

Description

The GP40N120FTD is use advanced field stop(FS) technology.
The 1200V FS IGBT offers superior conduction and switching performances.



Features

- 1200V Breakdown Voltage
- Low saturation voltage: $V_{CE(sat), typ} = 2.0V$
@ $I_c = 40A$ and $T_c = 25^\circ C$
- FS Planar Technology, Positive temperature coefficient
- High speed switch & Low power loss

Product Summary		
$V_{CES}(V)$	$V_{CESAT}(V)_{Typ}$	$I_c(A)$
1200	2.0 @ 15V, 40A	40

Mechanical Data

- Case: TO-247 Package

Application

- Solar Converters
- Welding Converters
- UPS

T0-247
GP40N120FTD



Block Diagram

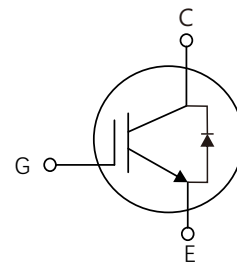


Table1 Absolute Maximum Ratings ($T_c = 25^\circ C$, unless otherwise specified)

Parameters	Symbol	Value	Unit
Collector-Emmitter Voltage	V_{CES}	1200	V
Gate-Emmitter Voltage	V_{GES}	± 30	V
Collector Current-continuous	I_c	$T_c = 25^\circ C$	65
		$T_c = 100^\circ C$	40
Collector Current – pulse (Note 1)	I_{CM}	130	A
Power Dissipation	P_D	$T_c = 25^\circ C$	280
		$T_c = 100^\circ C$	140
Operating Junction Temperature	T_J	-55 ~ +175	$^\circ C$
Storage Temperature Range	T_{STG}	-55 ~ +175	

Table 2. Thermal Characteristics

Parameters	Symbol	Value	Unit
IGBT Thermal resistance Junction to Ambient	$R_{\theta JA}$	40	$^{\circ}\text{C}/\text{W}$
IGBT Thermal resistance Junction to Case	$R_{\theta JC}$	0.446	$^{\circ}\text{C}/\text{W}$
Diode Thermal resistance Junction to Case	$R_{\theta JC}$	1.25	$^{\circ}\text{C}/\text{W}$

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Collector-Emmitter Voltage	V_{CES}	$V_{GE}=0\text{V}, I_C=250\mu\text{A}$	1200			V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}$			20	μA
Gate-body Leakage Current	Forward	I_{GES} $V_{GS}=30\text{V}, V_{DS}=0\text{V}$ $V_{GS}=-30\text{V}, V_{DS}=0\text{V}$			800	nA
	Reverse				-800	nA
On Characteristics						
Gate Threshold Voltage	$V_{GE(TH)}$	$V_{CE}=V_{GE}, I_C=1\text{mA}$	4.8	5.3	6.0	V
Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15\text{V}, I_C=40\text{A}$ $T_J=25^{\circ}\text{C}$		2.0	2.5	V
Dynamic Characteristics						
Input Capacitance	C_{IES}	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		3750		pF
Output Capacitance	C_{OES}			200		pF
Reverse Transfer Capacitance	C_{RES}			51		pF
Switching Characteristics						
Turn-On Delay Time	$t_d(\text{on})$	$V_{CE}=600\text{V}, I_C=40\text{A},$ $V_{GE}=15\text{V}, R_G=10\Omega,$		60		ns
Turn-On Rise Time	t_r			140		ns
Turn-Off Delay Time	$t_d(\text{off})$			320		ns
Turn-Off Fall Time	t_f			251		ns
Total Gate Charge	Q_G	$V_{CE}=600\text{V}, I_C=40\text{A},$ $V_{GE}=15\text{V}$		220		nC
Gate to emitter charge	Q_{GE}					nC
Gate to collector charge	Q_{GC}					nC
Diode Characteristics						
Diode Continuous Forward Current	I_F	$T_C=100^{\circ}\text{C}$		40		A
Diode Continuous Forward Current	I_{FM}	$T_C=100^{\circ}\text{C}$		200		A
Diode Forward Voltage	V_F	$I_F=20\text{A}$		1.75	2.15	V
Reverse Recovery Time	T_{rr}	$I_F=20\text{A}, T_J=25^{\circ}\text{C}$ $di/dt=200\text{A}/\mu\text{S}$		95		ns
Reverse Recovery Charge	Q_{rr}			1.1		nC

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature

Typical Characteristics Diagrams

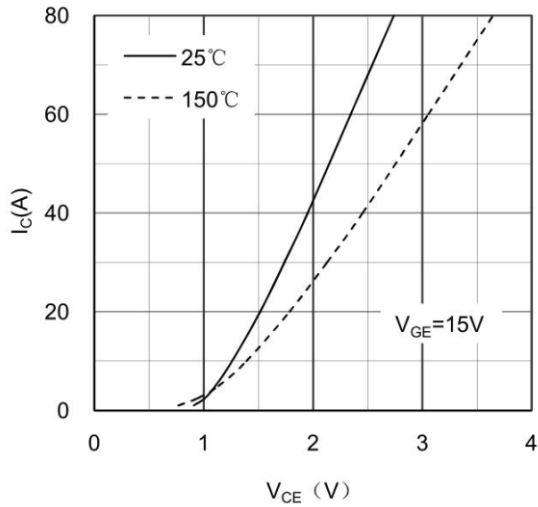


Figure 1. Typical Output Characteristics IGBT

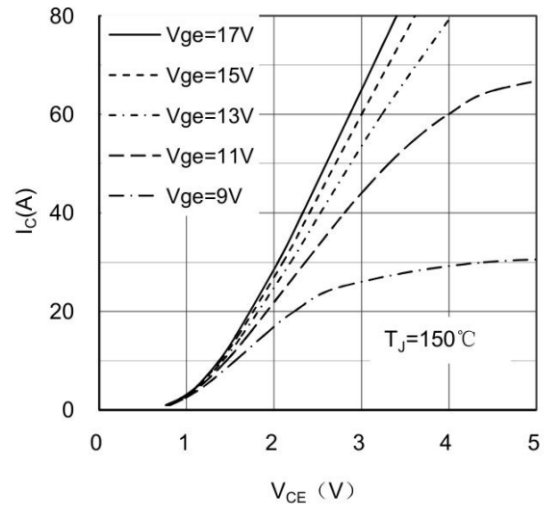


Figure 2. Typical Output Characteristics IGBT

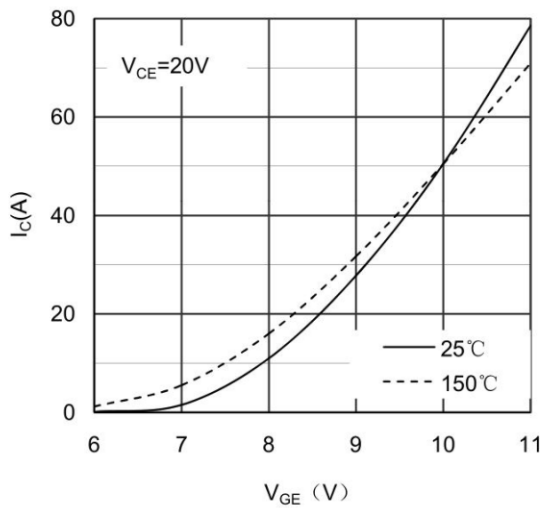


Figure 3. Typical Transfer characteristics IGBT

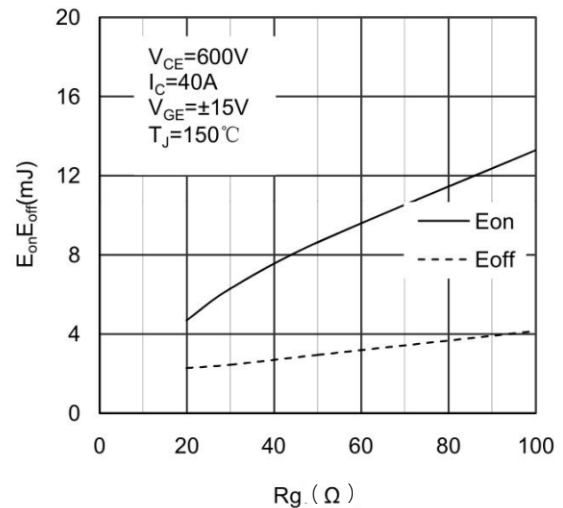


Figure 4. Switching Energy vs Gate Resistor IGBT

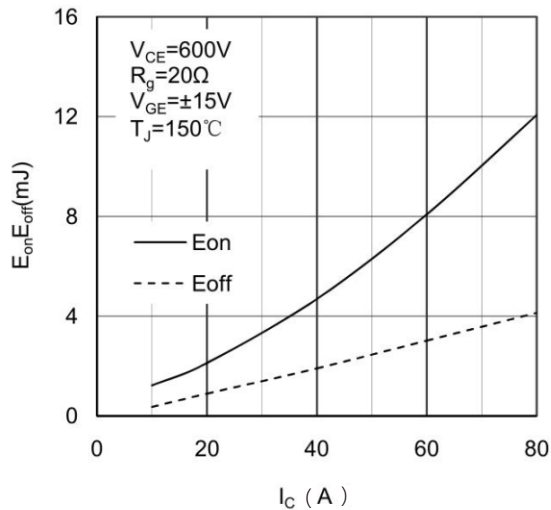


Figure 5. Switching Energy vs Collector Current IGBT

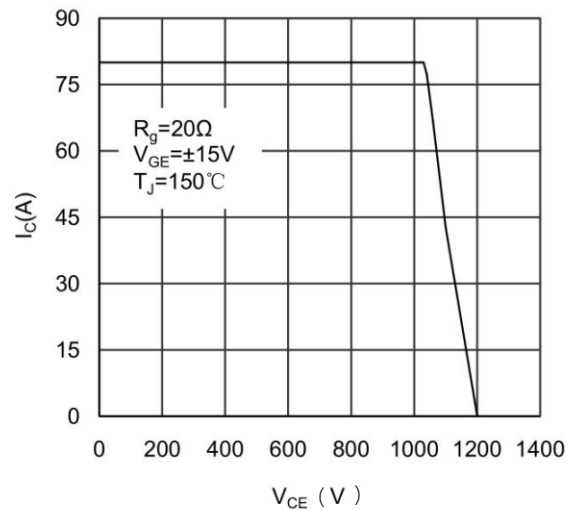


Figure 6. Reverse Biased Safe Operating Area IGBT

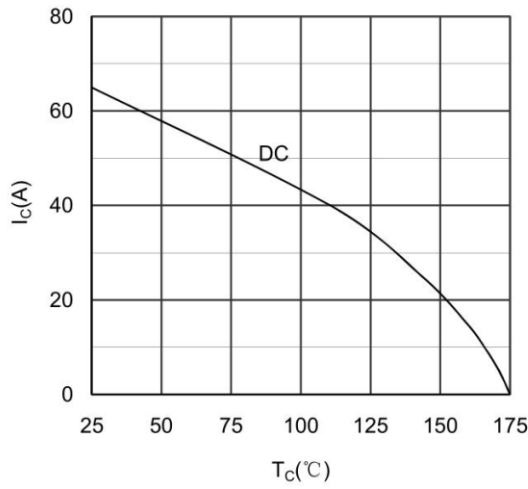


Figure 7. Collector Current vs Case temperature IGBT

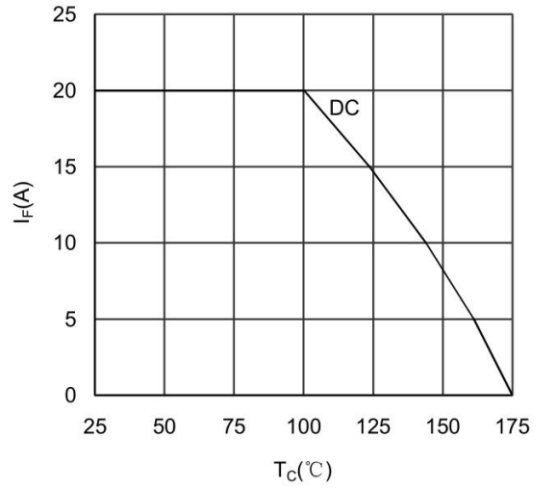


Figure 8. Forward current vs Case temperature Diode

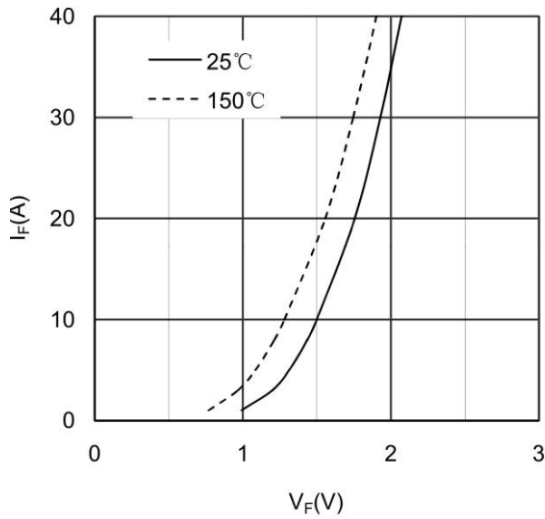


Figure 9. Diode Forward Characteristics Diode

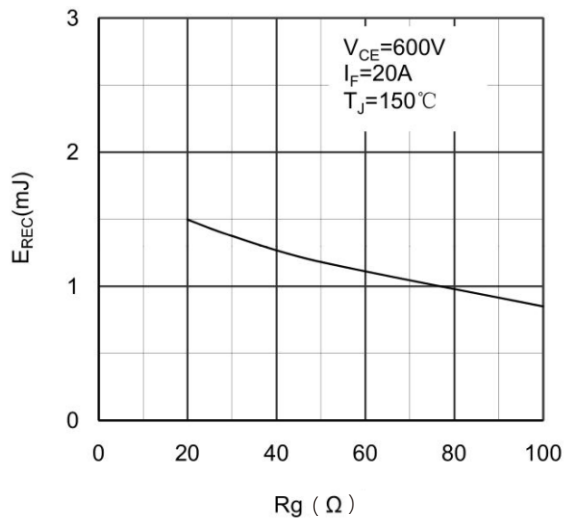


Figure 10. Switching Energy vs Gate Resistor Diode

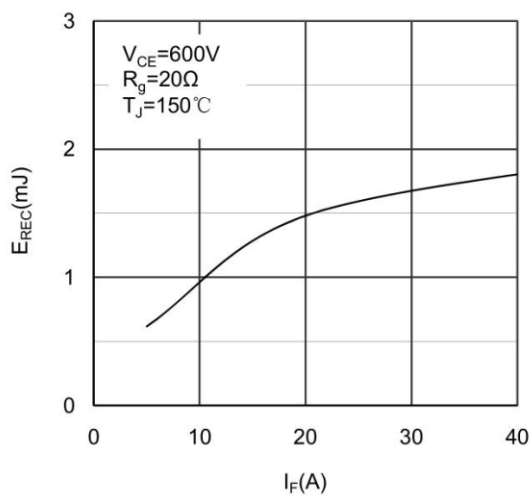


Figure 11. Switching Energy vs Forward Current Diode

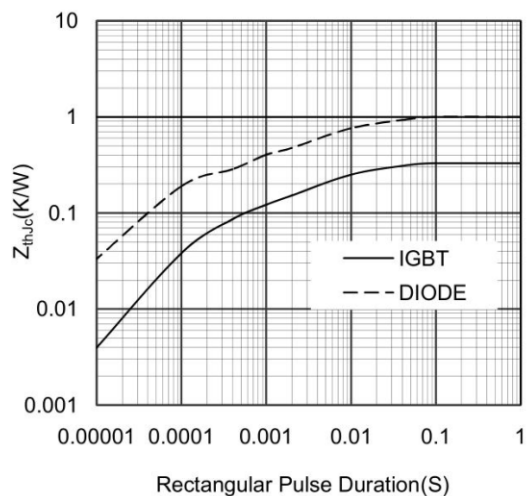
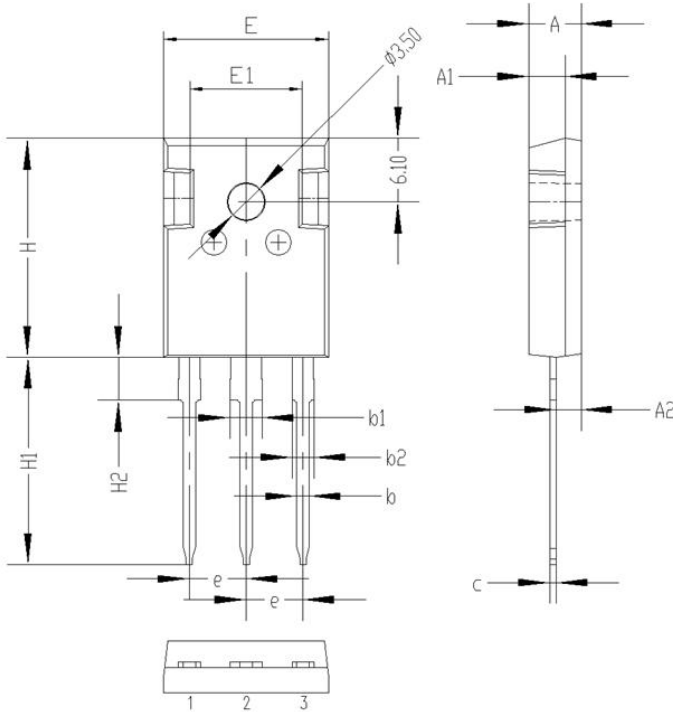


Figure 12. Transient Thermal Impedance of Diode and IGBT

Dimensions

TO-247 PACKAGE



Symbol	Dimensions (millimeters)	
	Min.	Max.
A	4.80	5.20
A1	3.30	3.70
A2	2.10	2.50
b	1.00	1.40
b1	2.90	3.30
b2	1.90	2.30
c	0.40	0.80
e	5.25	5.65
E	15.6	16.0
E1	10.6	11.6
H	20.8	21.2
H1	19.4	20.4
H2	3.90	4.30
G	5.90	6.30
ΦP	3.30	3.70

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