

## SGR20N40L / SGU20N40L

### General Description

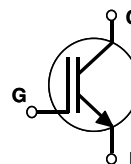
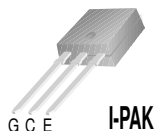
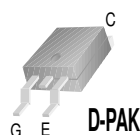
Insulated Gate Bipolar Transistors (IGBTs) with a trench gate structure provide superior conduction and switching performance in comparison with transistors having a planar gate structure. They also have wide noise immunity. These devices are very suitable for strobe applications

### Features

- High input impedance
- High peak current capability (150A)
- Easy gate drive
- Surface Mount : SGR20N40L
- Straight Lead : SGU20N40L

### Application

Strobe flash.



### Absolute Maximum Ratings T<sub>C</sub> = 25°C unless otherwise noted

Symbol	Description	SGR / SGU20N40L	Units
V <sub>CES</sub>	Collector - Emitter Voltage	400	V
V <sub>GES</sub>	Gate - Emitter Voltage	± 6	V
I <sub>CM (1)</sub>	Pulsed Collector Current	150	A
P <sub>C</sub>	Maximum Power Dissipation @ T <sub>C</sub> = 25°C	45	W
T <sub>J</sub>	Operating Junction Temperature	-40 to +150	°C
T <sub>stg</sub>	Storage Temperature Range	-40 to +150	°C
T <sub>L</sub>	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 <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	--	3.0	°C/W
R <sub>θJA (D-PAK)</sub>	Thermal Resistance, Junction-to-Ambient (PCB Mount) (2)	--	50	°C/W
R <sub>θJA (I-PAK)</sub>	Thermal Resistance, Junction-to-Ambient	--	110	°C/W

**Notes :**

(2) Mounted on 1" square PCB (FR4 or G-10 Material)

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
$BV_{CES}$	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 1mA$	450	--	--	V
$I_{CES}$	Collector Cut-Off Current	$V_{CE} = V_{CES}, V_{GE} = 0V$	--	--	10	$\mu A$
$I_{GES}$	G-E Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0V$	--	--	$\pm 0.1$	$\mu A$
<b>On Characteristics</b>						
$V_{GE(th)}$	G-E Threshold Voltage	$I_C = 1mA, V_{CE} = V_{GE}$	0.5	1.0	1.4	V
$V_{CE(sat)}$	C-E Saturation Current	$I_C = 150A, V_{GE} = 4.5V$	2.0	4.5	8.0	V
<b>Dynamic Characteristics</b>						
$C_{ies}$	Input Capacitance	$V_{GE} = 0V, V_{CE} = 30V,$ $f = 1MHz$	--	3800	--	pF
$C_{oes}$	Output Capacitance		--	50	--	pF
$C_{res}$	Reverse Transfer Capacitance		--	35	--	pF
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 300V, I_C = 150A,$ $V_{GE} = 4.5V, R_G = 15\Omega^*$ Resistive Load	--	0.2	--	$\mu s$
$t_r$	Rise Time		--	1.7	--	$\mu s$
$t_{d(off)}$	Turn-Off Delay Time		--	0.3	0.5	$\mu s$
$t_f$	Fall Time		--	1.5	2.0	$\mu s$

\* Notes : Recommendation of  $R_G$  Value :  $R_G \geq 15\Omega$

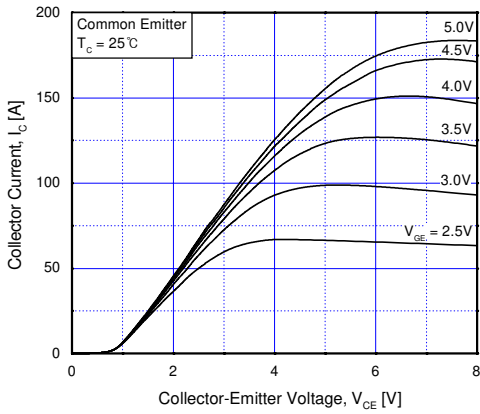


Fig 1. Typical Output Characteristics

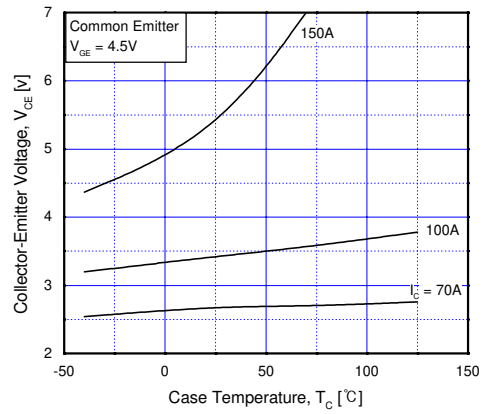


Fig 2. Saturation Voltage vs. Case Temperature at Variant Current Level

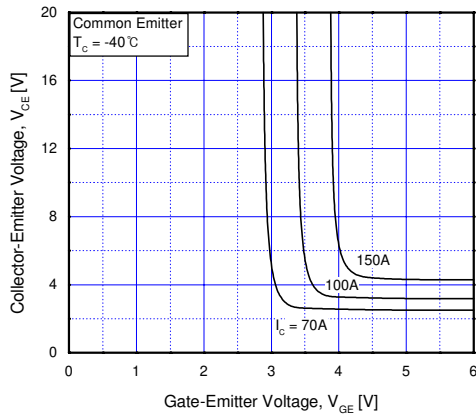


Fig 3. Saturation Voltage vs.  $V_{GE}$

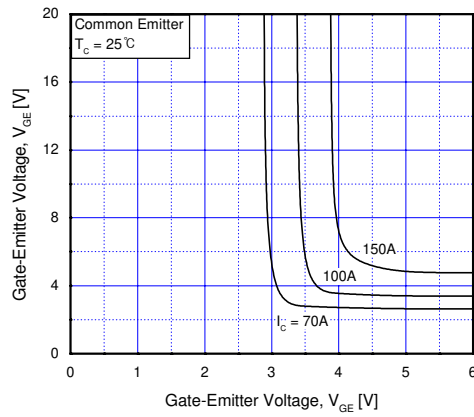


Fig 4. Saturation Voltage vs.  $V_{GE}$

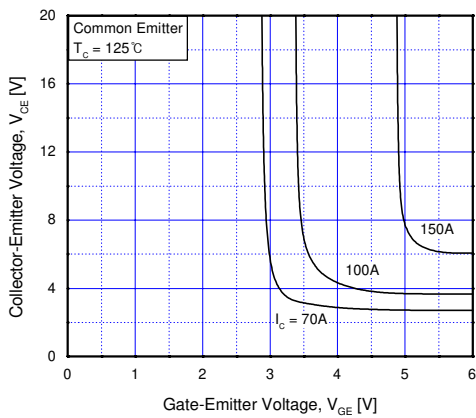


Fig 5. Saturation Voltage vs.  $V_{GE}$

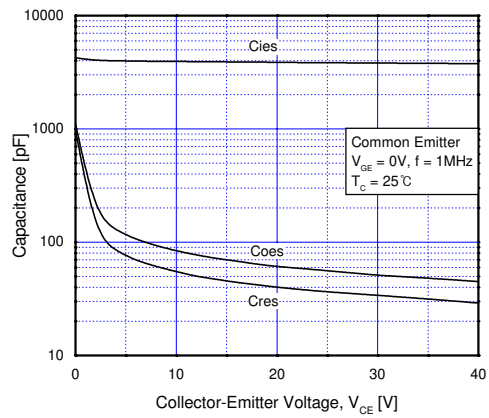
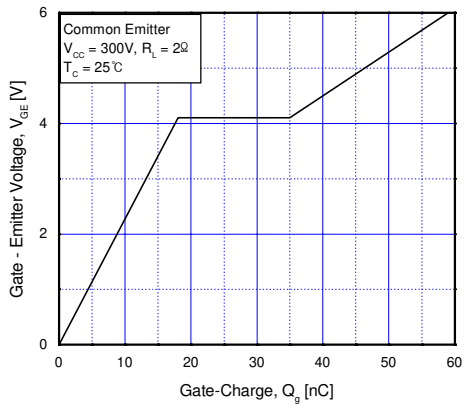
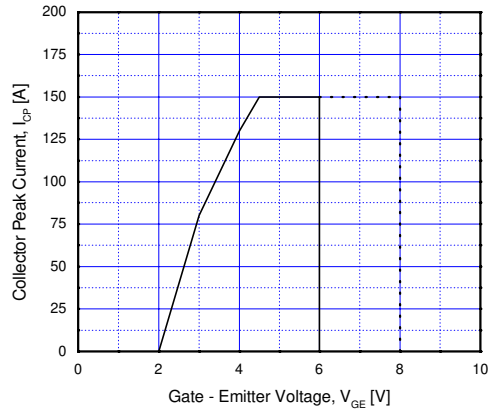


Fig 6. Capacitance Characteristics



**Fig 7. Turn-On Characteristics vs. Gate Resistance**



**Fig 8. Collector Current Limit vs. Gate - Emitter Voltage Limit**

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SGR20N40L  
Discrete, IGBT

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General description

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Features

- High Input Impedance
- High Peak Current Capability (150A)
- Easy Gate Drive
- Surface Mount: SGR20N40L
- Straight Lead: SGU20N40L

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Applications

- Strobe Flash

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[Product status/pricing/packaging](#)

Product	Product status	Pricing*	Inventory check & ordering	Package type	Leads	Packing method
SGR20N40LTF	Full Production	\$2.10	<a href="#">Purchase</a>	TO-252(DPAK)	2	TAPE REEL
SGR20N40LTM	Full Production	\$2.10	<a href="#">Purchase</a>	TO-252(DPAK)	2	TAPE REEL

\* Fairchild 1,000 piece Budgetary Pricing

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Models

Package & leads	Condition	Software version	Revision date
PSPICE			
TO-252(DPAK)-2	<a href="#">Electrical</a>	9.2	May 23, 2001

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Application notes

[AN-9006: AN-9006 IGBT Application Note for Camera Strobe](#) (146 K)  
Sep 27, 2002

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