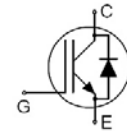
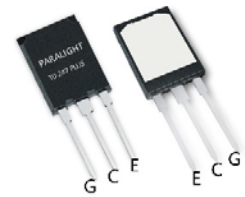


**1200V 75A CoolFAST™ 7 Technology IGBT
With Internal Isolation****Features:**

- 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
- Internal insulation

**Applications:**

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

**Key Performance and Package Parameters**

Type	V _{CE}	I _C	V _{CEsat} , T _{Vj} =25°C	T _{Vjmax}	Marking	Package
PC75N120HD7	1200V	75A	1.95V	175°C	PC75N120HD7	TO247IPS-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	150 75	A
Pulsed collector current, t _p limited by T _{Vjmax}	I _{Cpuls}	300	A
Turn-off safe operating area V _{CE} ≤ 1200V, T _{Vj} ≤ 175°C, t _p = 1μs	-	300	A
Diode forward current, limited by T _{Vjmax} T _C = 25°C T _C = 100°C	I _F	150 75	A
Gate-emitter voltage Transient gate-emitter voltage (t _p ≤ 10μs, D < 0.010)	V _{GES}	±20 ±30	V
IGBT max. power dissipation	P _{D_IGBT}	625	W
FWD max. power dissipation	P _{D_FWD}	350	W
Operating junction temperature	T _{Vj}	-40 ~ +175	°C
Storage temperature	T _{stg}	-55 ~ +150	°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)	-	-	0.24	
Thermal resistance, diodes junction-case	Rth(j-c)	-	-	0.43	

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 = 0.50mA	1200	-	-	V
Collector-emitter saturation voltage	V _{CEsat}	V _{GE} = 15V, I _C = 75A	-	1.95	2.40	V
		T _{vj} = 25°C	-	2.80		
Diode forward voltage	V _F	I _F = 75A	-	2.2	3.0	V
		T _{vj} = 175°C	-	1.8		
Gate-emitter threshold voltage	V _{GE(th)}	V _{CE} = V _{GE} , I _C = 2.6mA	5.0	5.8	6.6	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} = ±30V	-	-	±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	-	19.5	-	nF
Output capacitance	Coes		-	240	-	pF
Reverse transfer capacitance	Cres		-	130	-	pF
Gate charge	QG	VCC= 960V, Ic= 75A, VGE= 15V	-	590	-	nC

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

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC}= 600V$ $I_C= 75A$ $V_{GE}= 15V$ $R_G= 10\Omega$	-	160	-	ns
Rise time	t_r		-	60	-	ns
Turn-off delay time	$t_{d(off)}$		-	410	-	ns
Fall time	t_f		-	140	-	ns
Turn-on energy	E_{on}		-	3.9	-	mJ
Turn-off energy	E_{off}		-	2.6	-	mJ
Total switching energy	E_{ts}		-	6.5	-	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 _R = 600V	-	200	-	ns
Diode reverse recovery charge	Q _{rr}	I _F = 75A	-	3.6	-	μC
Diode peak reverse recovery current	I _{rrm}	di _F /dt= 1000A/μs	-	43	-	A

Switching Characteristics at $T_{vj}= 175^{\circ}\text{C}$

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
IGBT Characteristics						
Turn-on delay time	td(on)	Vcc= 600V Ic= 75A VGE= 15V RG= 10Ω	-	150	-	ns
Rise time	tr		-	60	-	ns
Turn-off delay time	td(off)		-	430	-	ns
Fall time	tf		-	170	-	ns
Turn-on energy	Eon		-	5.3	-	mJ
Turn-off energy	Eoff		-	3.2	-	mJ
Total switching energy	Ets		-	8.5	-	mJ

Switching Characteristics at $T_{vj}= 175^{\circ}\text{C}$

Parameter	Symbols	Conditions	Value			Unit
			Min	Typ	Max	
Diode Characteristics						
Diode reverse recovery time	t_{rr}	$V_R= 600V$ $I_F= 75A$ $di_F/dt= 1000A/\mu s$	-	320	-	ns
Diode reverse recovery charge	Q_{rr}		-	8.6	-	μC
Diode peak reverse recovery current	I_{rrm}		-	59	-	A

Typical Characteristics

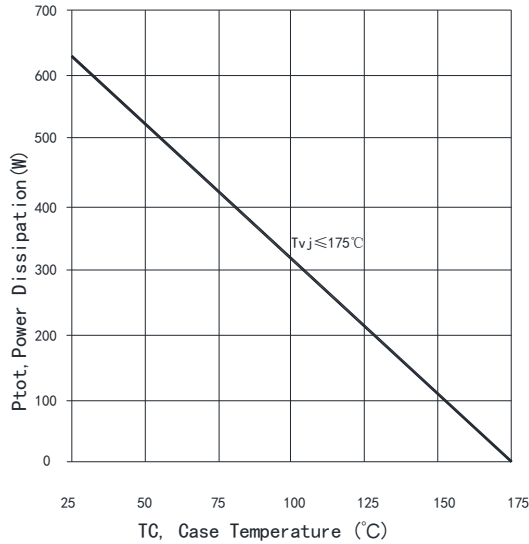


Fig. 1 Power dissipation vs. case temperature ($T_{vj} \leq 175^{\circ}\text{C}$)

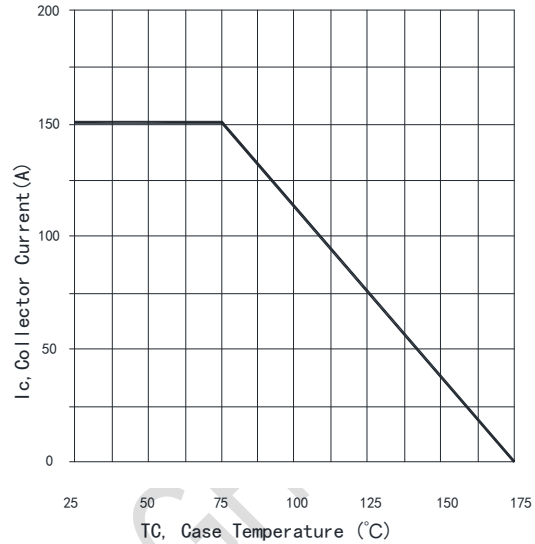


Fig. 2 DC Collector current vs. Case temperature ($V_{GE} \leq 15\text{V}$, $T_{vj} \leq 175^{\circ}\text{C}$)

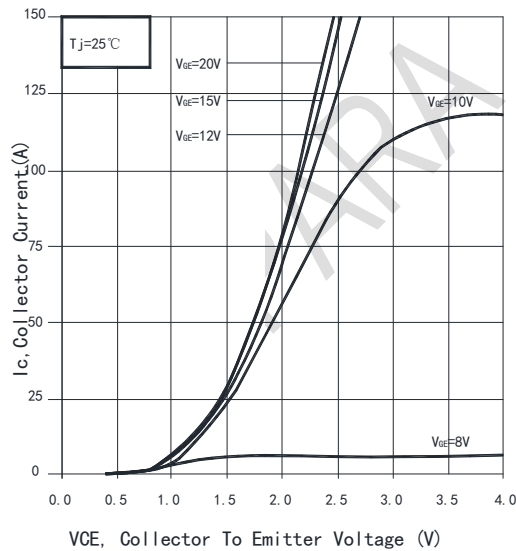


Fig. 3 Typical output characteristic ($T_{vj} = 25^{\circ}\text{C}$)

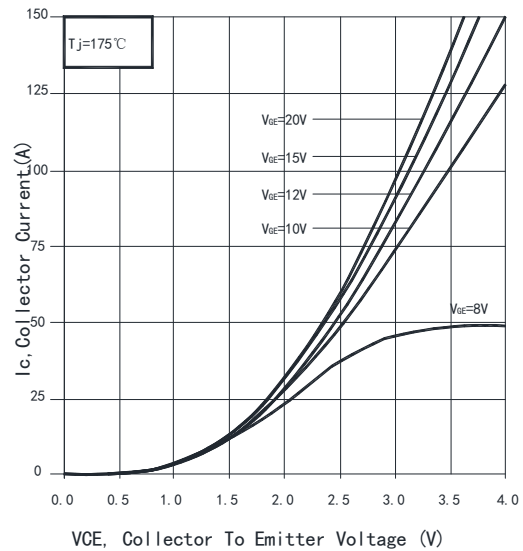


Fig. 4 Typical output characteristic ($T_{vj} = 175^{\circ}\text{C}$)

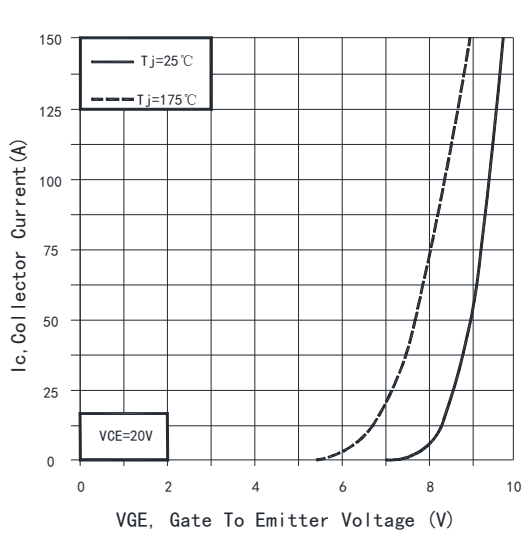


Fig. 5 Typical transfer characteristic
($V_{CE}=20V$)

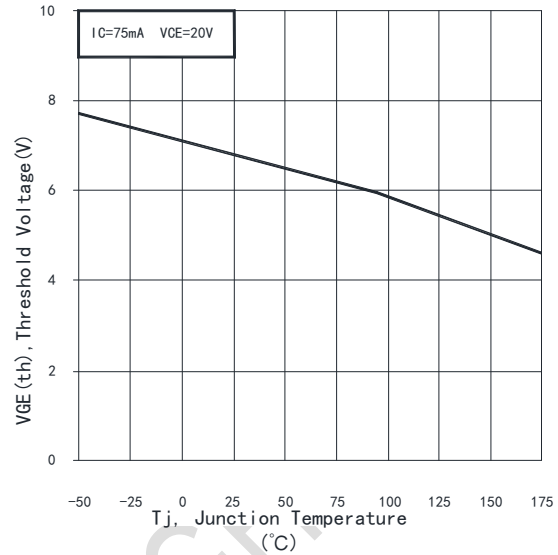


Fig. 6 Gate threshold voltage
($I_C=75mA$, $V_{CE}=20V$)

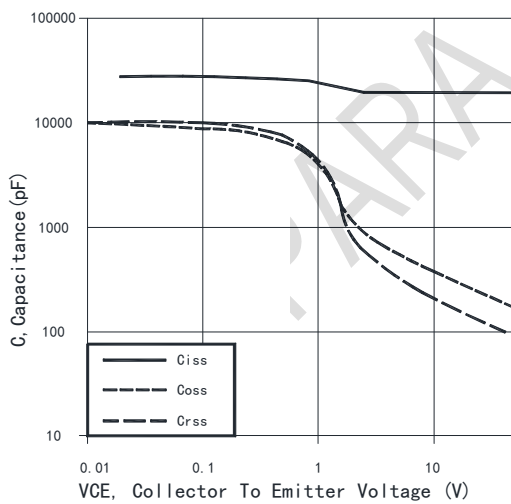


Fig. 7 Typical capacitance vs. collector-emitter
voltage ($V_{GE}=0V$, $f=1MHz$)

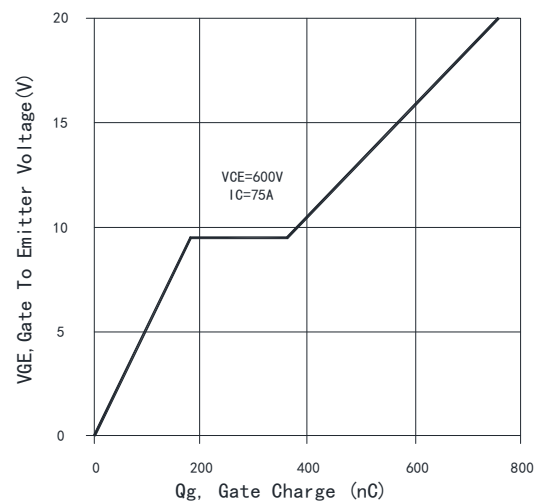


Fig. 8 Typical gate charge
($I_C=75A$, $V_{CE}=600V$, $T_{vj} = 25^\circ C$)

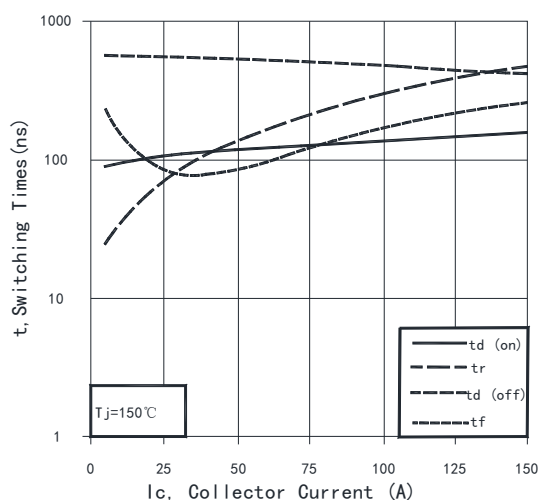


Fig. 9 Typical switching times vs. collector current ($T_j=150^\circ\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $R_g=10\Omega$)

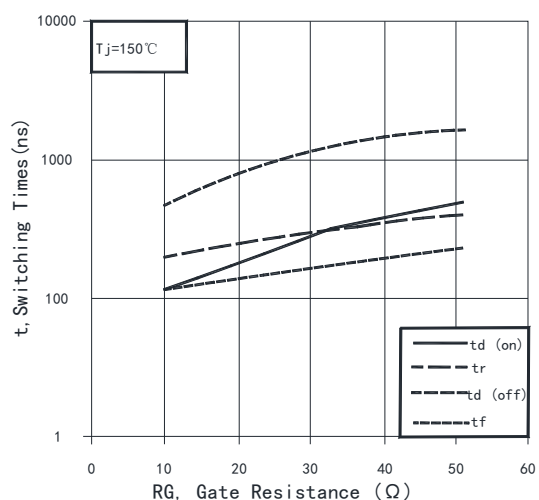


Fig. 10 Typical switching times vs. gate resistor ($T_j=150^\circ\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $I_c=75\text{A}$)

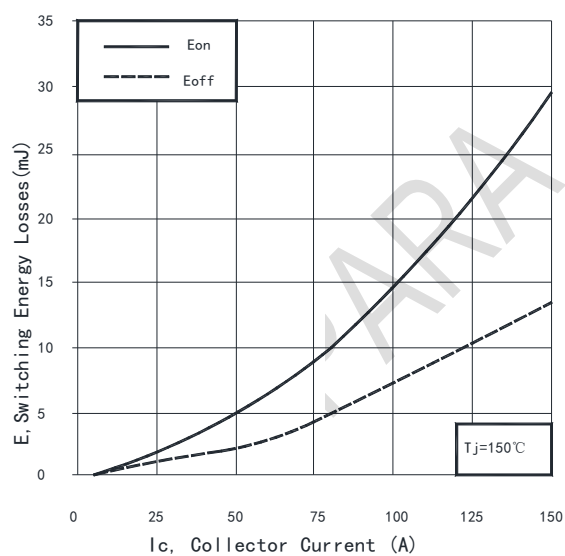


Fig. 11 Typical switching losses vs. Collector current ($T_j=150^\circ\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $R_g=10\Omega$)

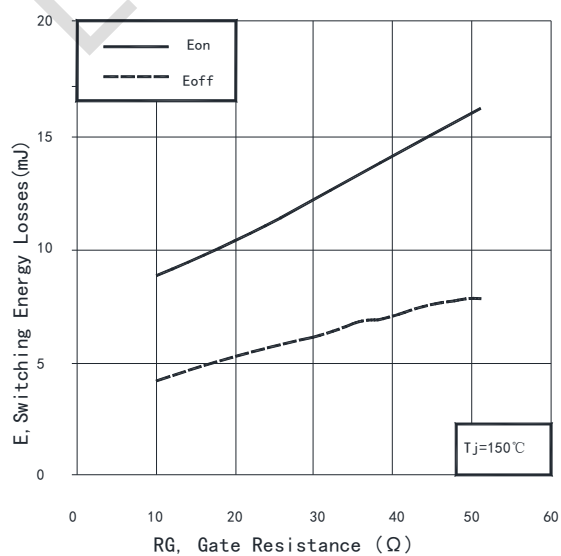


Fig. 12 Typical capacitance vs. collector-emitter voltage ($T_j=150^\circ\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $R_g=10\Omega$)

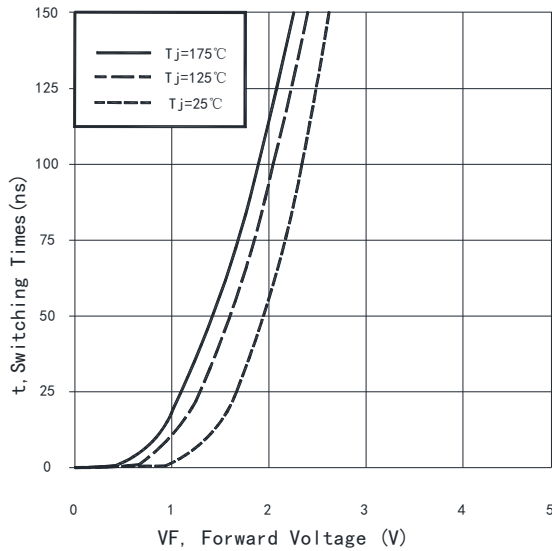


Fig. 13 Typical forward characteristics of diode
($V_{CE}=600V$, $V_{GE}=15V$, $R_g=10\Omega$)

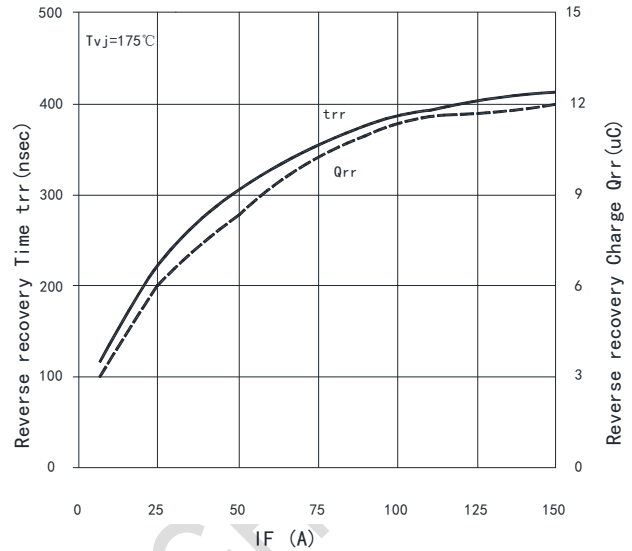


Fig. 14 Typical reverse recovery characteristics vs. forward current of diode
($T_{vj}=175^\circ C$, $V_{CE}=600V$, $V_{GE}=15V$, $R_g=10\Omega$)

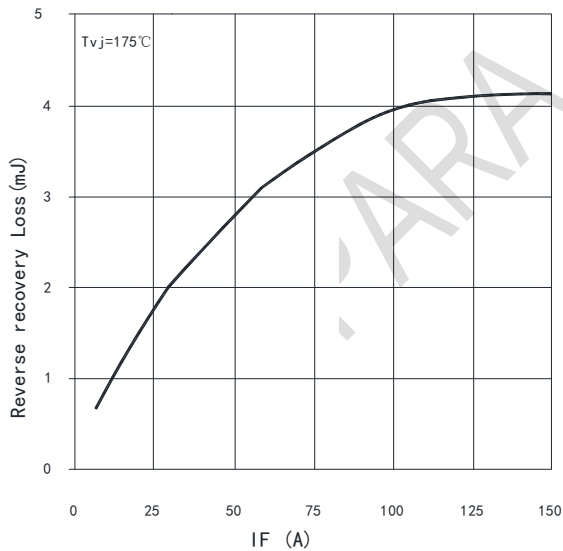


Fig. 15 Typical reverse recovery loss vs. forward current of diode
($T_{vj}=175^\circ C$, $V_{CE}=600V$, $V_{GE}=15V$, $R_g=10\Omega$)

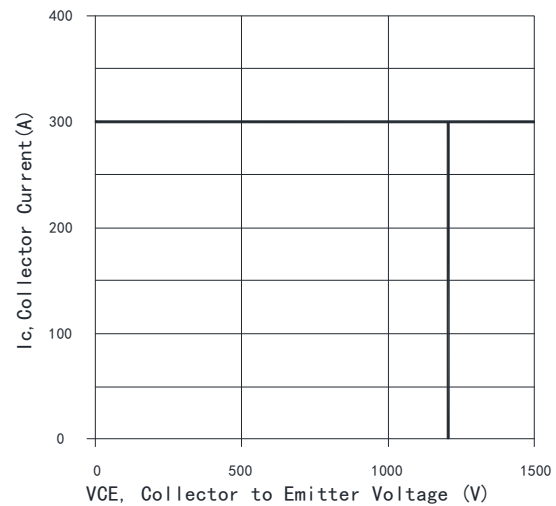


Fig. 16 Reverse biased safe operating area
($T_{vj}=175^\circ C$, $V_{GE}=15/0V$, $R_g=20\Omega$)

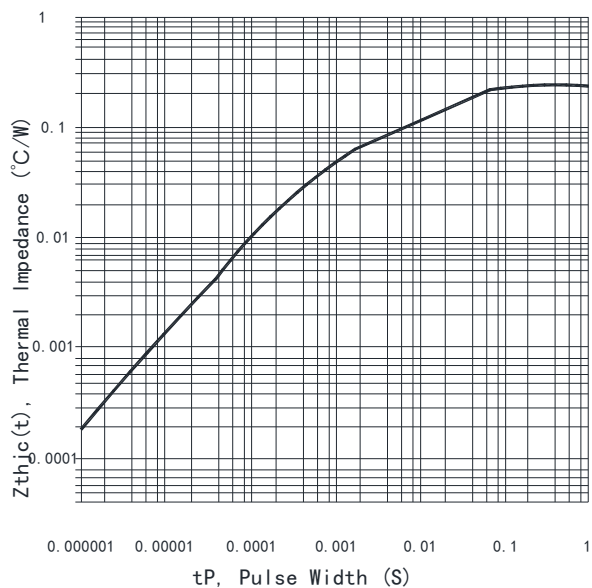


Fig. 17 Transient thermal impedance of IGBT (D=0)

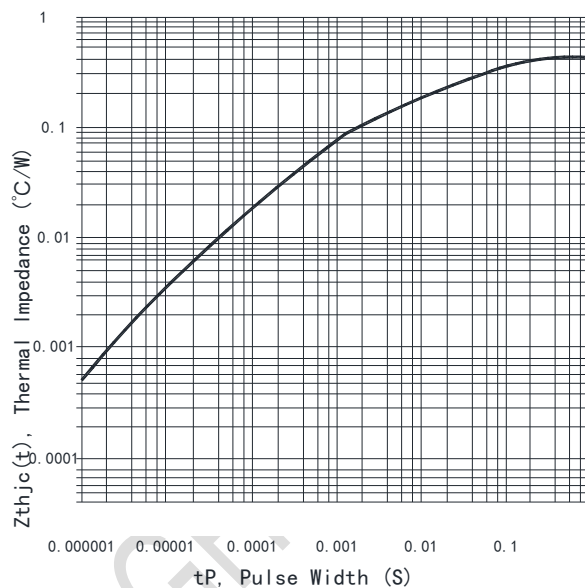
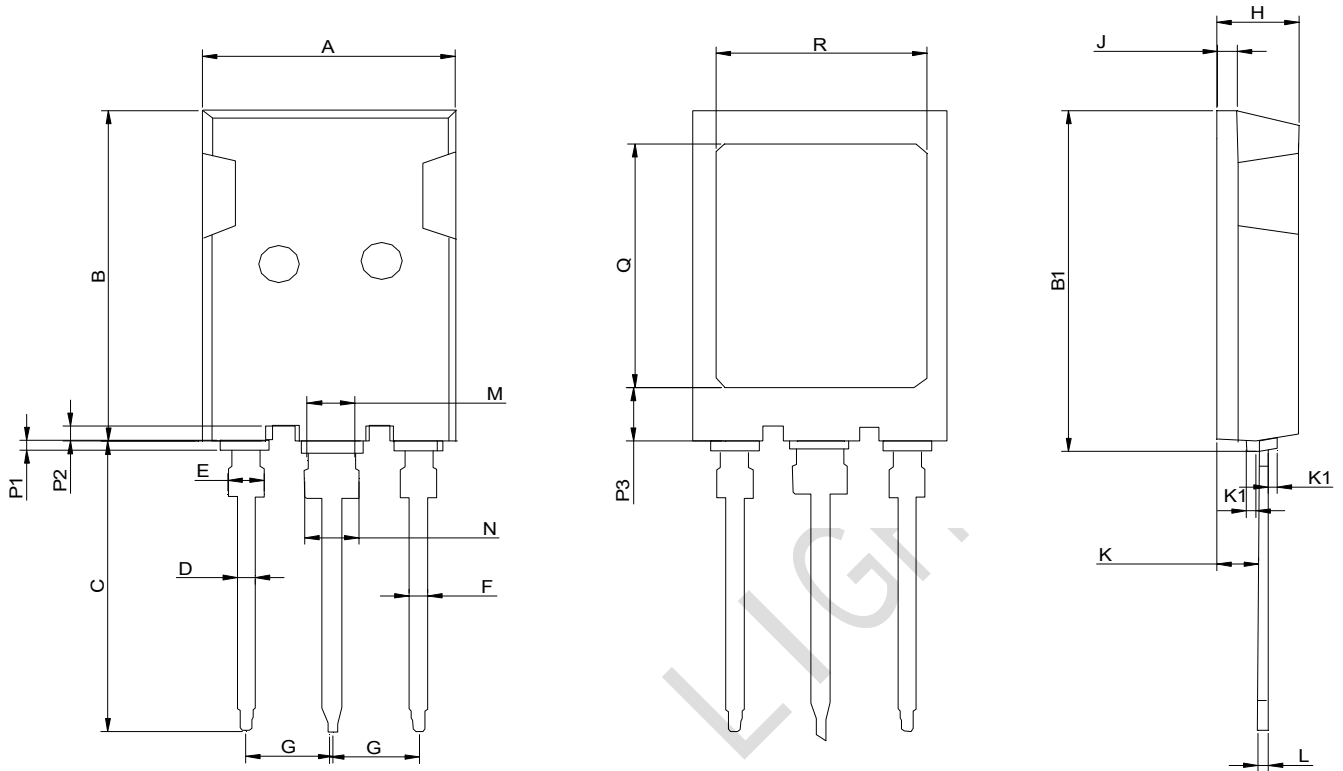


Fig. 18 Transient thermal impedance of diode (D=0)

Package Dimensions



Common dimensions(mm)							
Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	15.70	16.00	16.30	K	2.20	2.35	2.50
B	21.80	22.00	22.20	K1	0.45	0.60	0.75
B1	22.30	22.50	22.70	L	0.51	0.70	0.89
C	19.40	19.70	20.00	M	2.80	3.00	3.20
D	1.80	2.00	2.20	N	3.15	3.35	3.55
E	2.15	2.35	2.55	P1	0.44	0.64	0.84
F	1.16	1.36	1.56	P2	0.80	1.00	1.20
G	5.25	5.45	5.65	P3	3.55	3.75	3.95
H	4.80	5.00	5.20	Q	12.60	12.90	13.20
J	1.10	1.20	1.30	R	15.55	15.85	16.15

PART NO. SYSTEM :

P C 75 N 120 H D 7

Internal code

Package type :

"A": TO-247; "B": TO-220; "C": TO-252;
"D": TO-263; "E": TO-3PN;
"G": TO-247 plus; "H": TO247iPS

Voltage: 010=100V;
065=650V; 120=1200V

Chip type : "N": N Channel IGBT+FRD ;
"P": P Channel IGBT+FRD ;
"I": Si IGBT; "F": FRD ; "M": Si MOS ;
"S": SiC MOS; "C": SiC IGBT+SBD

Current :

(a) < 100A; 05=5A; 15=15A; 40=40A;
(b) ≥ 100A; 2B=100A; 3B=150A;
4B=200A

PIN : "C" : 3 PIN ; "D": 4 PIN; "F" : 5PIN

PARA LIGHT

Revision history

Document revision history

Date	Version	Changes
2024.01.31	A / 0	First release.