FAIRCHILD SEMICONDUCTOR®

July 2007

FGL40N120AN
1200V NPT IGBT

Features

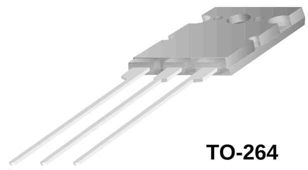
- High speed switching
- Low saturation voltage : $V_{CE(sat)}$ = 2.6 V @ I_C = 40A
- High input impedance

Applications

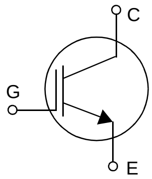
Induction Heating, UPS, AC & DC motor controls and general purpose inverters.

Description

Employing NPT technology, Fairchild's AN series of IGBTs provides low conduction and switching losses. The AN series offers an solution for application such as induction heating (IH), motor control, general purpose inverters and uninterruptible power supplies (UPS).



TO-264



Absolute Maximum Ratings

Symbol	Parameter		FGL40N120AN	Units
V_{CES}	Collector-Emitter Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		±25	V
I_C	Collector Current	@T_C = 25°C	64	A
	Collector Current	@T_C = 100°C	40	A
$I_{CM(1)}$	Pulsed Collector Current		160	A
P_D	Maximum Power Dissipation	@T_C = 25°C	500	W
	Maximum Power Dissipation	@T_C = 100°C	200	W
SCWT	Short Circuit Withstand Time, V_{CE} = 600V, V_{GE} = 15V, T_C = 125°C		10	μs
T_J	Operating Junction Temperature		-55 to +150	°C
T_{STG}	Storage Temperature Range		-55 to +150	°C
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8" from Case for 5 seconds		300	°C

Notes:

(1) Pulse width limited by max. junction temperature

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$(IGBT)	Thermal Resistance, Junction-to-Case	--	0.25	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	25	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FGL40N120AN	FGL40N120AN	TO-264	-	-	25

Electrical Characteristics of the IGBT T_C = 25°C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 1mA	1200	--	--	V
$BV_{CES}/\Delta T_J$	Temperature Coefficient of Breakdown Voltage	V_{GE} = 0V, I_C = 1mA	--	0.6	--	V/°C
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}$, V_{GE} = 0V	--	--	1	mA
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}$, V_{CE} = 0V	--	--	±250	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	I_C = 250μA, $V_{CE} = V_{GE}$	3.5	5.5	7.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 40A, V_{GE} = 15V	--	2.6	3.2	V
		I_C = 40A, V_{GE} = 15V, T_C = 125°C	--	2.9	--	V
		I_C = 64A, V_{GE} = 15V	--	3.15	--	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V f = 1MHz	--	3200	--	pF
C_{oes}	Output Capacitance		--	370	--	pF
c_{res}	Reverse Transfer Capacitance		--	125	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 600V, I_C = 40A, R_G = 5Ω, V_{GE} = 15V, Inductive Load, T_C = 25°C	--	15	--	ns
t_r	Rise Time		--	20	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	110	--	ns
t_f	Fall Time		--	40	80	ns
E_{on}	Turn-On Switching Loss		--	2.3	3.45	mJ
E_{off}	Turn-Off Switching Loss		--	1.1	1.65	mJ
E_{ts}	Total Switching Loss		--	3.4	5.1	mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 600V, I_C = 40A, R_G = 5Ω, V_{GE} = 15V, Inductive Load, T_C = 125°C	--	20	--	ns
t_r	Rise Time		--	25	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	120	--	ns
t_f	Fall Time		--	45	--	ns
E_{on}	Turn-On Switching Loss		--	2.5	--	mJ
E_{off}	Turn-Off Switching Loss		--	1.8	--	mJ
E_{ts}	Total Switching Loss		--	4.3	--	mJ
Q_g	Total Gate charge	V_{CE} = 600V, I_C = 40A, V_{GE} = 15V	--	220	330	nC
Q_{ge}	Gate-Emitter Charge		--	25	38	nC
Q_{gc}	Gate-Collector Charge		--	130	195	nC

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

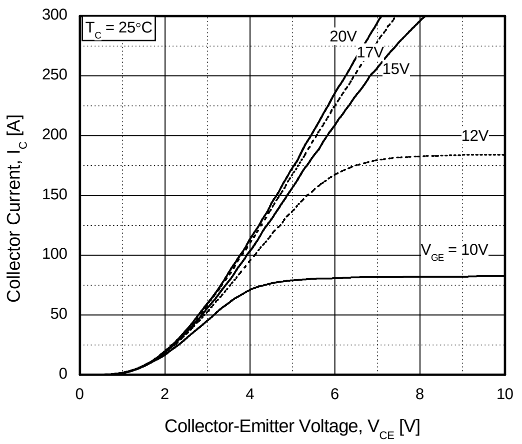


Figure 2. Typical Saturation Voltage Characteristics

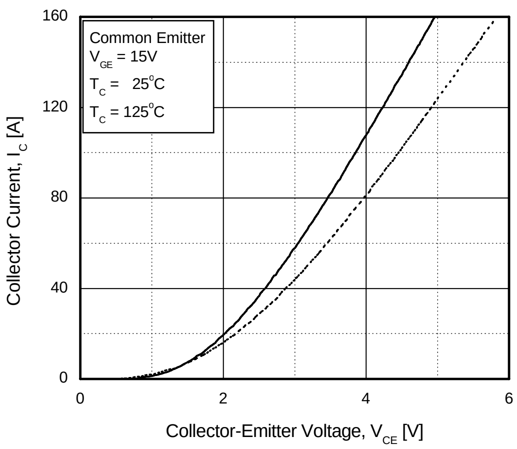


Figure 3. Saturation Voltage vs. Case Temperature at Variant Current Level

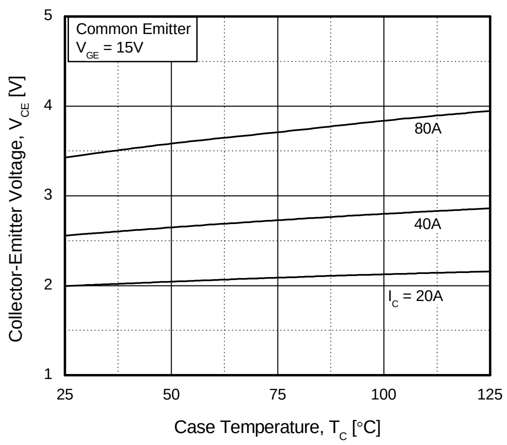


Figure 4. Load Current vs. Frequency

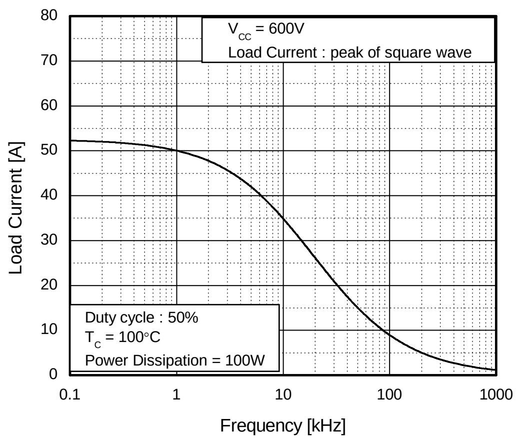


Figure 5. Saturation Voltage vs. V_{GE}

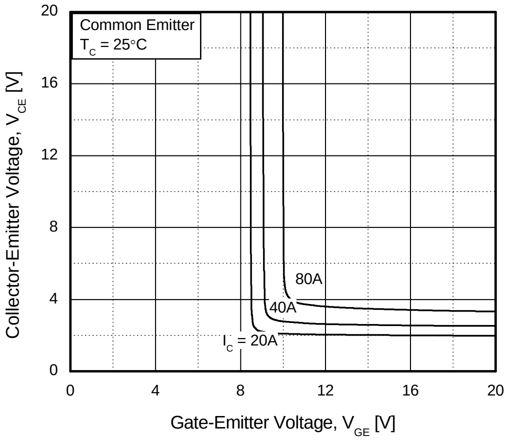
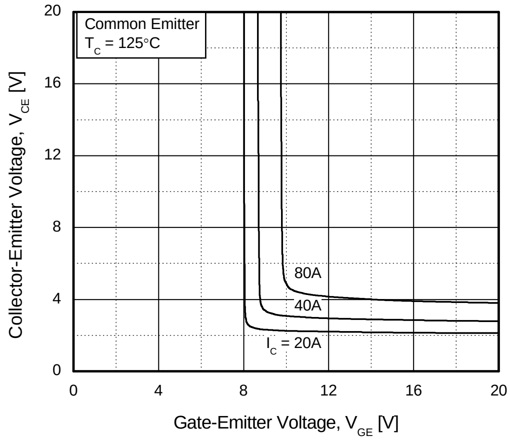


Figure 6. Saturation Voltage vs. V_{GE}



Typical Performance Characteristics (Continued)

Figure 7. Capacitance Characteristics

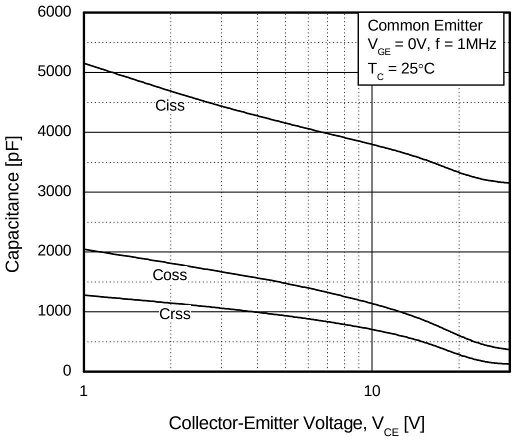


Figure 8. Turn-On Characteristics vs. Gate Resistance

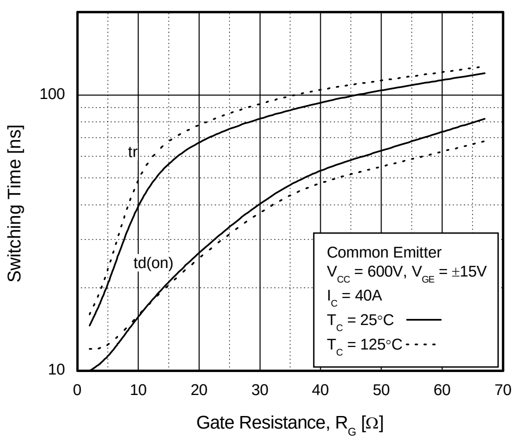


Figure 9. Turn-Off Characteristics vs. Gate Resistance

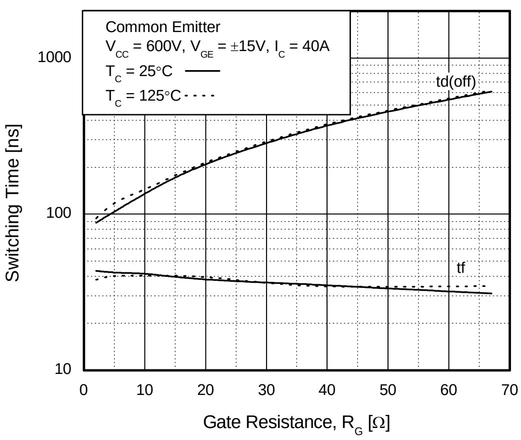


Figure 10. Switching Loss vs. Gate Resistance

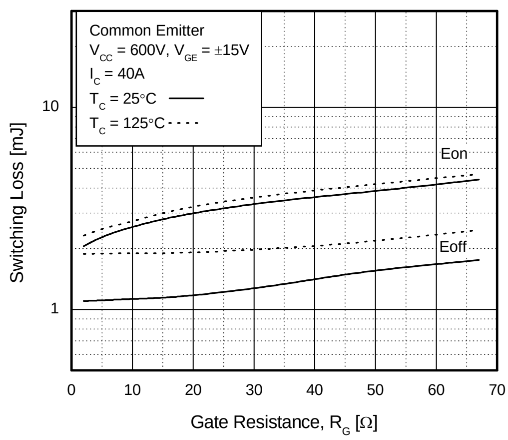


Figure 11. Turn-On Characteristics vs. Collector Current

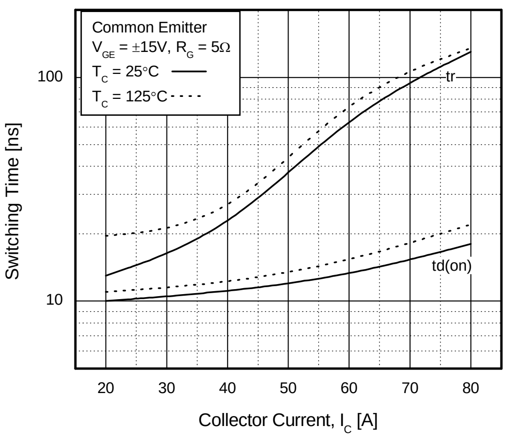
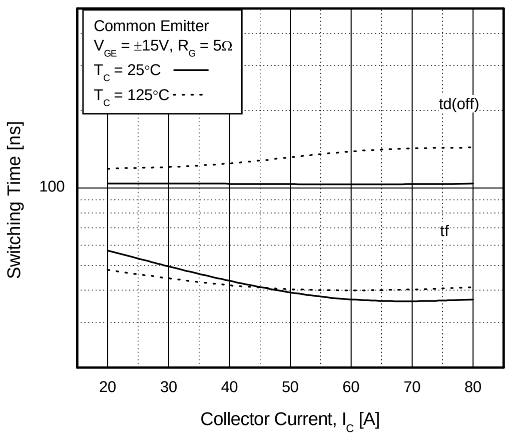


Figure 12. Turn-Off Characteristics vs. Collector Current



Typical Performance Characteristics (Continued)

Figure 13. Switching Loss vs. Collector Current

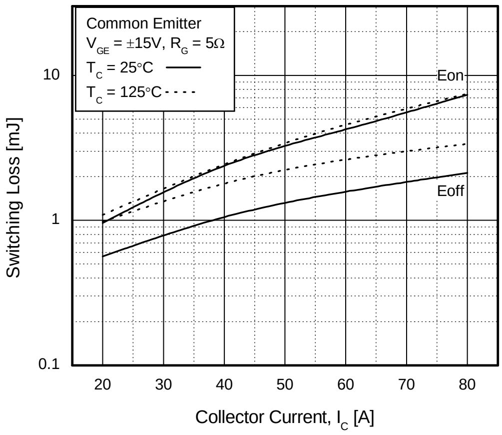


Figure 14. Gate Charge Characteristics

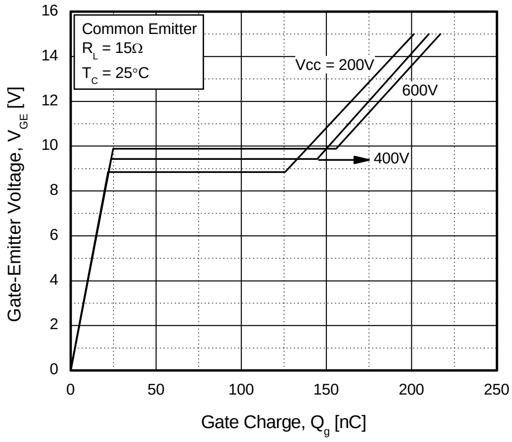


Figure 15. SOA Characteristics

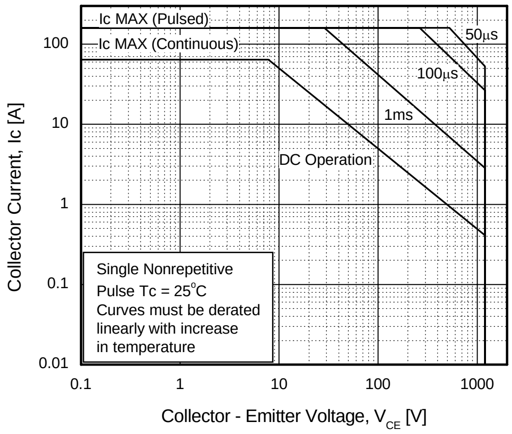


Figure 16. Turn-Off SOA

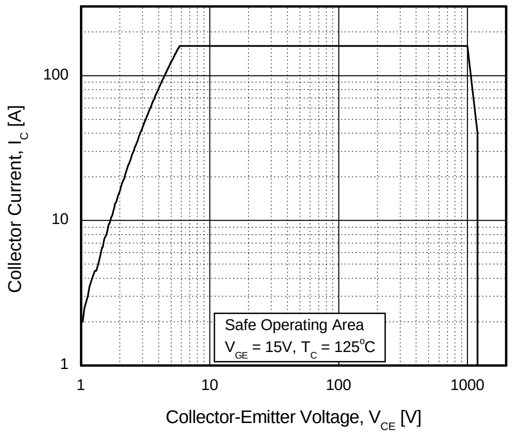
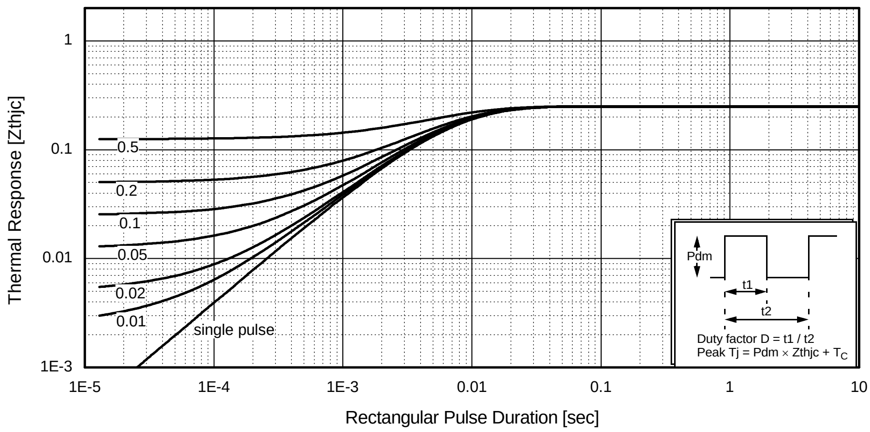
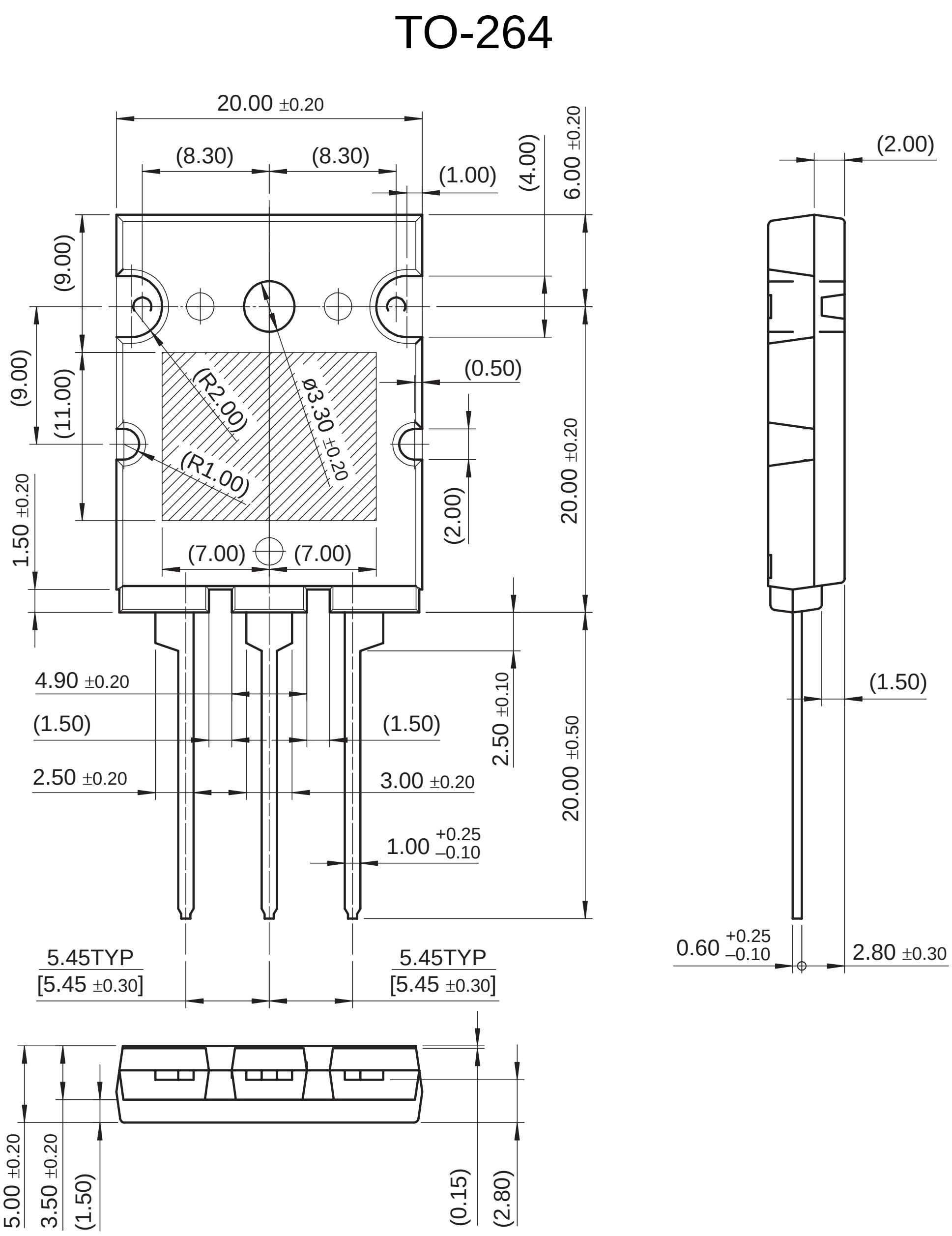


Figure 17. Transient Thermal Impedance of IGBT



Mechanical Dimensions



Dimensions in Millimeters

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PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild Semiconductor. The datasheet is printed for reference information only.

Rev. I29

FGL40N120AN

1200V NPT IGBT

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General description

Employing NPT technology, Fairchild's AN series of IGBTs provides low conduction and switching losses. The AN series offers an solution for application such as induction heating (IH), motor control, general purpose inverters and uninterruptible power supplies (UPS).

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Features

- High speed switching
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- High input impedance

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Applications

Induction Heating, UPS, AC & DC motor controls and general purpose inverters.

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Product status/pricing/packaging

BUY

Product	Product status	Pb-free Status	Pricing*	Package type	Leads	Packing method	Package Marking Convention**

FGL40N120ANTU	Full Production	Full Production	$10.78	TO-264	3	RAIL	Line 1: **$Y** (Fairchild logo) &**Z** (Asm. Plant Code) &E Line 2: FGL40N120 Line 3: AN &3

* Fairchild 1,000 piece Budgetary Pricing
** A sample button will appear if the part is available through Fairchild's on-line samples program. If there is no sample button, please contact a Fairchild distributor to obtain samples

Indicates product with Pb-free second-level interconnect. For more information click here.

Package marking information for product FGL40N120AN is available. Click here for more information .

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Qualification Support

Click on a product for detailed qualification data

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