



HBP60T60-SAOCH

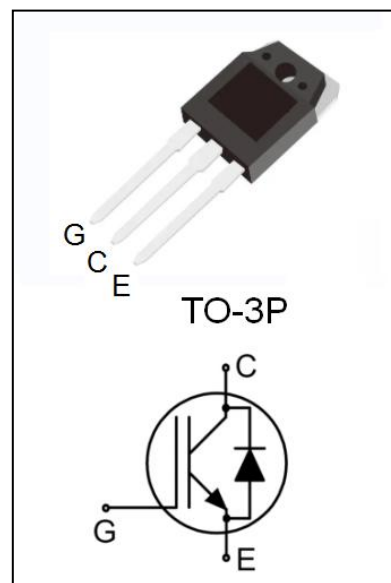
600V N-Channel Insulated Gate Bipolar Transistor

● Features:

- 60.0A, 600V, $V_{CESAT(Typ)} = 1.9V @ V_{GE}=15V, I_C=60A$
- Trench FS Technology
- With Fast Recovery anti-parallel Diode
- Low Gate Charge
- Low Saturation Voltage
- Low Switching Loss
- Positive Temperature Coefficient

● Application:

- General Purpose Inverters
- Welding Machine
- UPS



Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CE}	Collector-Emitter Voltage	600	V
I_C	Collector Current-Continuous - ($T_C=25^{\circ}C$) - ($T_C=100^{\circ}C$)	120	A
		60	A
I_{CM}	Collector Current – Pulse (Note1)	180	A
I_F	Diode Forward Current - ($T_C=25^{\circ}C$) - ($T_C=100^{\circ}C$)	60	A
		30	A
I_{FSM}	Surge non Repetitive Forward Current $t_p=10ms$ Sinusoidal	90	A
V_{GE}	Gate-Emitter Voltage	± 20	V
P_D	Power Dissipation ($T_C = 25^{\circ}C$)	305	W
T_j	Operating Junction Temperature	150	$^{\circ}C$
T_{stg}	Storage Temperature Range	-55 to +150	$^{\circ}C$

*Collector Current Limited by Maximum Junction Temperature.

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case for IGBT	0.41	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance, Junction to Case for Diode	0.91	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	40	$^{\circ}C/W$

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Electrical Characteristics(Tc=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV _{CES}	Collector-Emitter Breakdown Voltage	V _{GE} =0V ,I _C =1mA	600	--	--	V
I _{CES}	Zero Gate Voltage Collector Current	V _{CE} =600V,V _{GE} =0V	--	--	200	μA
I _{GESF}	Gate-Body Leakage Current,Forward	V _{GE} =+20V, V _{CE} =0V	--	--	400	nA
I _{GESR}	Gate-Body Leakage Current,Reverse	V _{GE} =-20V, V _{CE} =0V	--	--	-400	nA
On Characteristics						
V _{GE(th)}	Gate Threshold Voltage	V _{CE} = V _{GE} , I _C =1mA	4.0	5.8	7.0	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} =15 V, I _C =60A	--	1.9	2.5	V
Dynamic Characteristics						
C _{ies}	Input Capacitance	V _{CE} =30V,V _{GE} =0V, f=1.0MHz	--	6730	--	pF
C _{oes}	Output Capacitance		--	132	--	pF
C _{res}	Reverse Transfer Capacitance		--	62	--	pF
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{CE} = 400 V, I _C = 60 A, R _G = 10 Ω,V _{GE} =15 V, Inductive Load	--	70	--	ns
t _r	Turn-On Rise Time		--	160	--	ns
t _{d(off)}	Turn-Off Delay Time		--	190	--	ns
t _f	Turn-Off Fall Time		--	140	--	ns
E _{on}	Turn-On Energy		--	3.8	--	mJ
E _{off}	Turn-off Energy		--	1.5	--	mJ
E _{ts}	Total Switching Energy		--	5.3	--	mJ
Q _g	Total Gate Charge	V _{CE} = 400 V, I _C =60 A, V _{GE} = 15 V	--	210	--	nC
Q _{ge}	Gate-Emitter Charge		--	65	--	nC
Q _{gc}	Gate-Collector Charge		--	70	--	nC
Anti-Parallel Diode Characteristics and Maximum Ratings						
V _F	Collector-Emitter Diode Forward Voltage	I _F =30A,T _c =25°C	--	1.65		V
		I _F =30A,T _c =125°C	--	1.55	--	V
t _{rr}	Diode Reverse Recovery Time	I _{EC} =30A	--	37	--	ns
Q _{rr}	Diode Reverse Recovery Charge	dI _{EC} /dt=200A/μs	--	82	--	nC

Notes:

1、 Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature.

Typical Performance Characteristics

Fig 1. Output Characteristic

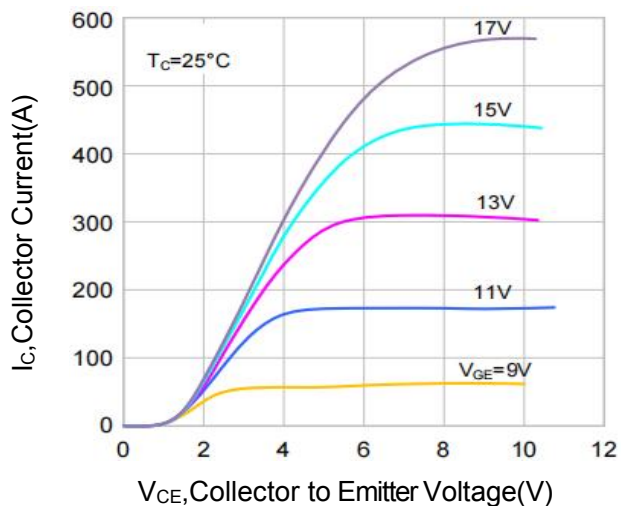


Fig 2. I_C vs T_C

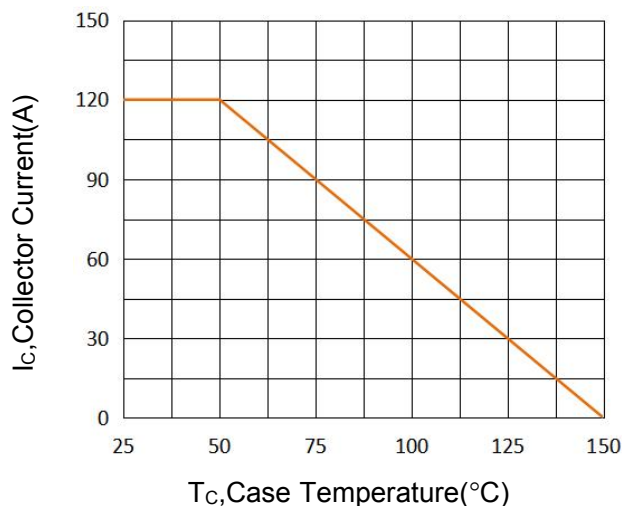


Fig 3. Saturation Voltage Characteristic

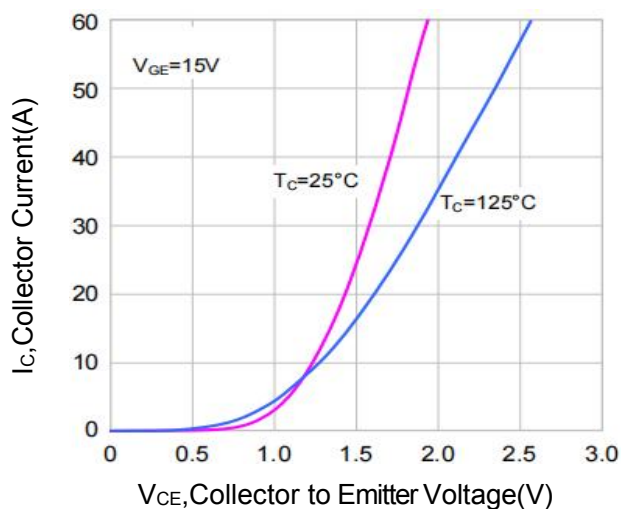


Fig 4. Transfer Characteristic

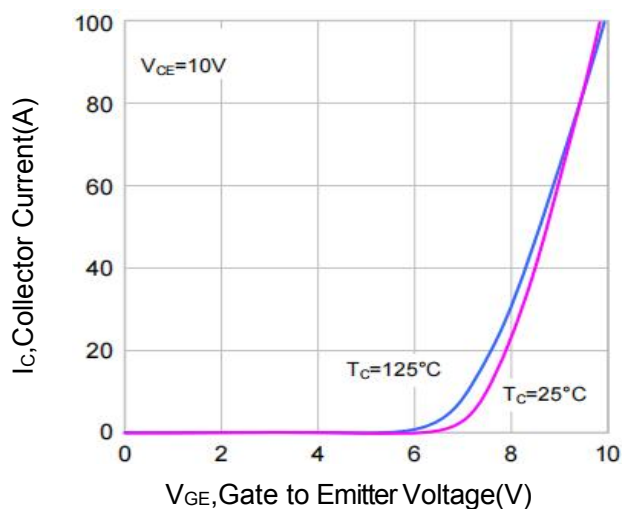


Fig 5. $V_{CE(sat)}$ vs. $V_{GE}(V)$

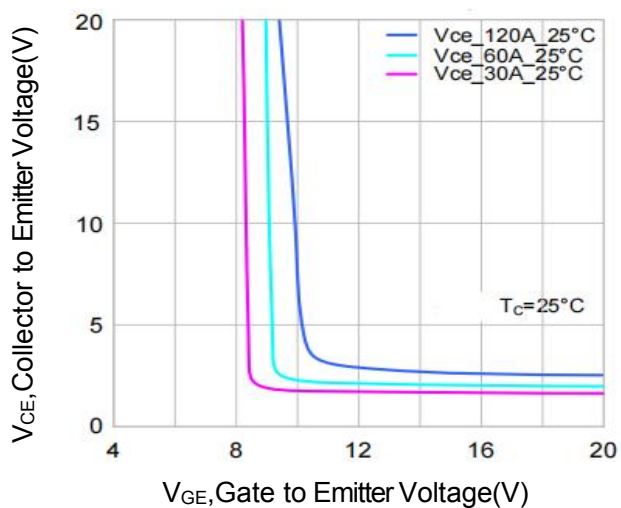


Fig 6. $V_{CE(sat)}$ vs. $V_{GE}(V)$

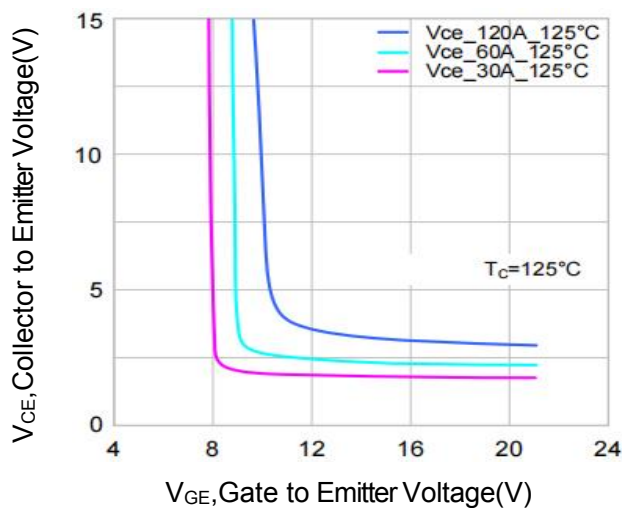


Fig 7. $V_{CE(sat)}$ vs. T_C

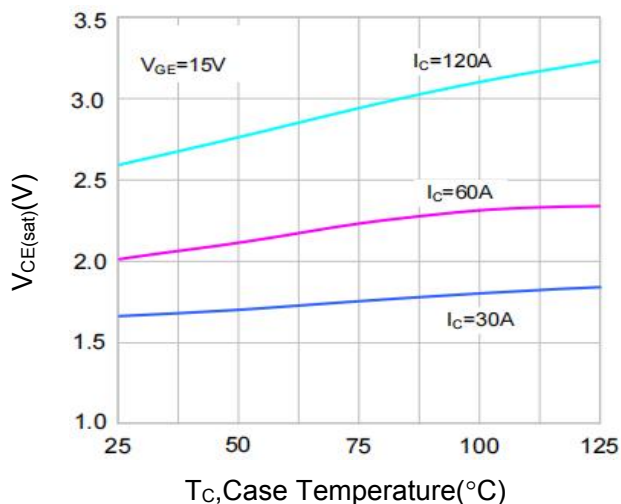


Fig 8. Capacitance Characteristic

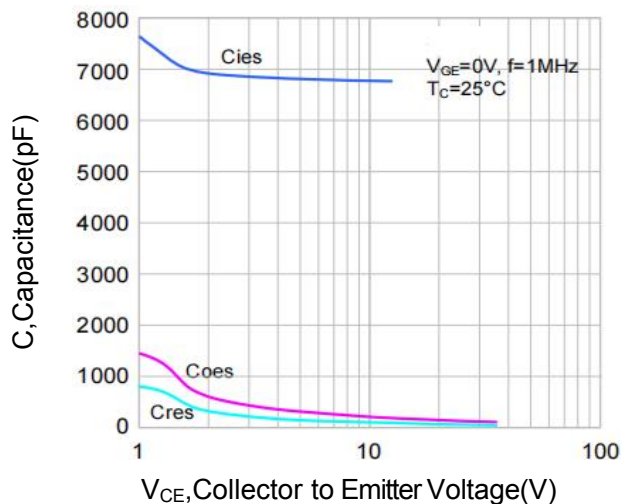


Fig 9. Gate Charge Characteristics

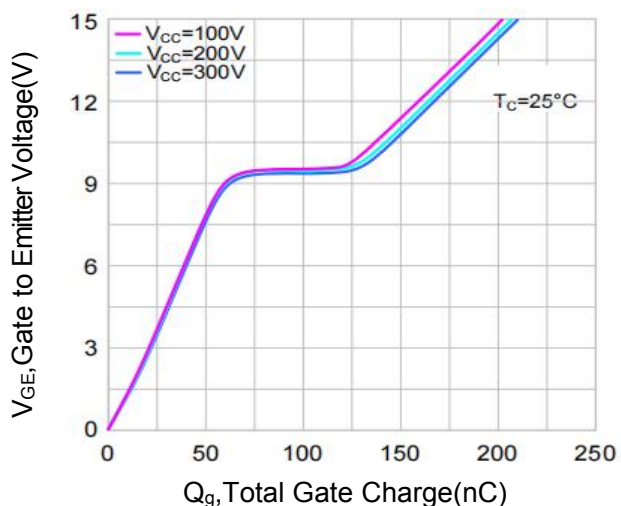


Fig 10. Switching Time vs. Rg

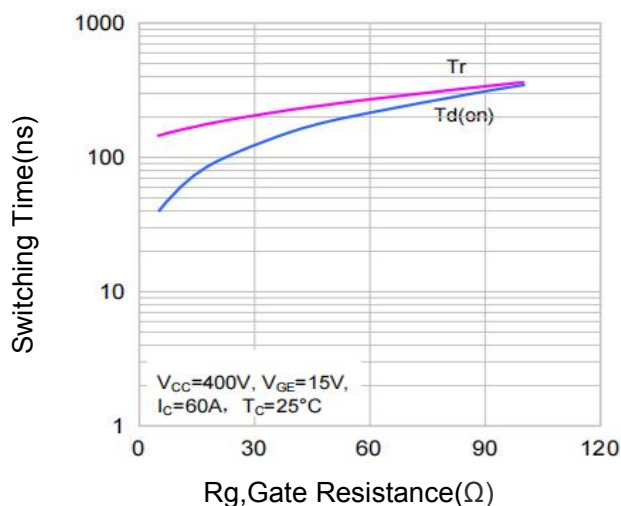


Fig 11. Switching Time vs. Rg

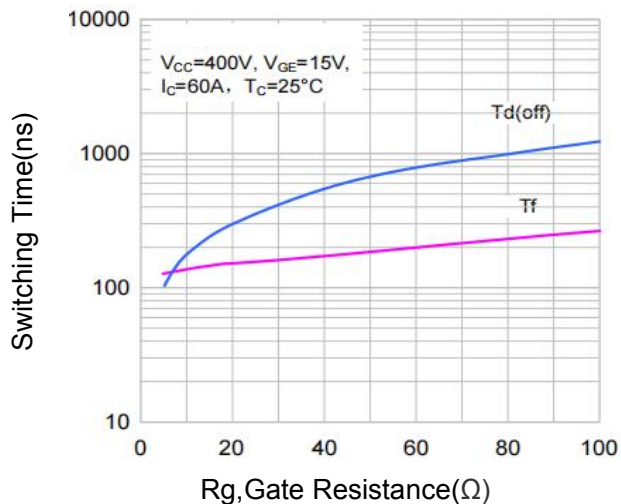


Fig 12. Switching Loss vs. Rg

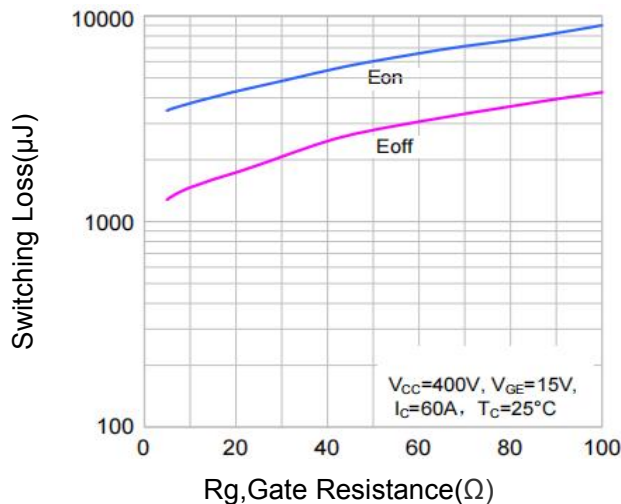


Fig 13. Switching Time vs. I_c

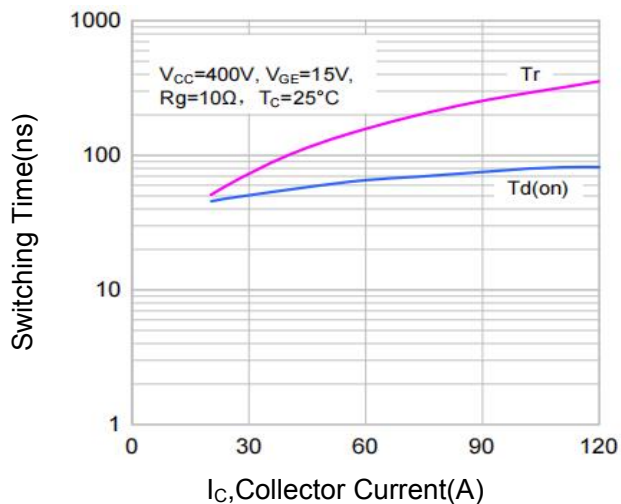


Fig 14. Switching Time vs. I_c

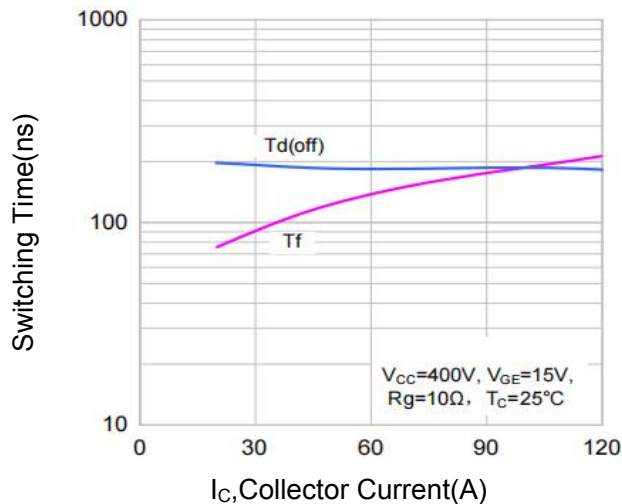


Fig 15. Switching Loss vs. I_c

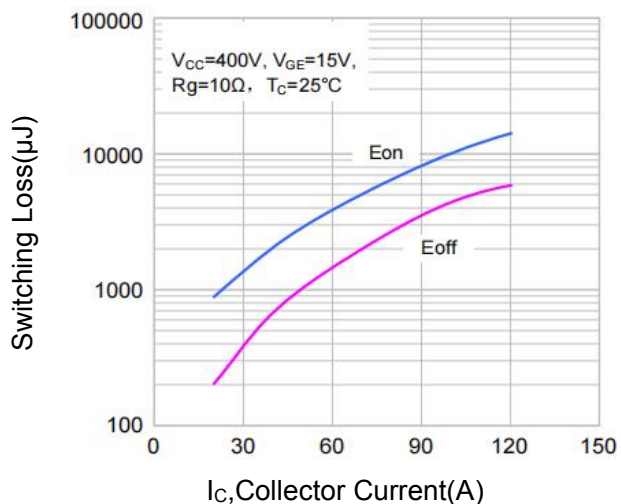


Fig 16. Diode Forward Characteristic

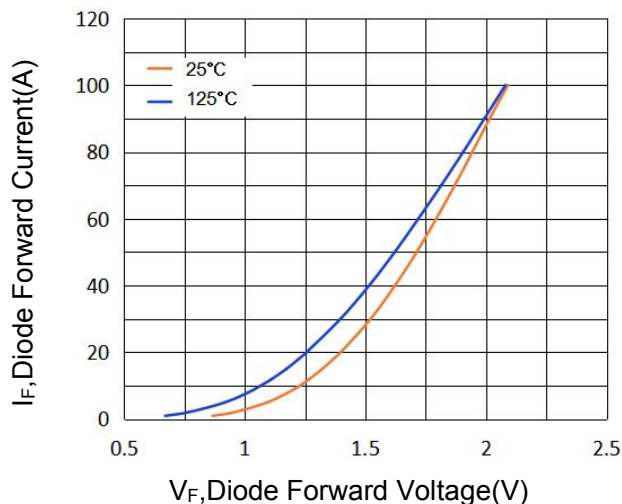
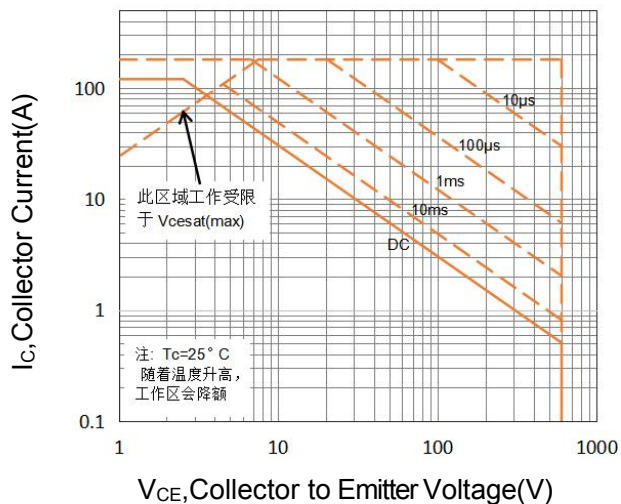


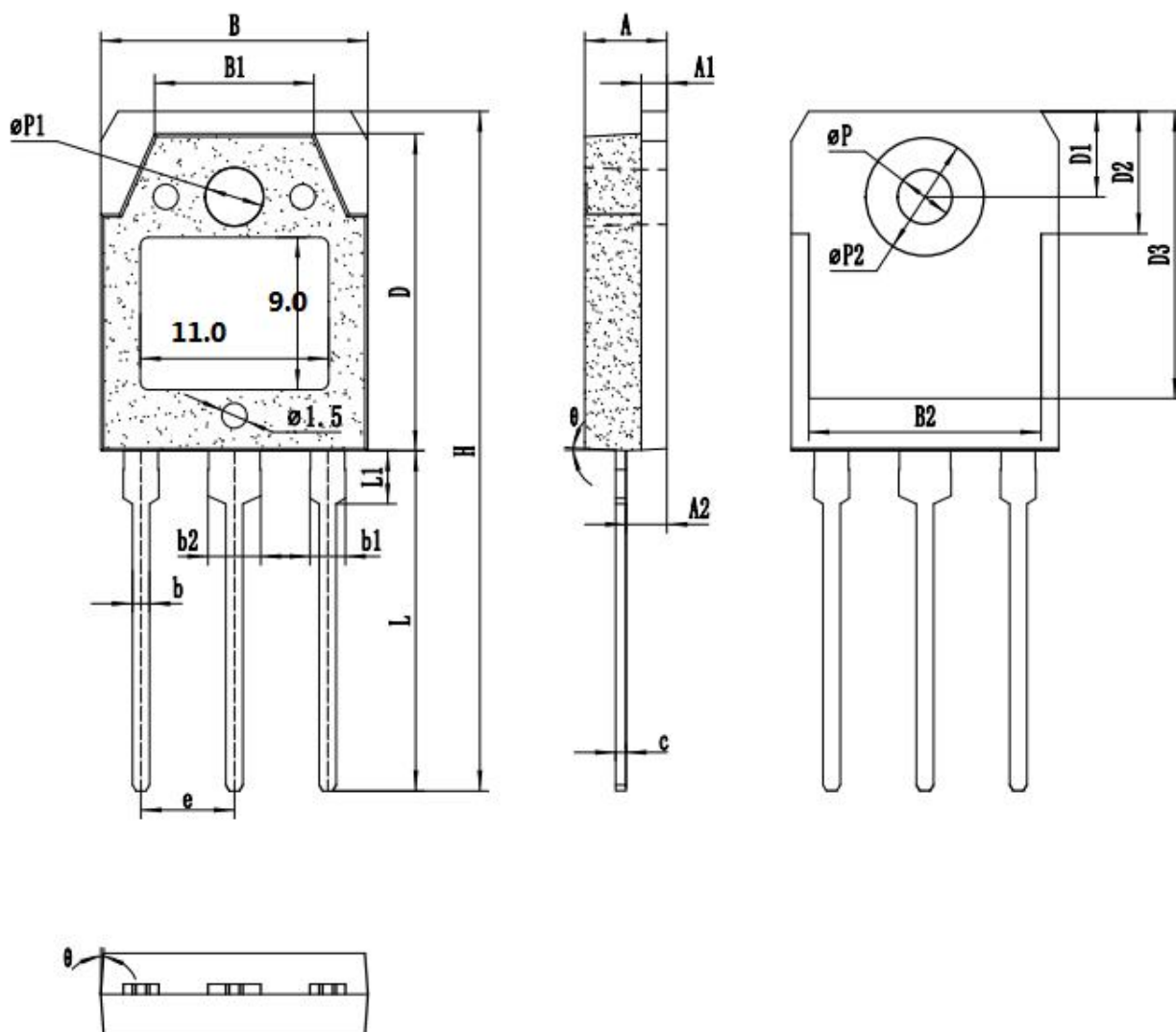
Fig 17. Safe Operating Area



TO-3P Package Dimensions

UNIT: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	4.50	4.80	5.10	D	18.00	18.50	19.00
A1	1.40	1.50	1.60	D1	4.60	5.00	5.40
A2	2.10	2.40	2.70	D2	6.70	7.10	7.50
b	0.80	1.00	1.20	D3	16.20	16.70	17.20
b1	1.90	2.10	2.30	L1	2.70	3.10	3.50
b2	2.90	3.10	3.30	L	19.20	20.20	21.20
e		5.45		H	38.40	39.90	41.40
B	15.20	15.70	16.20	ΦP	2.90	3.15	3.40
B1	9.10	9.40	9.70	ΦP1	3.15	3.40	3.65
B2	13.20	13.60	14.00	ΦP2	6.70	7.00	7.30
c	0.50	0.60	0.70	θ	3°	5°	7°



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注意事项:

- 1、在电路设计时请不要超过器件的最大额定值，否则会影响整机的可靠性。
- 2、IGBT产品为静电敏感型器件，使用时应注意采取防静电保护措施，如佩戴防静电手环、设备接地等。
- 3、如需安装散热片，请注意控制扭力大小及散热片的平整度。
- 4、该规格书由华科公司制作，并可能不定期更改，恕不另行通知。
- 5、如有疑问，请及时联系我司销售代表。

版本履历表:

序号	版本号	修改时间	修改记录
1	V1.0	2023-3-16	首次发行