

SGL40N150D

General Description

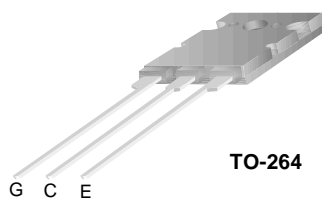
Fairchild's Insulated Gate Bipolar Transistor (IGBT) provides low conduction and switching losses. The SGL40N150D is designed for induction heating applications.

Features

- High speed switching
- Low saturation voltage : $V_{CE(sat)} = 3.7 \text{ V @ } I_C = 40\text{A}$
- High input impedance
- Built-in fast recovery diode

Applications

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



TO-264



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Description	SGL40N150D	Units
V_{CES}	Collector-Emitter Voltage	1500	V
V_{GES}	Gate-Emitter Voltage	± 25	V
I_C	Collector Current @ $T_C = 25^\circ\text{C}$	40	A
	Collector Current @ $T_C = 100^\circ\text{C}$	20	A
$I_{CM(1)}$	Pulsed Collector Current	120	A
I_F	Diode Continuous Forward Current @ $T_C = 100^\circ\text{C}$	10	A
I_{FM}	Diode Maximum Forward Current	100	A
P_D	Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$	200	W
	Maximum Power Dissipation @ $T_C = 100^\circ\text{C}$	80	W
T_J	Operating Junction Temperature	-55 to +150	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8" from Case for 5 Seconds	300	$^\circ\text{C}$

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	$^\circ\text{C/W}$
$R_{\theta JC}$ (DIODE)	Thermal Resistance, Junction-to-Case	--	0.83	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	25	$^\circ\text{C/W}$

Electrical Characteristics of the IGBT $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	1500	--	--	V
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}, V_{GE} = 0V$	--	--	250	μA
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, $T_C = 25^\circ\text{C}$	--	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

Electrical Characteristics of DIODE $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{FM}	Diode Forward Voltage	$I_F = 10A$	--	1.3	1.8	V
t_{rr}	Diode Reverse Recovery Time	$I_F = 10A, di/dt = 200A/\mu s$	--	170	300	ns

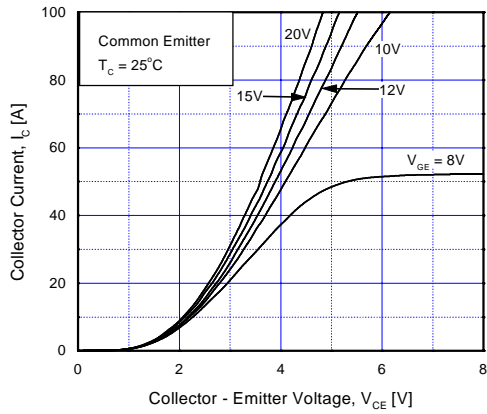


Fig 1. Typical Output Characteristics

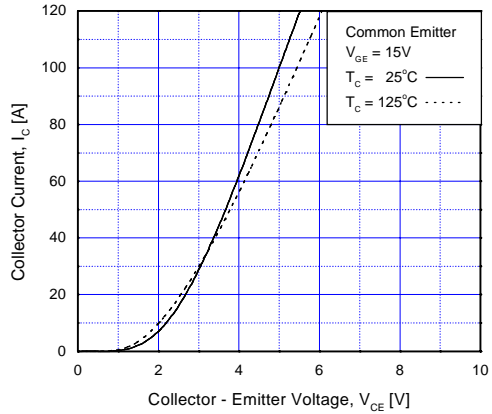


Fig 2. Typical Output Characteristics

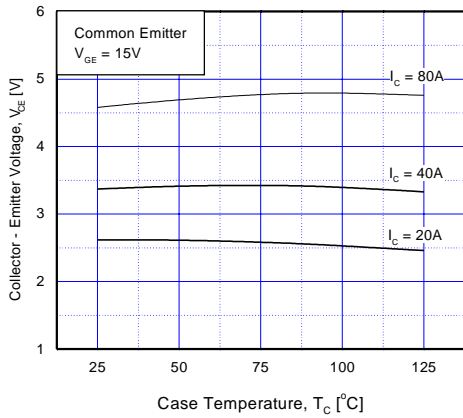


Fig 3. Collector to Emitter Saturation Voltage vs. Case Temperature

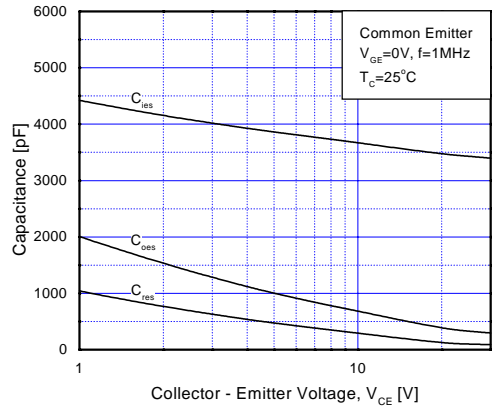


Fig 4. Typical Capacitance vs. Collector to Emitter Voltage

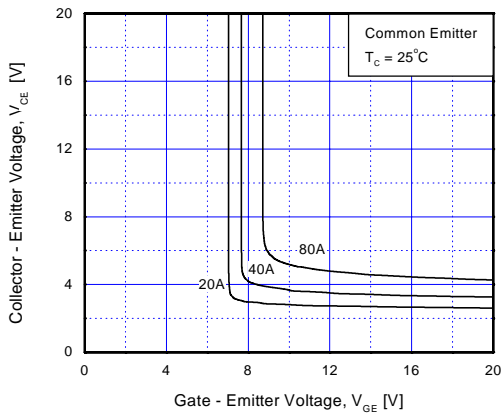


Fig 5. Saturation Voltage vs. V_{GE}

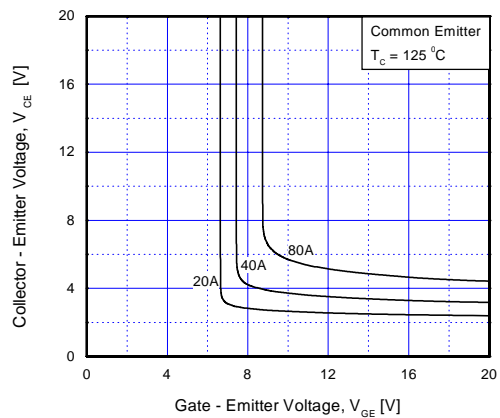


Fig 6. Saturation Voltage vs. V_{GE}

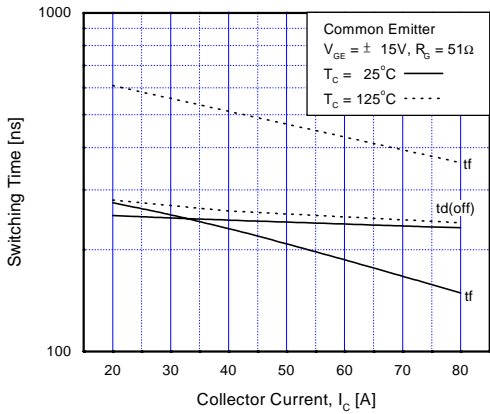


Fig 7. Turn-Off Characteristics vs. Collector Current

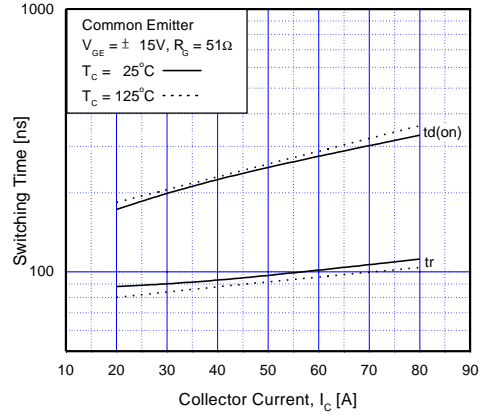


Fig 8. Turn-On Characteristics vs. Collector Current

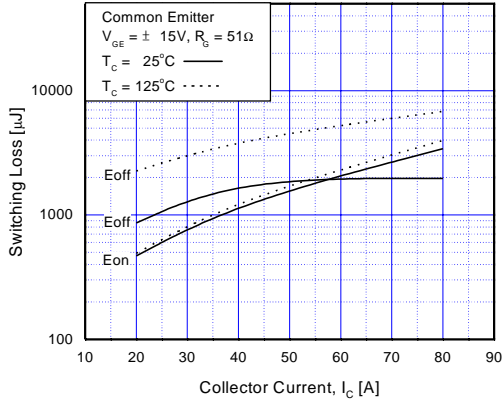


Fig 9. Switching Loss vs. Collector Current

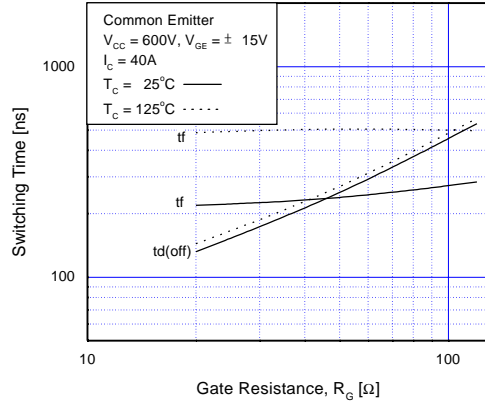


Fig 10. Turn-Off Characteristics vs. Gate Resistance

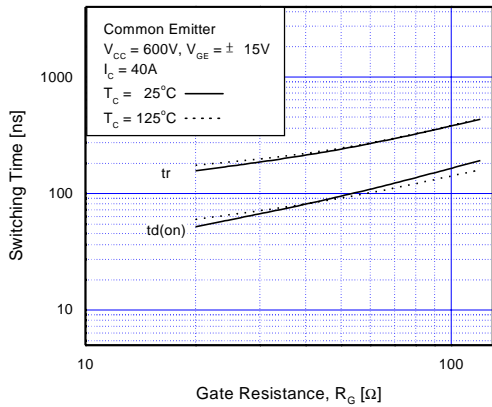


Fig 11. Turn-On Characteristics vs. Gate Resistance

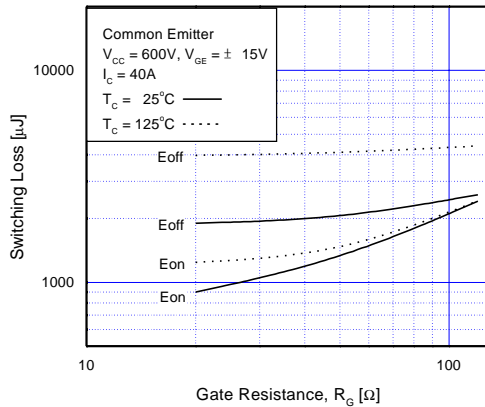


Fig 12. Switching Loss vs. Gate Resistance

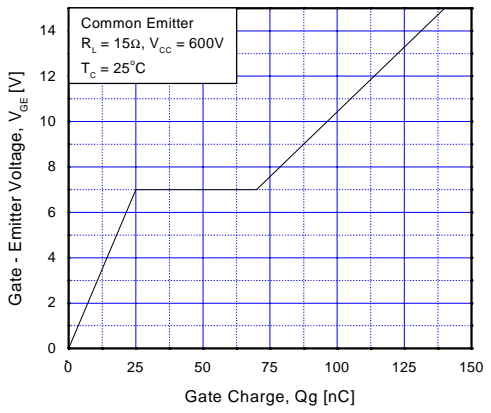


Fig 13. Gate Charge Characteristics

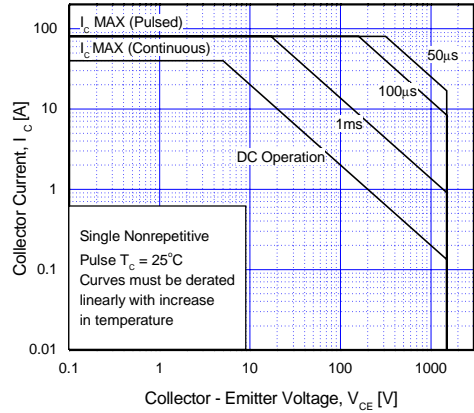


Fig 14. SOA Characteristics

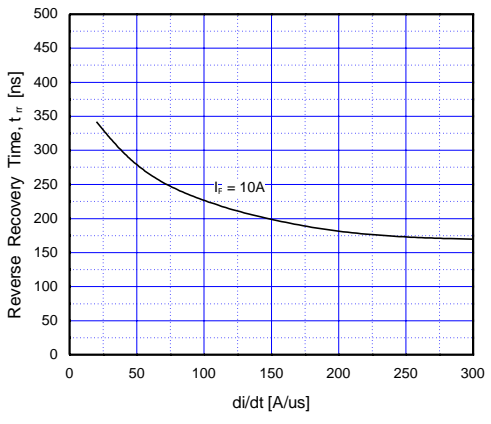


Fig 15. Typical T_{rr} vs. di/dt

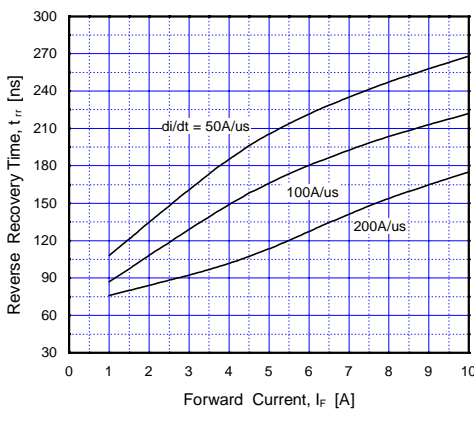


Fig 16. Typical T_{rr} vs. Forward Current

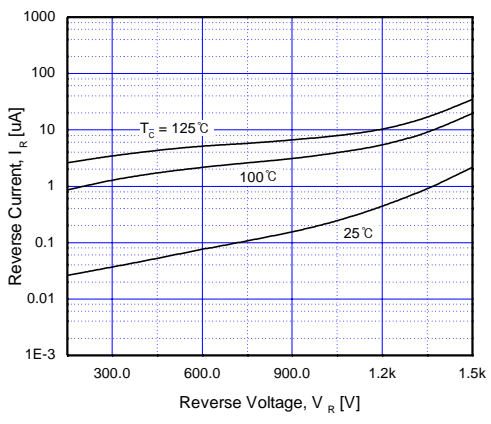


Fig 17. Reverse Current vs. Reverse Voltage

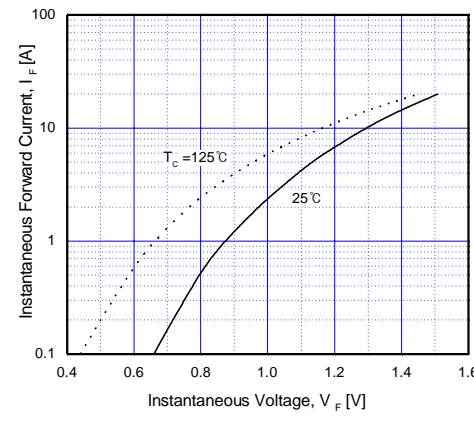


Fig 18. Typical Forward Voltage Drop vs. Forward Current

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