FAIRCHILD

SEMICONDUCTOR®

IGBT

SGL40N150

General Description

Fairchild's Insulated Gate Bipolar Transistor (IGBT) provides low conduction and switching losses. The SGL40N150 is designed for induction heating applications.
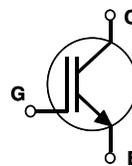
Features

- High speed switching
- Low saturation voltage : $V_{CE(sat)} = 3.7$ V @ $I_C = 40$A
- High input impedance

Applications

Home appliances, induction heaters, IH JAR, and microwave ovens.

TO-264

G   C   E

C

G

E
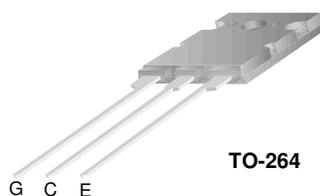
Absolute Maximum Ratings $T_C = 25°C$ unless otherwise noted

Symbol	Description		SGL40N150	Units
V_{CES}	Collector-Emitter Voltage		1500	V
V_{GES}	Gate-Emitter Voltage		± 25	V
I_C	Collector Current	@ $T_C = 25°C$	40	A
	Collector Current	@ $T_C = 100°C$	20	A
$I_{CM\ (1)}$	Pulsed Collector Current		120	A
P_D	Maximum Power Dissipation	@ $T_C = 25°C$	200	W
	Maximum Power Dissipation	@ $T_C = 100°C$	80	W
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) Repetitive rating : Pulse width limited by max. junction temperature

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$(IGBT)	Thermal Resistance, Junction-to-Case	--	0.625	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	25	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V$, $I_C = 250uA$	1500	--	--	V
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}$, $V_{GE} = 0V$	--	--	250	uA
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}$, $V_{CE} = 0V$	--	--	± 100	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	$I_C = 40mA$, $V_{CE} = V_{GE}$	3.5	5.0	7.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C = 40A$, $V_{GE} = 15V$	--	3.7	4.7	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	$V_{CE} = 10V$, $V_{GE} = 0V$, f = 1MHz	--	4000	--	pF
C_{oes}	Output Capacitance		--	700	--	pF
C_{res}	Reverse Transfer Capacitance		--	300	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 600V$, $I_C = 40A$, $R_G = 51\Omega$, $V_{GE} = 15V$, Resistive Load, $T_C = 25°C$	--	90	200	ns
t_r	Rise Time		--	230	700	ns
$t_{d(off)}$	Turn-Off Delay Time		--	245	400	ns
t_f	Fall Time		--	230	400	ns
Q_g	Total Gate Charge	$V_{CE} = 600V$, $I_C = 40A$, $V_{GE} = 15V$	--	140	170	nC
Q_{ge}	Gate-Emitter Charge		--	25	25	nC
Q_{gc}	Gate-Collector Charge		--	45	60	nC
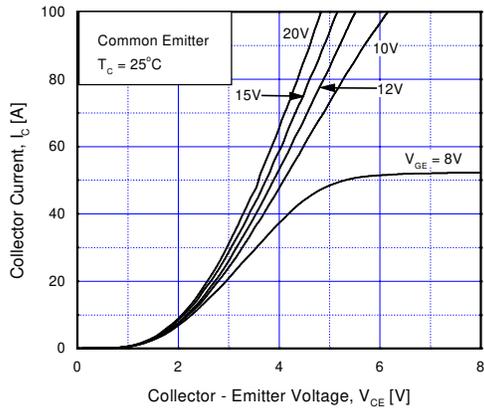
Fig 1. Typical Output Characteristics

Common Emitter
$T_C = 25^\circ C$
20V
10V
15V
12V
$V_{GE} = 8V$
Collector Current, I_C [A]
Collector - Emitter Voltage, V_{CE} [V]

Fig 2. Typical Output Characteristics

Common Emitter
$V_{GE} = 15V$
$T_C = 25^\circ C$ ——
$T_C = 125^\circ C$ ······
Collector Current, I_C [A]
Collector - Emitter Voltage, V_{CE} [V]
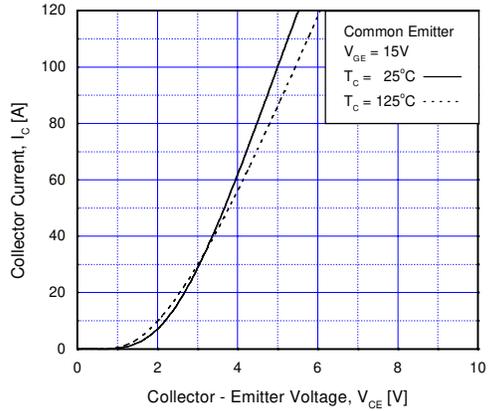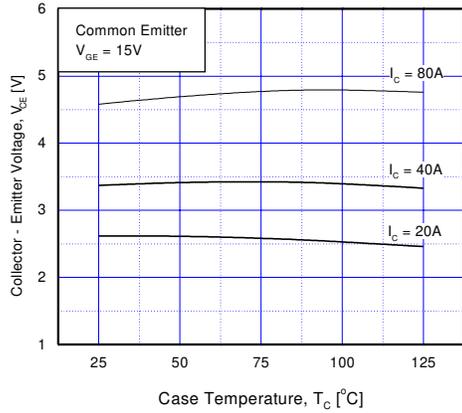
Fig 3. Collector to Emitter Saturation Voltage vs. Case Temperature

Common Emitter
$V_{GE} = 15V$
$I_C = 80A$
$I_C = 40A$
$I_C = 20A$
Collector - Emitter Voltage, V_{CE} [V]
Case Temperature, T_C [$^\circ C$]
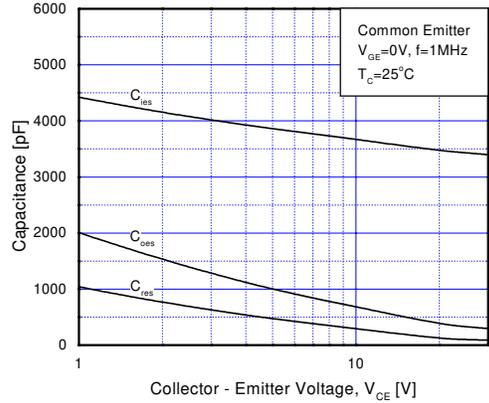
Fig 4. Typical Capacitance vs. Collector to Emitter Voltage

Common Emitter
$V_{GE} = 0V$, f=1MHz
$T_C = 25^\circ C$
C_{ies}
C_{oes}
C_{res}
Capacitance [pF]
Collector - Emitter Voltage, V_{CE} [V]

Fig 5. Saturation Voltage vs. V_{GE}

Common Emitter
$T_C = 25^\circ C$
80A
40A
20A
Collector - Emitter Voltage, V_{CE} [V]
Gate - Emitter Voltage, V_{GE} [V]

Fig 6. Saturation Voltage vs. V_{GE}

Common Emitter
$T_C = 125^\circ C$
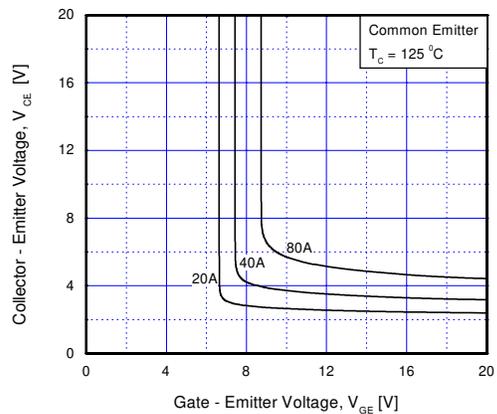80A
40A
20A
Collector - Emitter Voltage, V_{CE} [V]
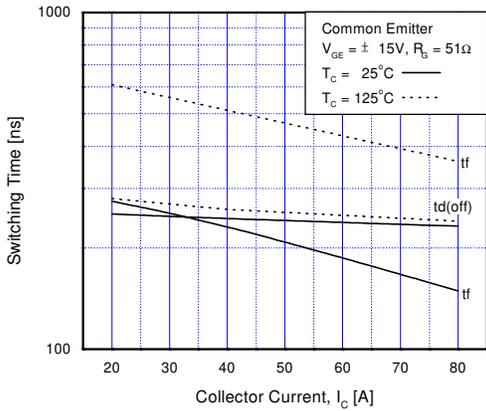Gate - Emitter Voltage, V_{GE} [V]
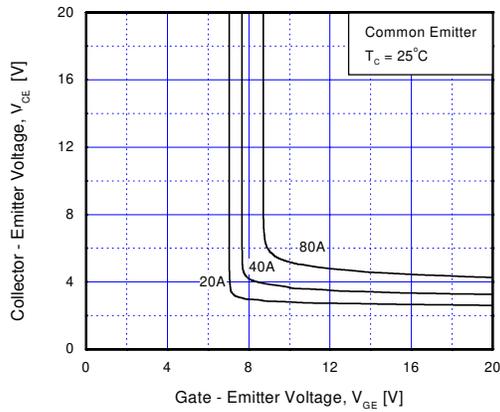
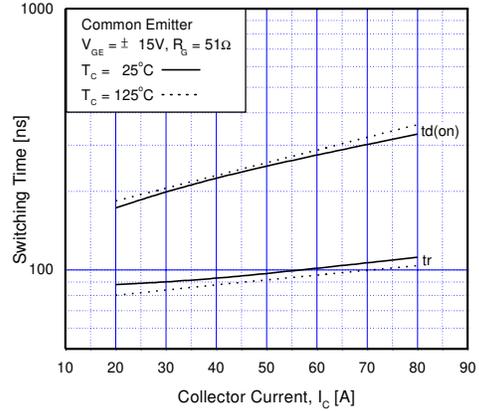Fig 7. Turn-Off Characteristics vs.
Collector Current

Fig 8. Turn-On Characteristics vs.
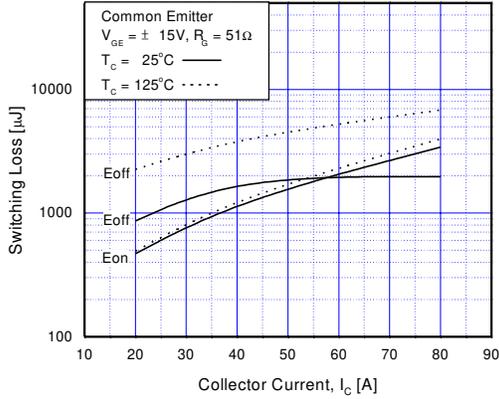Collector Current

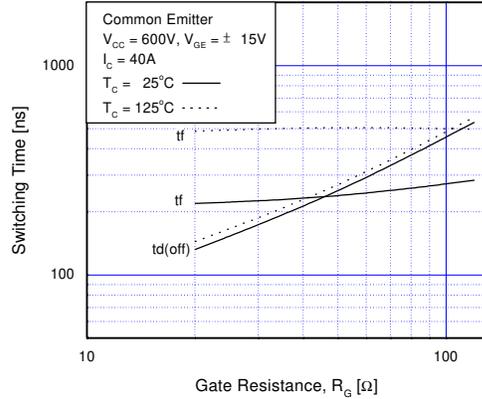

Fig 9. Switching Loss vs. Collector Current

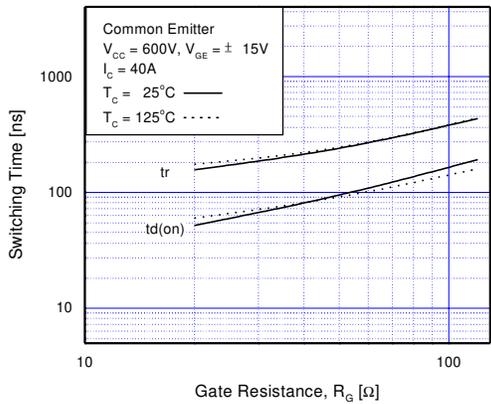Fig 10. Turn-Off Characteristics vs.
Gate Resistance
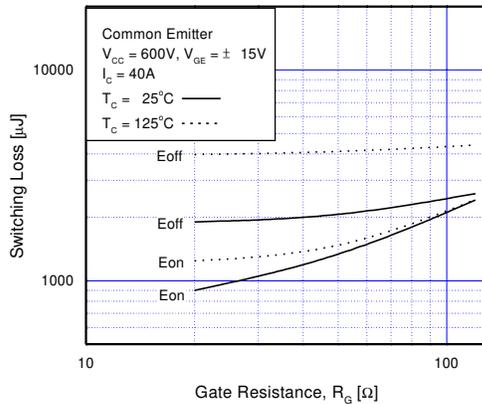

Fig 11. Turn-On Characteristics vs.
Gate Resistance

Fig 12. Switching Loss vs. Gate Resistance
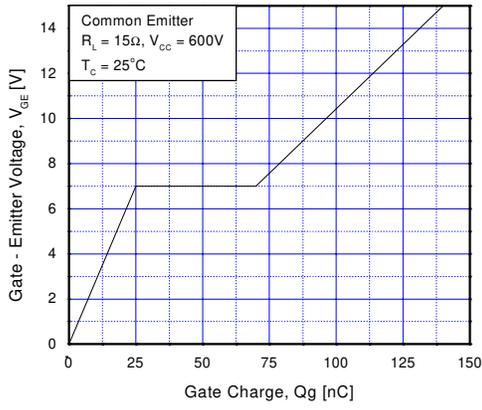
Fig 13. Gate Charge Characteristics

Fig 14. SOA Characteristics

Package Dimension

TO-264

20.00 ±0.20

(8.30) (8.30)

(1.00)

(4.00)

6.00 ±0.20

(2.00)

(9.00)

(9.00)

(11.00)

(R2.00)

ø3.30 ±0.20

(R1.00)

(0.50)

(2.00)

20.00 ±0.20

1.50 ±0.20

(7.00) (7.00)

4.90 ±0.20

(1.50)

(1.50)

2.50 ±0.10

2.50 ±0.20

3.00 ±0.20

20.00 ±0.50

1.00 +0.25 −0.10

(1.50)

5.45TYP
[5.45 ±0.30]

5.45TYP
[5.45 ±0.30]

0.60 +0.25 −0.10

2.80 ±0.30

5.00 ±0.20

3.50 ±0.20

(1.50)

(0.15)

(2.80)

Dimensions in Millimeters
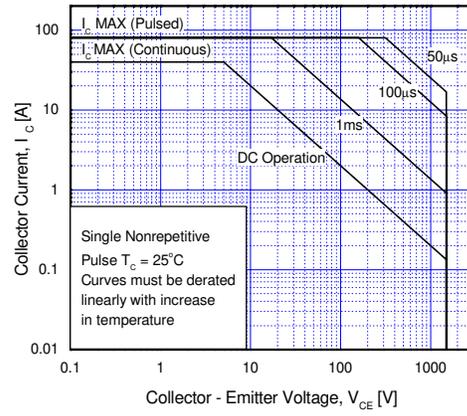
TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™	FAST®	MICROWIRE™	SLIENT SWITCHER®	UHC™
Bottomless™	FASTr™	OPTOLOGIC™	SMART START™	UltraFET®
CoolFET™	FRFET™	OPTOPLANAR™	SPM™	VCX™
CROSSVOLT™	GlobalOptoisolator™	PACMAN™	STAR*POWER™	
DenseTrench™	GTO™	POP™	Stealth™	
DOME™	HiSeC™	Power247™	SuperSOT™-3	
EcoSPARK™	I²C™	PowerTrench®	SuperSOT™-6	
E²CMOS™	ISOPLANAR™	QFET™	SuperSOT™-8	
EnSigna™	LittleFET™	QS™	SyncFET™	
FACT™	MicroFET™	QT Optoelectronics™	TinyLogic™	
FACT Quiet Series™	MicroPak™	Quiet Series™	TruTranslation™	

STAR*POWER is used under license

DISCLAIMER
FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.
As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
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.

Fairchild Semiconductor

space ☐ Product Folders and   ☐ Applica

find products

Products groups
Analog and Mixed Signal
Discrete
Interface
Logic
Microcontrollers
Non-Volatile
Memory
Optoelectronics
Markets and applications
New products
Product selection and parametric search
Cross-reference search

technical information

buy products

technical support

my Fairchild

company

SGL40N150
Discrete, IGBT

Contents

General description | Features | Applications |
Product status/pricing/packaging

Datasheet
Download this datasheet

PDF

e-mail this datasheet

[E-

This page Print version

Related Links

Request samples

Dotted line
How to order products

Dotted line
Product Change Notices (PCNs)

Dotted line
Support

Dotted line
Distributor and field sales representatives

Dotted line
Quality and reliability

Dotted line
Design tools

General description

Fairchild's Insulated Gate Bipolar Transistor (IGBT) provides low conduction and switching losses. SGL40N150 is designed for the Induction Heating applications.

back to top

Features

- High Speed Switching
- Low Saturation Voltage : $V_{CE(sat)} = 3.7$ V @ $I_C = 40A$
- High Input Impedance

back to top

Applications

- Home Appliance
- Induction Heater
- IH JAR
- Micro Wave Oven

back to top

Product status/pricing/packaging

Product	Product status	Pricing*	Package type	Leads	Packing method
SGL40N150TU	Full Production	$11.78	TO-264	3	RAIL

* 1,000 piece Budgetary Pricing

back to top

Home | Find products | Technical information | Buy products |
Support | Company | Contact us | Site index | Privacy policy