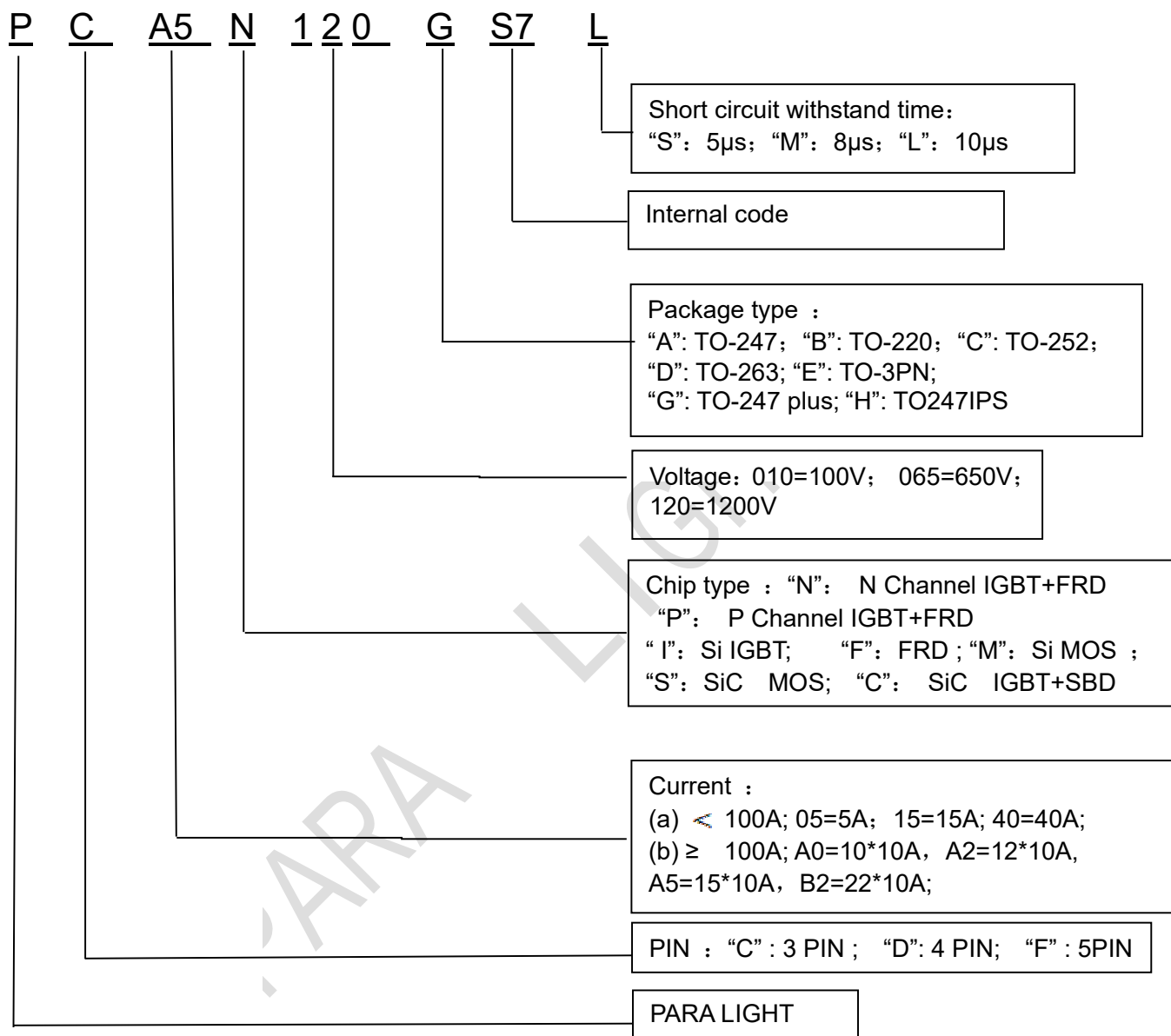
Fig. 6 Typical diode forward current vs. forward voltage

Package Dimensions



Common dimensions(mm)							
Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	4.80	5.00	5.20	D3	0.53	0.68	0.83
A1	2.21	2.4	2.61	E	15.50	15.80	16.10
A2	1.85	-	2.15	E1	13.10	13.30	13.50
b	1.07	-	1.33	E3	1.30	1.45	1.60
b2	1.9	-	2.16	e	5.44TYP		
b4	2.90	-	3.20	L	19.62	19.92	20.22
c	0.52	0.60	0.68	L1	-	-	4.30
D	20.70	21.00	21.30	R	1.85	2.00	2.15
D1	16.25	16.55	16.85				

PART NO. SYSTEM :



Revision history

Document revision history

Date	Version	Changes
2024.06.22	A / 0	First release.