



HBNS25T120-SADCH

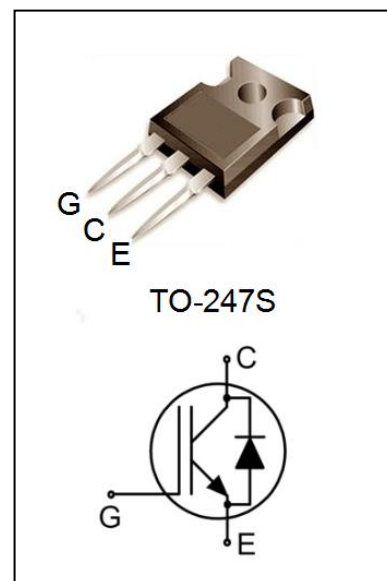
1200V N-Channel Insulated Gate Bipolar Transistor

● Features:

- 25.0A, 1200V, $V_{CESAT(Typ)} = 2.1V @ V_{GE}=15V, I_C=25A$
- 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	1200	V
I_C	Collector Current-Continuous - ($T_C=25^{\circ}C$) - ($T_C=100^{\circ}C$)	50	A
		25	A
I_{CM}	Collector Current – Pulse (Note1)	75	A
I_F	Diode Forward Current - ($T_C=25^{\circ}C$) - ($T_C=100^{\circ}C$)	25	A
		12.5	A
I_{FSM}	Surge non Repetitive Forward Current $t_p=10ms$ Sinusoidal	37.5	A
V_{GE}	Gate-Emitter Voltage	± 20	V
P_D	Power Dissipation ($T_C = 25^{\circ}C$)	193	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	0.65	$^{\circ}C / W$
$R_{\theta JC}$	Thermal Resistance, Junction to Case for Diode	1.65	$^{\circ}C / W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	41	$^{\circ}C / W$

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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	1200	--	--	V
I _{CES}	Zero Gate Voltage Collector Current	V _{CE} =1200V,V _{GE} =0V	--	--	500	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	5.0	6.6	8.0	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} =15 V, I _C =25A	--	2.1	2.7	V
Dynamic Characteristics						
C _{ies}	Input Capacitance	V _{CE} =30V,V _{GE} =0V, f=1.0MHz	--	2770	--	pF
C _{oes}	Output Capacitance		--	85	--	pF
C _{res}	Reverse Transfer Capacitance		--	19	--	pF
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{CE} = 600 V, I _C = 25 A, R _G = 10 Ω,V _{GE} =15 V, Inductive Load	--	30	--	ns
t _r	Turn-On Rise Time		--	78	--	ns
t _{d(off)}	Turn-Off Delay Time		--	68	--	ns
t _f	Turn-Off Fall Time		--	109	--	ns
E _{on}	Turn-On Energy		--	2.3	--	mJ
E _{off}	Turn-off Energy		--	0.42	--	mJ
E _{ts}	Total Switching Energy		--	2.72	--	mJ
Q _g	Total Gate Charge	V _{CE} = 600 V, I _C =25 A, V _{GE} = 15 V	--	92	--	nC
Q _{ge}	Gate-Emitter Charge		--	31	--	nC
Q _{gc}	Gate-Collector Charge		--	30	--	nC
Anti-Parallel Diode Characteristics and Maximum Ratings						
V _F	Collector-Emitter Diode Forward Voltage	I _F =12.5A,T _C =25°C	--	2.1	2.8	V
		I _F =12.5A,T _C =125°C	--	1.9	--	V
t _{rr}	Diode Reverse Recovery Time	I _{EC} =10A	--	70	--	ns
Q _{rr}	Diode Reverse Recovery Charge	dI _{EC} /dt=100A/μs	--	121	--	nC

Notes:

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

Typical Performance Characteristics

Fig 1. Output Characteristic

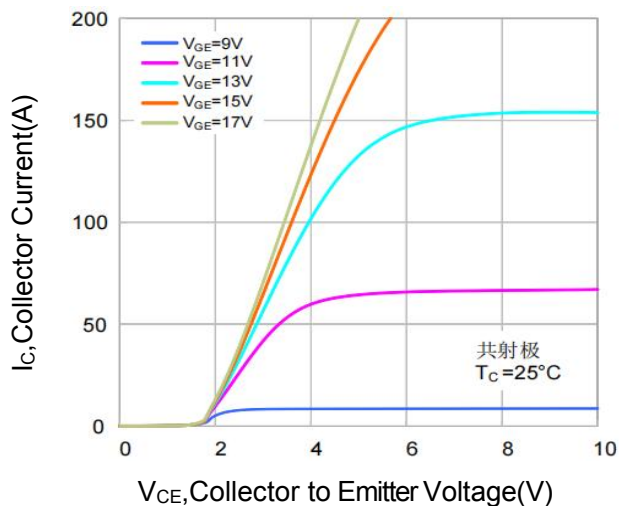


Fig 2. Output Characteristic

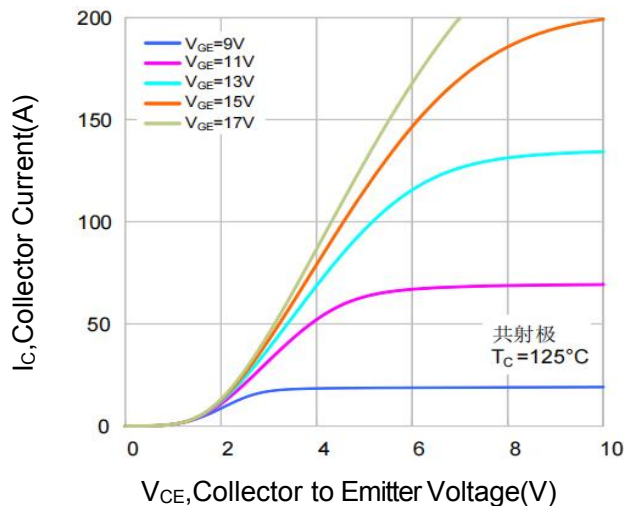


Fig 3. Saturation Voltage Characteristic

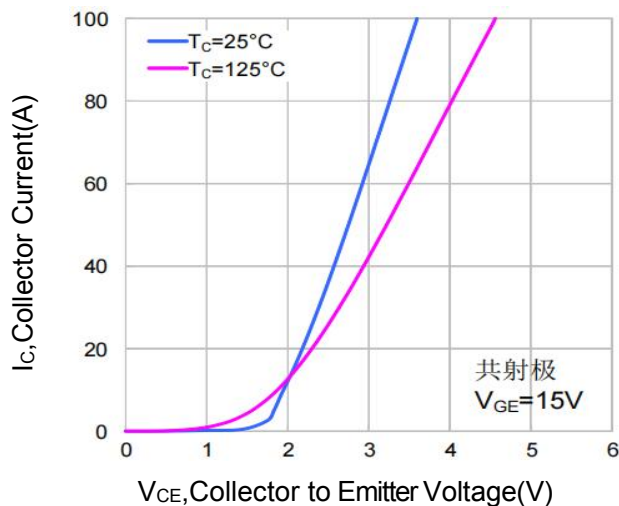


Fig 4. Transfer Characteristic

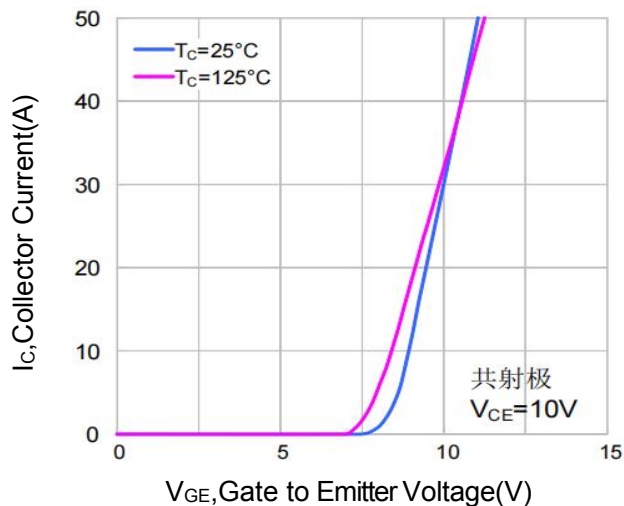


Fig 5. $V_{CE(sat)}$ vs. $V_{GE}(V)$

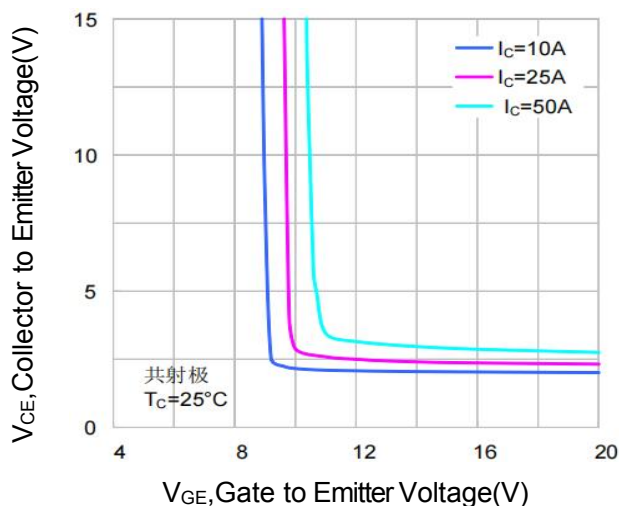


Fig 6. $V_{CE(sat)}$ vs. $V_{GE}(V)$

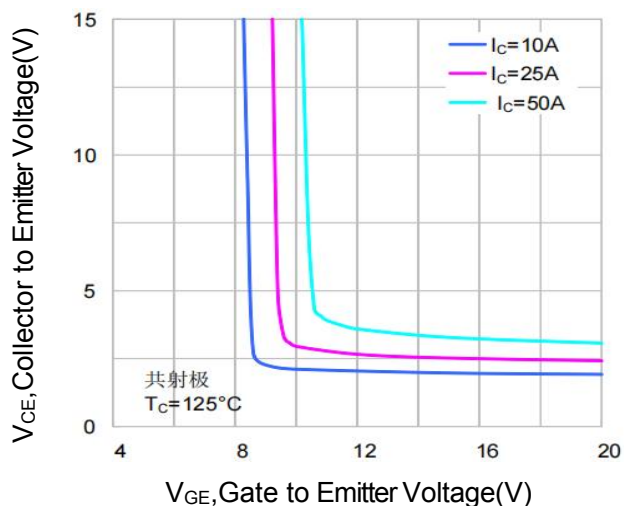


Fig 7. $V_{CE(sat)}$ vs. T_C

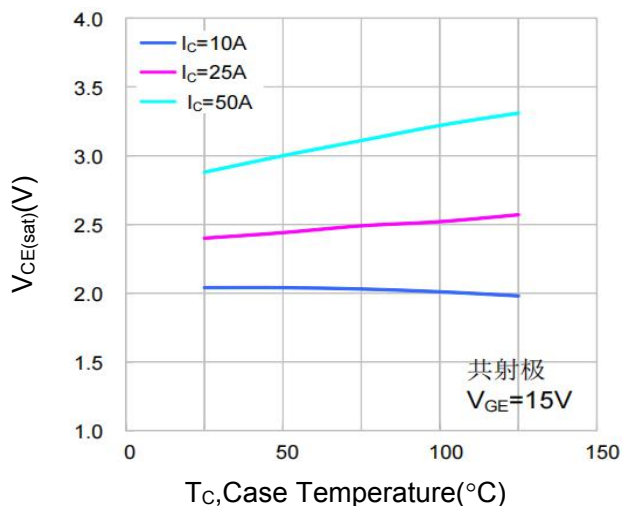


Fig 8. Capacitance Characteristic

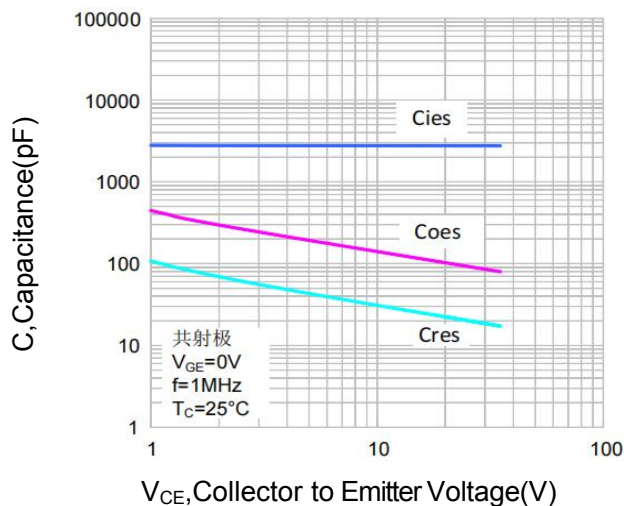


Fig 9. Gate Charge Characteristics

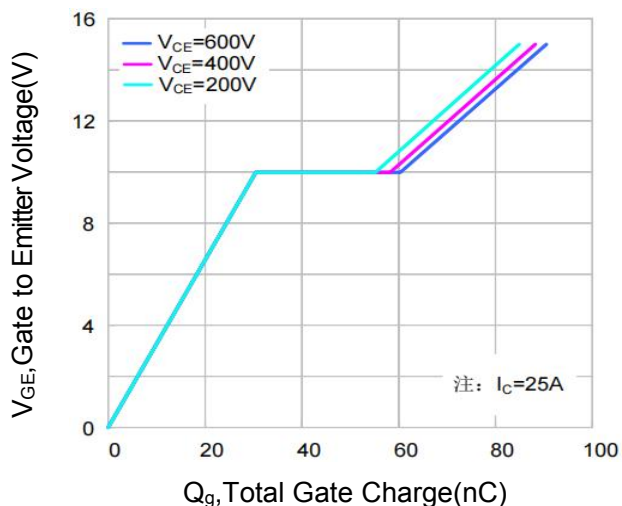


Fig 10. Switching Time vs. R_g

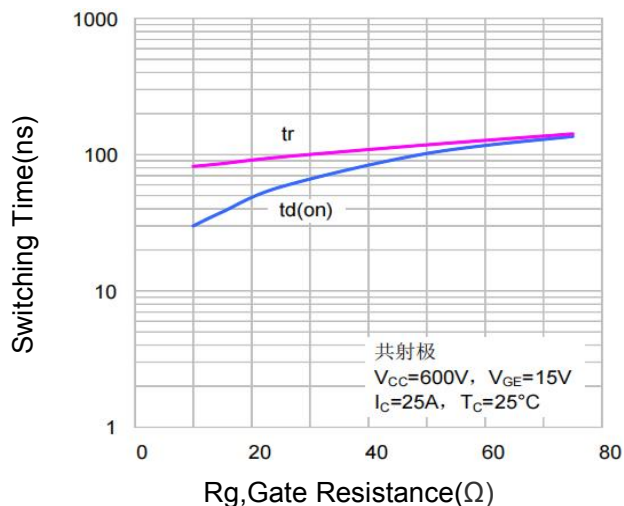


Fig 11. Switching Time vs. R_g

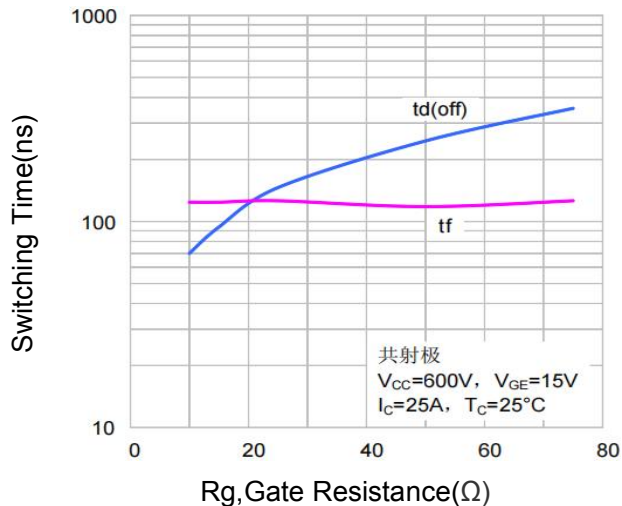


Fig 12. Switching Loss vs. R_g

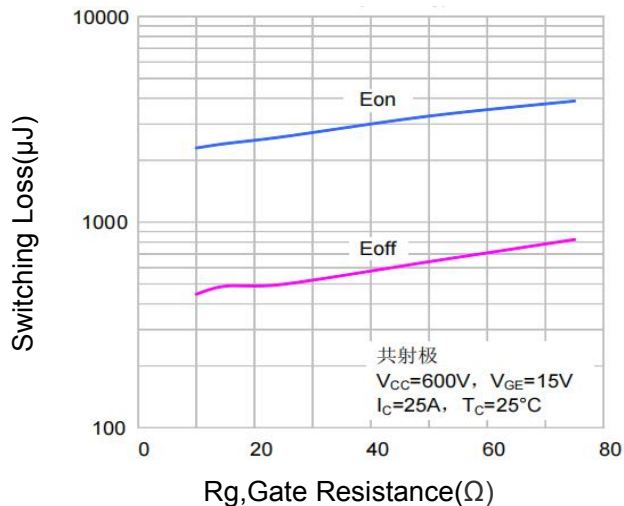


Fig 13. Switching Time vs. I_c

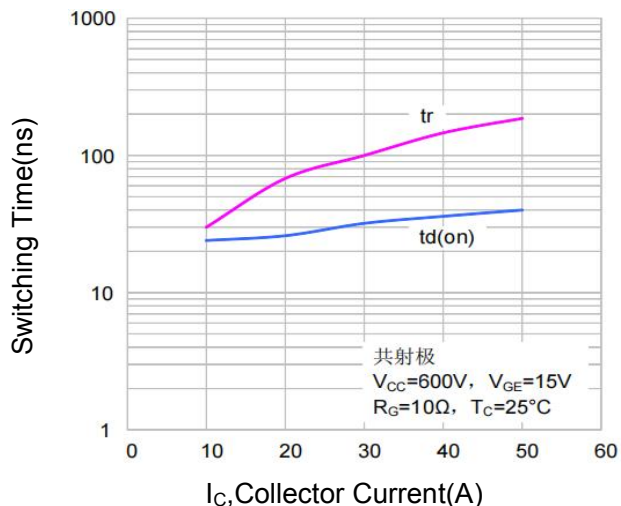


Fig 14. Switching Time vs. I_c

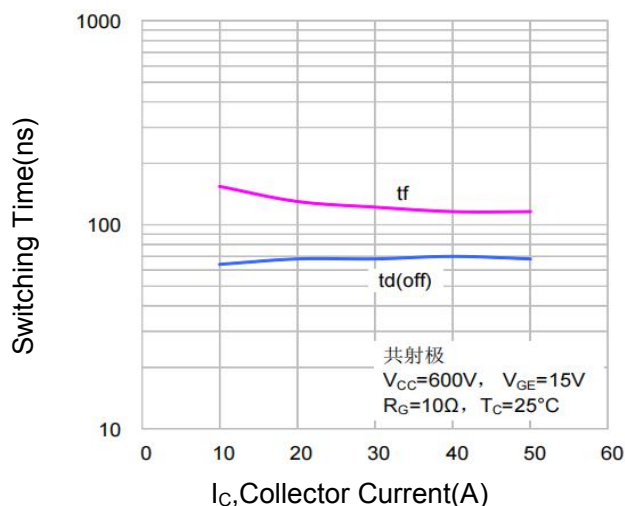


Fig 15. Switching Loss vs. I_c

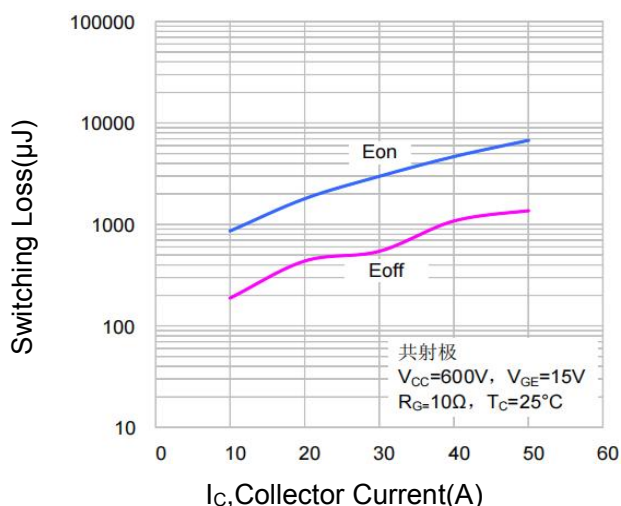


Fig 16. Diode Forward Characteristic

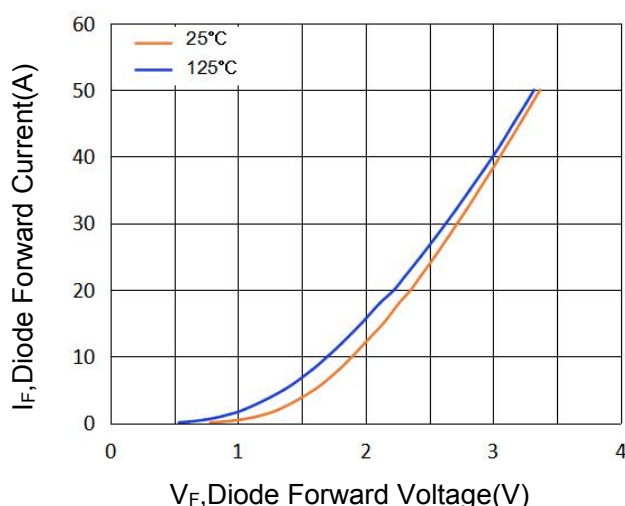


Fig 17. Safe Operating Area

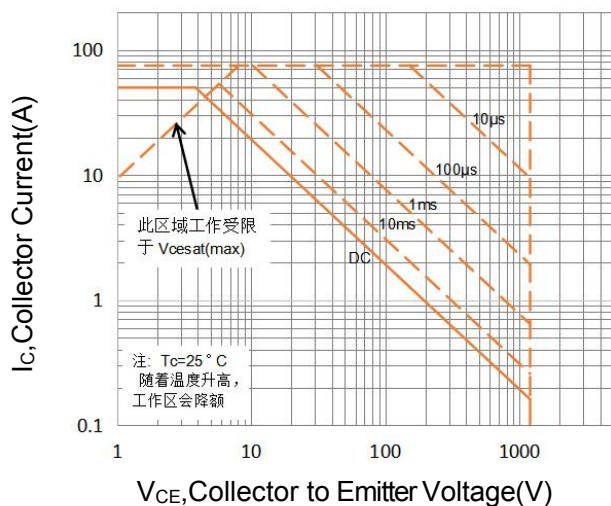
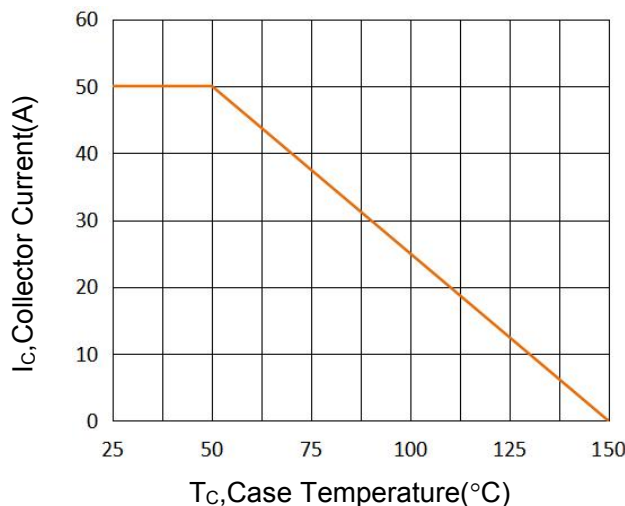


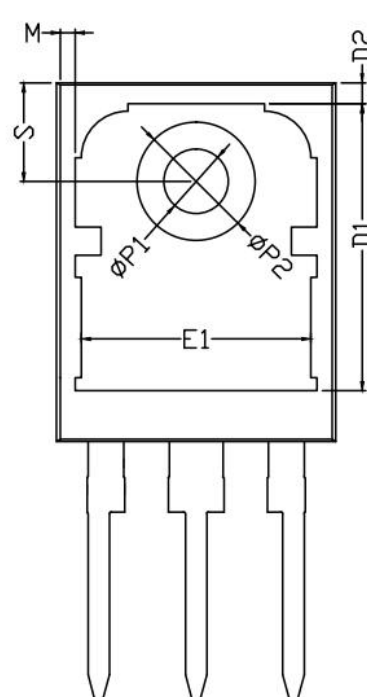
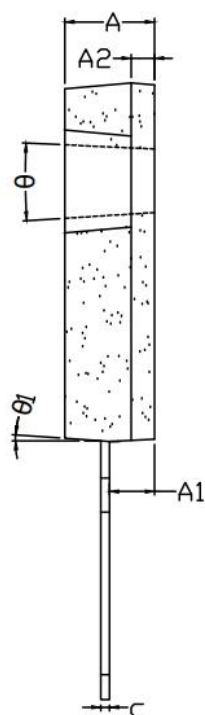
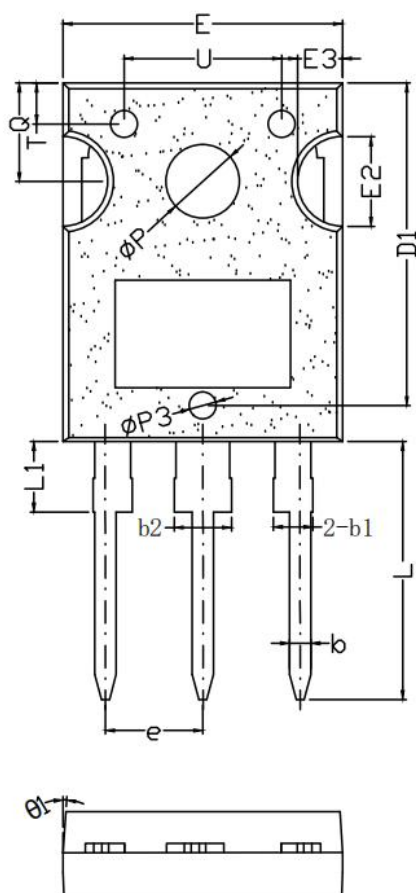
Fig 18. I_c vs T_C



TO-247S Package Dimensions

UNIT: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	4.80	5.00	5.20	e	5.44REF		
A1	2.30	2.50	2.70	L	12.90	14.40	15.90
A2	1.10	1.30	1.50	L1			4.30
b	1.10	1.20	1.30	ΦP	3.90	4.10	4.30
b1	1.90	2.10	2.30	ΦP1	3.40	3.60	3.80
b2	2.85	3.10	3.35	ΦP2	6.30	6.60	6.90
C	0.40	0.50	0.60	ΦP3	1.35	1.50	1.65
D	18.50	20.0	21.50	Q	5.00	5.50	6.00
D1	14.50	16.00	17.50	S	5.20	5.50	5.80
D2	1.00	1.15	1.30	T	2.10	2.30	2.50
E	14.10	15.60	17.10	U	8.30	8.80	9.30
E1	12.30	13.30	14.30	θ	3°	6°	9°
E2	4.80	5.00	5.20	θ 1	3°	6°	9°
E3	2.30	2.50	2.70				



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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	2023-11-20	首次发行