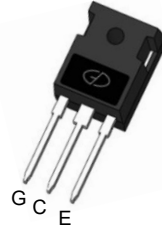


## 40A,1250V Insulated Gate Bipolar Transistor

### Features

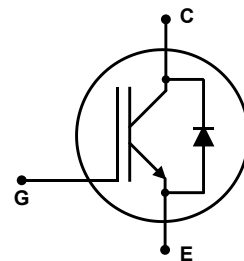
- Trench FS technology offering
- High speed switching
- Low gate charge and VCE(sat)
- High ruggedness, temperature stable behavior
- Maximum junction temperature 175°C



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### Applications

- Solar Inverters
- Uninterruptible power supplies
- Motor drives
- Air condition



<b>Absolute Maximum Ratings</b> (@T <sub>J</sub> =25°C unless otherwise noted)			
Parameter	Symbol	Ratings	Unit
Collector-Emitter Voltage	V <sub>CES</sub>	1250	V
Gate- Emitter Voltage	V <sub>GES</sub>	±30	V
Collector Current	I <sub>C</sub>	80	A
Collector Current @TC = 100 °C		40	
Pulsed Collector Current, tp limited by Tjmax	I <sub>Cpuls</sub>	160	A
Diode Continuous Forward Current @T <sub>C</sub> = 100 °C	I <sub>F</sub>	40	A
Diode Maximum Forward Current	I <sub>FM</sub>	160	
Power Dissipation @ TC = 25°C	P <sub>D</sub>	468	W
Power Dissipation @ TC = 100°C		234	W
Operating Junction	T <sub>J</sub>	-55 to +175	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +175	°C

<b>Thermal Characteristics</b>			
<b>Parameter</b>	<b>Symbol</b>	<b>Max</b>	<b>Unit</b>
Thermal Resistance ,Junction-to-Ambient	$R_{\theta JA}$	40	$^{\circ}C/W$
Thermal Resistance Junction-to-Case for IGBT	$R_{\theta JC}$	0.32	$^{\circ}C/W$
Thermal Resistance Junction-to-Case for Diode	$R_{\theta JC}$	0.61	$^{\circ}C/W$

Electrical Characteristics (@T <sub>j</sub> =25°C unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	V <sub>(BR)CES</sub>	V <sub>GE</sub> =0V, I <sub>CE</sub> =1mA	1250	--	--	V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =40A, V <sub>GE</sub> =15V	--	1.8	2	V
Gate Threshold Voltage	V <sub>GE(th)</sub>	I <sub>C</sub> =1.9mA, V <sub>CE</sub> =V <sub>GE</sub>	4.5	--	6	V
Collector-Emitter Leakage Current	I <sub>CES</sub>	V <sub>GE</sub> =0V, V <sub>CE</sub> =1200V	--	--	200	μA
Gate to Emitter Reverse Leakage	I <sub>GES</sub>	V <sub>GE</sub> =25V, V <sub>CE</sub> =0V	--	--	200	nA
		V <sub>GE</sub> =-25V, V <sub>CE</sub> =0V	--	--	-200	
Input capacitance	C <sub>ies</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 50V f = 1MHz	--	4700	--	pF
Output capacitance	C <sub>oes</sub>		--	106	--	
Reverse transfer capacitance	C <sub>res</sub>		--	66	--	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>CC</sub> =600V, V <sub>GE</sub> =0/15V, R <sub>g</sub> =10Ω, L <sub>σ</sub> =70nH, C <sub>σ</sub> =67pF	--	40	--	ns
Rise time	t <sub>r</sub>		--	23	--	
Turn-Off delay time	t <sub>d(off)</sub>		--	350	--	
Fall time	t <sub>f</sub>		--	50	--	
Turn-On Switching Loss	E <sub>on</sub>		--	2.2	--	mJ
Turn-Off Switching Loss	E <sub>off</sub>		--	1.8	--	
Total Switching Loss	E <sub>ts</sub>		--	4	--	
Total Gate Charge	Q <sub>g</sub>	V <sub>CC</sub> =480V, I <sub>C</sub> =40A, V <sub>GE</sub> =15V	--	238	--	nC
Gate to Emitter Charge	Q <sub>ge</sub>		--	40	--	
Gate to Collector Charge	Q <sub>gc</sub>		--	135	--	

Electrical Characteristics of the Diode (@T <sub>j</sub> =25°C unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Diode Forward Voltage	V <sub>FM</sub>	I <sub>F</sub> =40A, V <sub>GE</sub> =0V	--	2.3	3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =40A, di/dt=700A/μs,	--	320	--	ns
Reverse Recovery Charge	Q <sub>rr</sub>		--	2.6	--	μC
Diode Peak Reverse Recovery Current	I <sub>RRM</sub>		--	19	--	A

## Typical Electrical and Thermal Characteristics

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

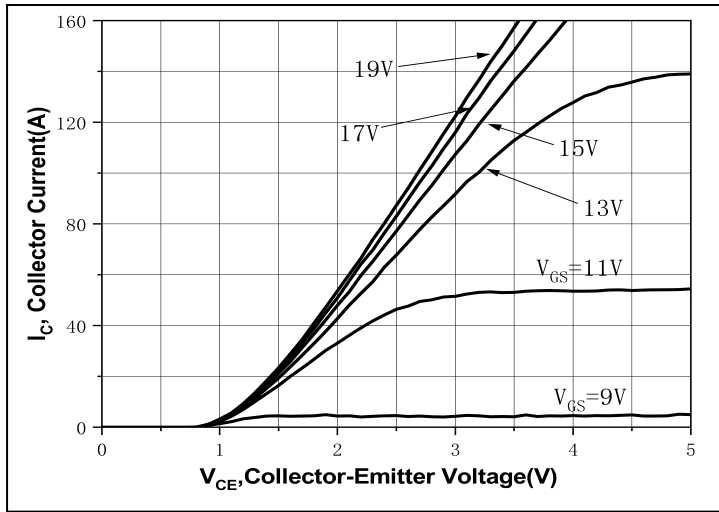


Figure1. Typical Output Characteristics

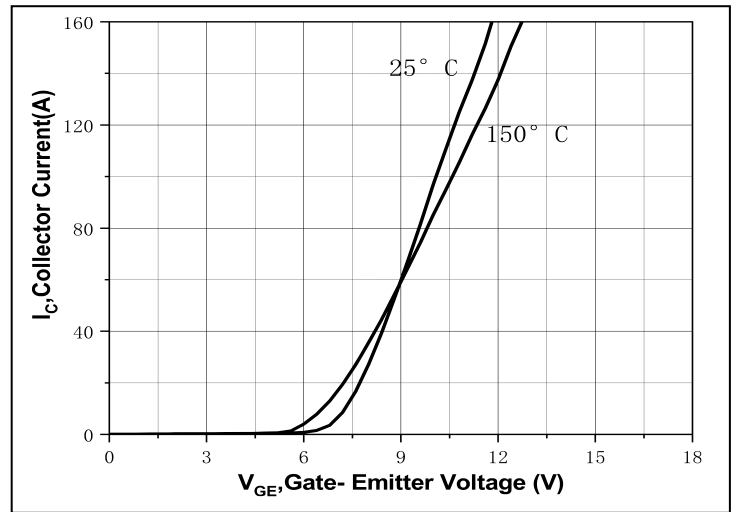


Figure2. Typical Transfer Characteristics

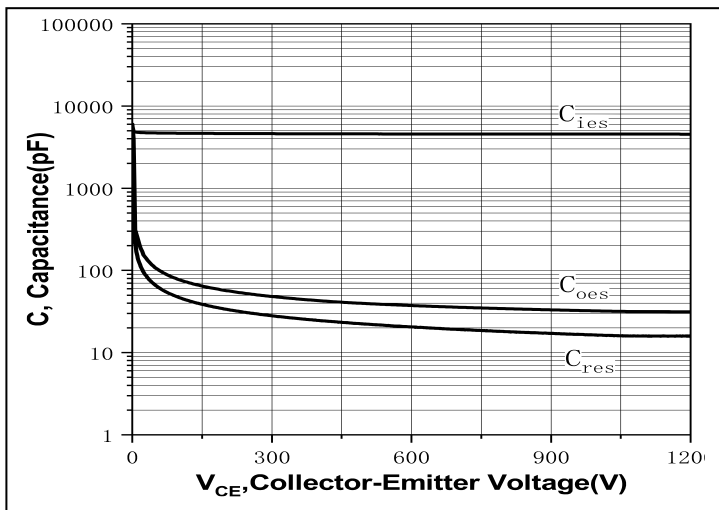


Figure3. Typical Capacitance

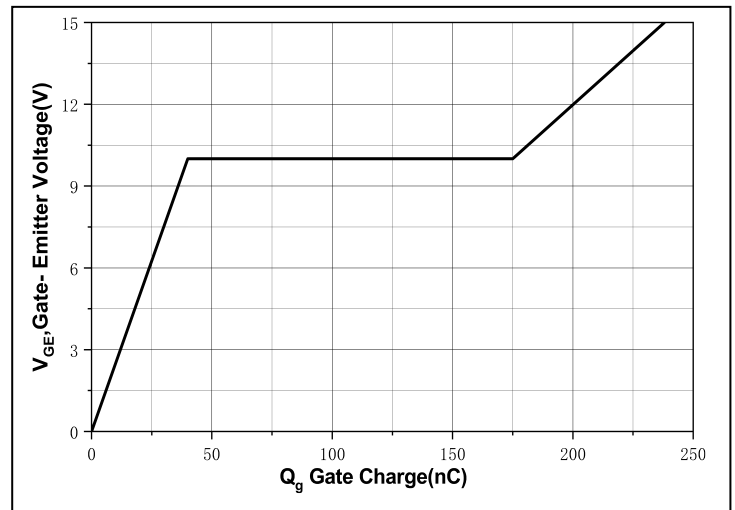


Figure4. Typical Gate Charge

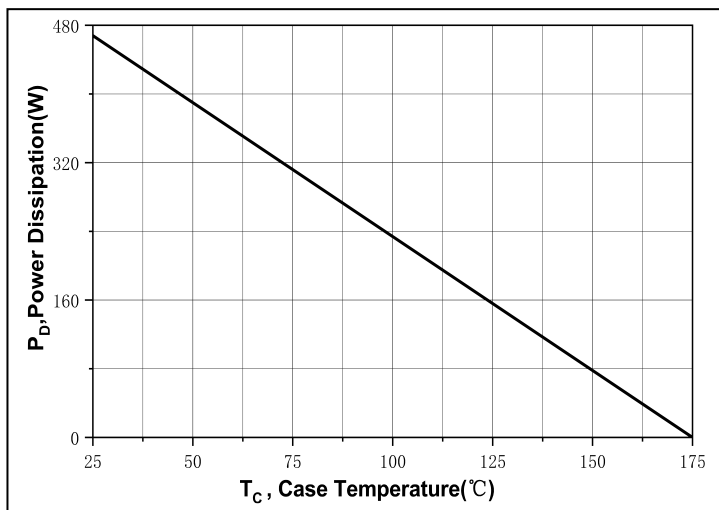


Figure5. Power Dissipation vs. Case Temperature

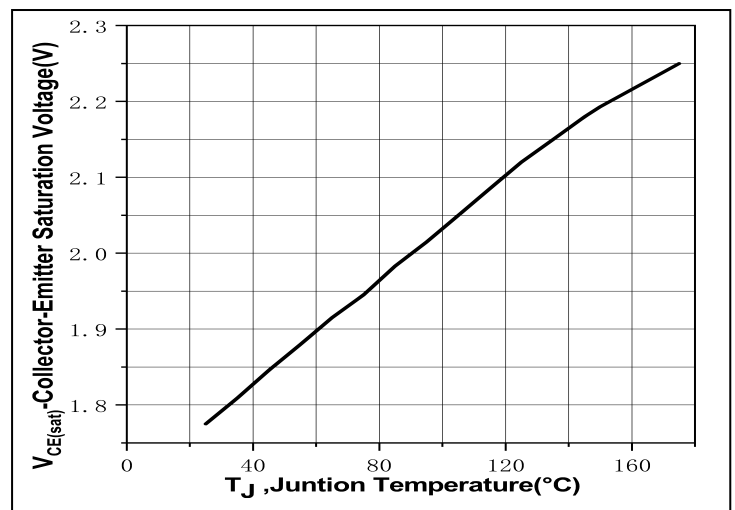


Figure6. Collector-Emitter Saturation Voltage vs. Temperature

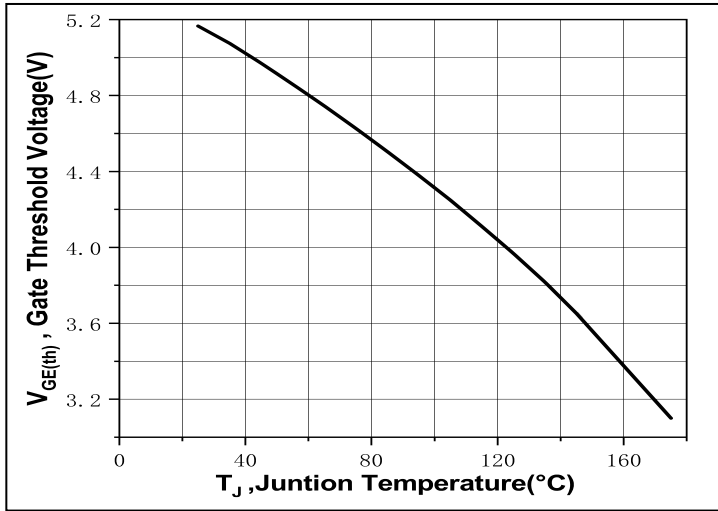


Figure7. Gate Threshold Voltage vs. Temperature

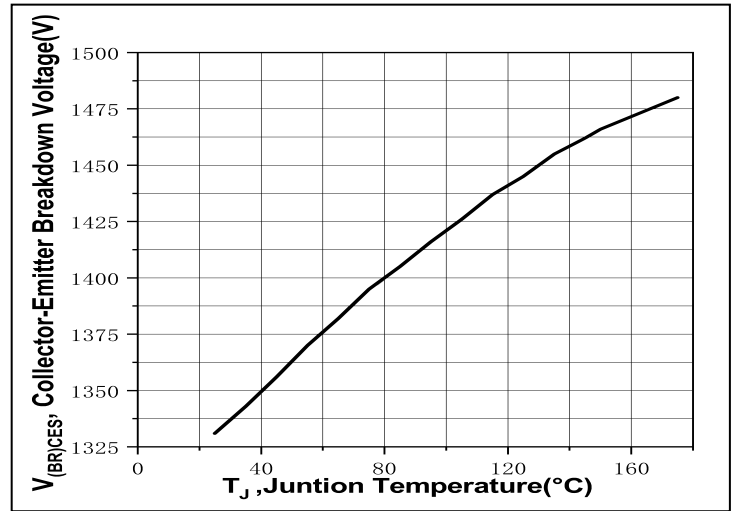
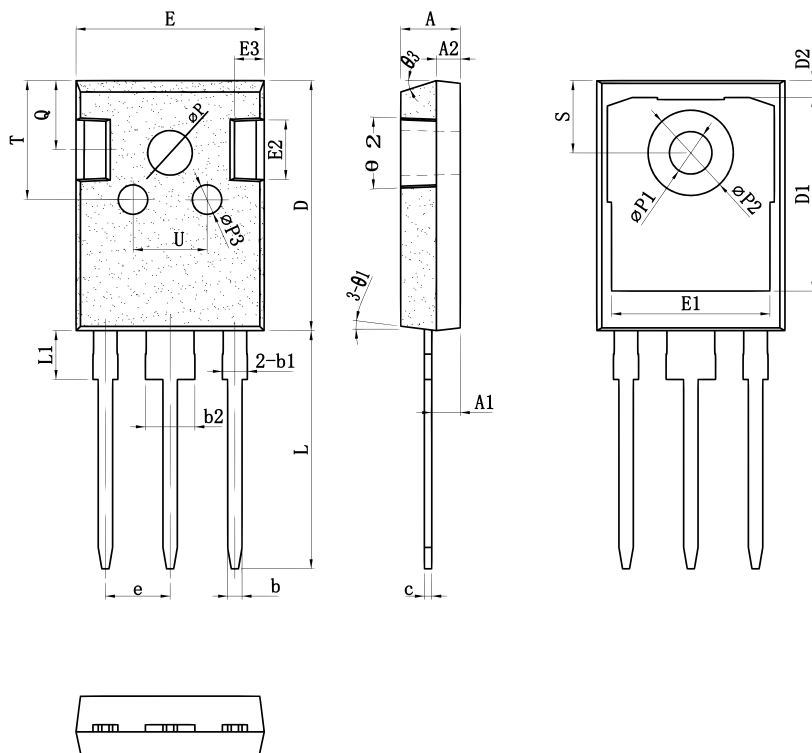


Figure8. Collector-Emitter Breakdown Voltage vs. Temperature

## Package Outline Dimensions (Unit: millimeters)

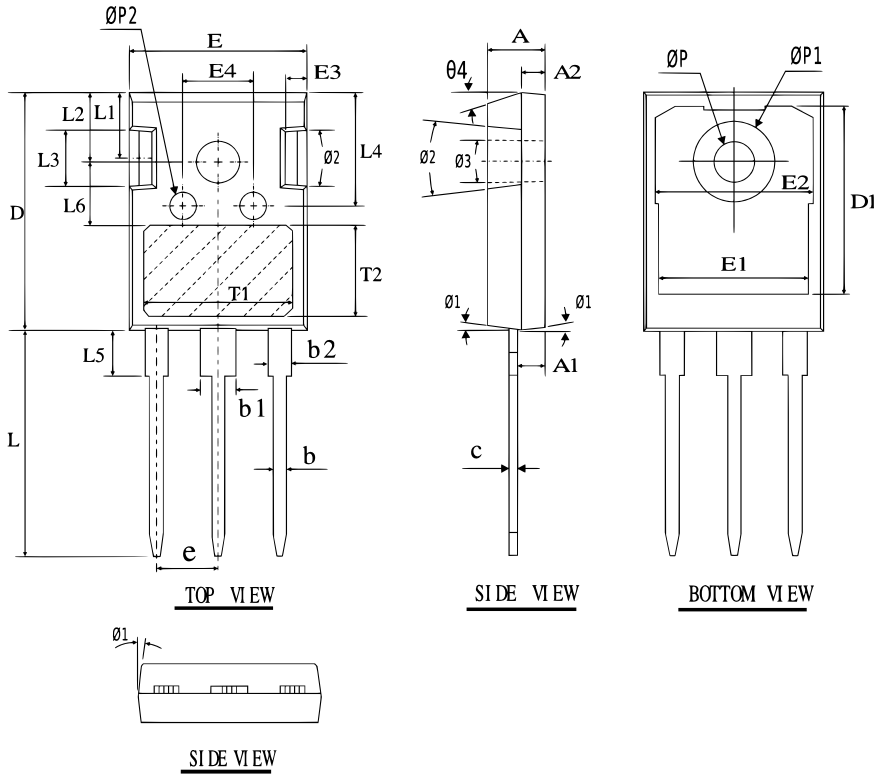
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Option B:



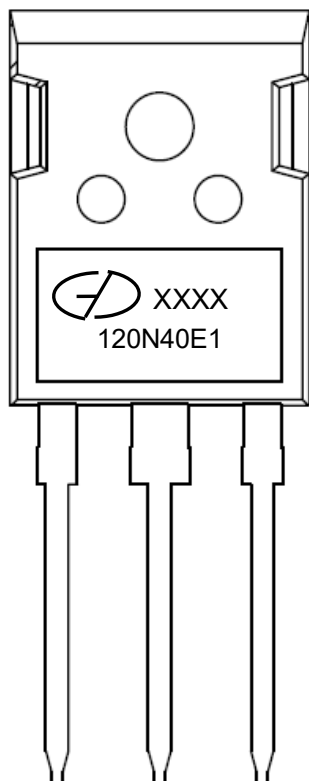
SYMBOL	mm		
	MIN	NOM	MAX
*A	4.90	5.00	5.10
*A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
*b	1.15	1.20	1.25
*b1	1.95	2.10	2.25
*b2	2.95	3.10	3.25
*C	0.55	0.60	0.65
*D	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.05	1.20	1.35
*E	15.70	15.80	15.90
E1	13.10	13.25	13.40
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
*e	5.40	5.44	5.48
*L	19.80	19.98	20.15
*L1	-	-	4.30
* $\phi P$	3.60	3.70	3.80
* $\phi P1$	3.45	3.55	3.65
$\phi P2$	7.03	7.18	7.33
$\phi P3$	2.40	2.50	2.60
Q	5.60	5.80	6.00
*S	6.05	6.15	6.25
T	9.80	10.00	10.20
U	6.00	6.20	6.40
$\theta 1$	5°	7°	9°
$\theta 2$	1°	3°	5°
$\theta 3$	13°	15°	17°

### Option H:




SYMBOL	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.20	2.40	2.60
A2	1.85	2.00	2.15
b	1.10	1.20	1.30
b1	2.80	3.00	3.20
b2	1.80	2.00	2.20
C	0.52	0.62	0.72
D	20.35	20.65	20.95
D1	16.35	16.55	16.75
E	15.50	15.80	16.10
E1	13.10	13.30	13.50
E2	13.80	14.00	14.20
E3	1.45	1.60	1.75
E4	6.00	6.20	6.40
L	19.80	20.00	20.20
L1	5.88	5.98	6.08
L2	5.88	5.98	6.08
L3	4.90	5.00	5.10
L4	9.70	9.80	9.90
L5	4.10	4.30	4.50
theta1	4°	7°	10°
theta2	11°	14°	17°
theta3	1°	-	2°
theta4	10°	15°	20°
phi P	3.35	3.60	3.85
phi P1	-	-	7.30
phi P2	2.25	2.50	2.75
e	5.44BSC		
T1	12.80REF		
T2	7.80REF		
L6	5.50REF		

## Marking Outline



Part Name: GIT120N40E1

1. Logo Mark: 
2. P/N Mark: 120N40E1
3. Date Code: XXXX

## Revision History

Version	Date	Major Changes
Rev.A	2025.01.07	Official Release



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