FAIRCHILD SEMICONDUCTOR®

July 2005

FGR15N40A
Strobe Flash N-Channel Logic Level IGBT

Features

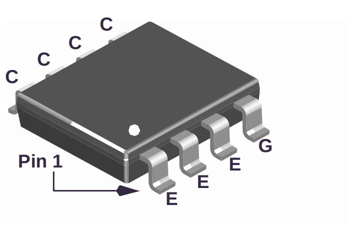
- $V_{CE(SAT)}$ = 4.4V at I_C=150A
- t_{fI} = 1.1µs, $td_{(OFF)I}$ = 0.46µs
- 2kV ESD Protected
- High Peak Current Density
- SuperSOT - 8 package, small footprint, low profile (1mm thick)

Applications

- Camera Strobe

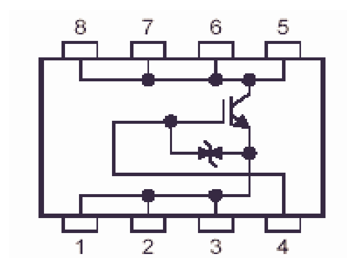
General Description

This N-Channel IGBT is a MOS gated, logic level device which has been especially tailored for camera flash applications where board space is a premium. These devices have been designed to offer exceptional power dissipation in a very small footprint for applications where bigger, more expensive packages are impractical. The gate is ESD protected with a zener diode.



SSOT-8

Internal Diagram



Device Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
BV_{CES}	Collector to Emitter Breakdown Voltage	400	V
I_C	Collector Current Continuous(DC)	8	A
I_{CP}	Collector Current Pulsed(100µs)	150	A
V_{GES}	Gate to Emitter Voltage Continuous(DC)	±6	V
V_{GEP}	Gate to Emitter Voltage Pulsed	±8	V
P_D	Power Dissipation Total T_C = 25°C	1.25	W
T_J	Operating Junction Temperature Range	-40 to 150	°C
T_{STG}	Storage Junction Temperature Range	-40 to 150	°C
ESD	Electrostatic Discharge Voltage at 100pF, 1500Ω	2	kV

Package Marking and Ordering Information

Device Marking	Device	Package	Tape Width	Quantity
15N40A	FGR15N40A	SuperSOT - 8	12mm	3000

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
Off State Characteristics							
BV_{CES}	Collector to Emitter Breakdown Voltage	I_C = 1mA, V_{GE} = 0V		400	-	-	V
BV_{GES}	Gate-Emitter Breakdown Voltage	I_{GES} = ± 1mA		±8	-	-	V
I_{CES}	Collector to Emitter Leakage Current	V_{CE} = 400V	T_C = +25°C	-	-	10	µA
			T_C = +125°C	-	-	250	µA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ± 8V		-	-	±10	µA
On State Characteristics							
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_C = 150A, V_{GE} = 4.0V (NOTE 1)		-	4.4	6.0	V
Dynamic Characteristics							
$Q_{G(ON)}$	Gate Charge	I_C = 150A, V_{CE} = 300V, V_{GE} = 8V		-	41	-	nC
V_{GEPL}	Gate to Emitter Plateau Voltage	I_C = 150A, V_{CE} = 300V		-	3.1	-	V
$V_{GE(TH)}$	Gate to Emitter Threshold Voltage	I_C = 1.0mA, V_{CE} = V_{GE}		0.4	0.61	0.75	V
C_{IES}	Input Capacitance	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz		-	1800	-	pF
Switching Characteristics							
t_{ON}	Turn-On Time	V_{CE} = 300V, I_C = 150A, V_{GE} = 4V, R_L = 2Ω, R_G = 51Ω, T_J = 25°C		-	0.91	-	µs
$t_{d(ON)I}$	Current Turn-On Delay Time			-	0.18	-	µs
t_{rI}	Current Rise Time			-	0.73	-	µs
t_{OFF}	Turn-Off Time			-	1.56	-	µs
$t_{d(OFF)I}$	Current Turn-Off Delay Time			-	0.46	-	µs
t_{fI}	Current Fall Time			-	1.1	-	µs
Thermal Characteristics							
$R_{\theta JA}$	Thermal Resistance Junction-Case	SuperSOT - 8 (NOTE 2)		-	80	-	°C/W

Notes:

1. Pulse Duration = 100µsec
2. Mounted on a 1 inch^2 1oz copper pad

Typical Characteristics

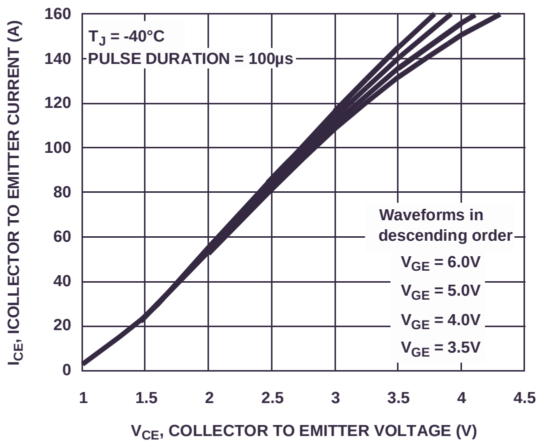


Figure 1. Collector to Emitter On-State Voltage vs Collector Current

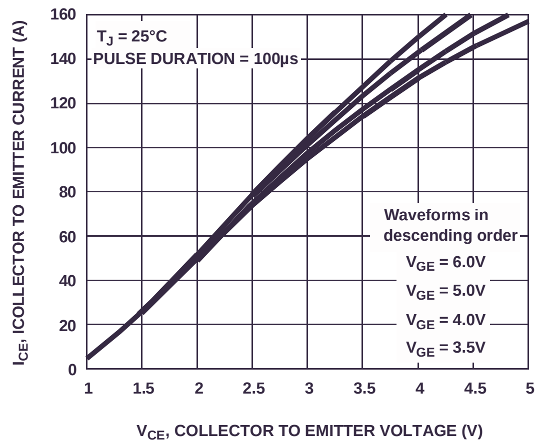


Figure 2. Collector to Emitter On-State Voltage vs Collector Current

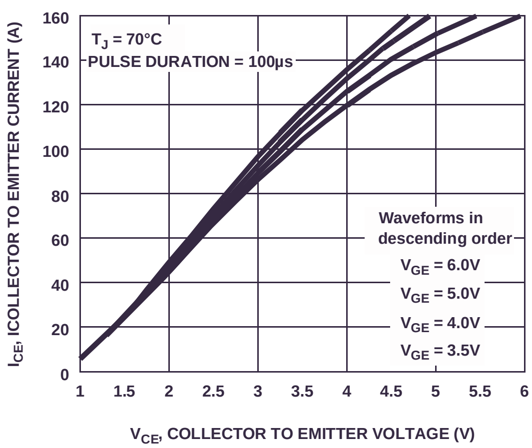


Figure 3. Collector to Emitter On-State Voltage vs Collector Current

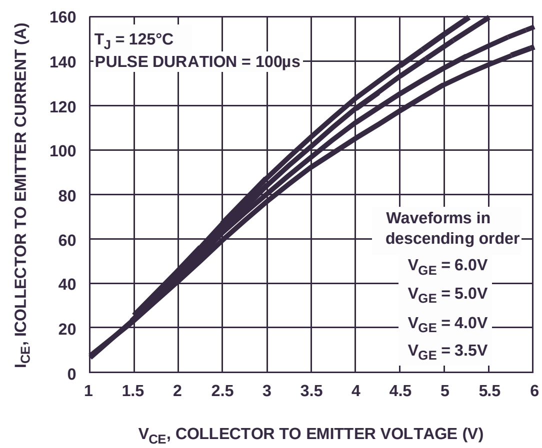


Figure 4. Collector to Emitter On-State Voltage vs Collector Current

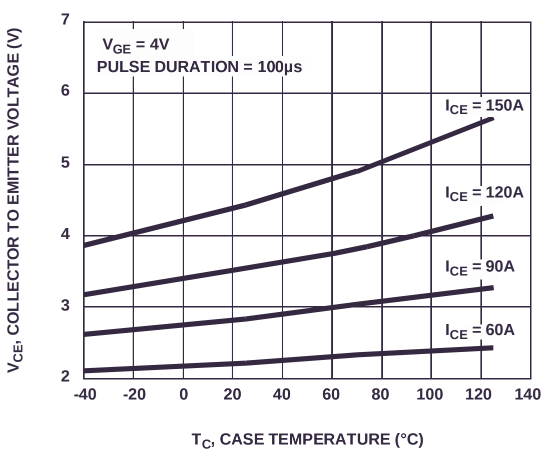


Figure 5. Collector to Emitter Saturation Voltage vs Case Temperature

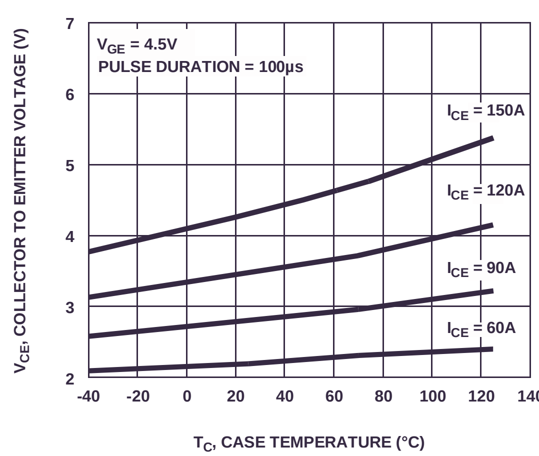


Figure 6. Collector to Emitter Saturation Voltage vs Case Temperature

Typical Characteristics (Continued)

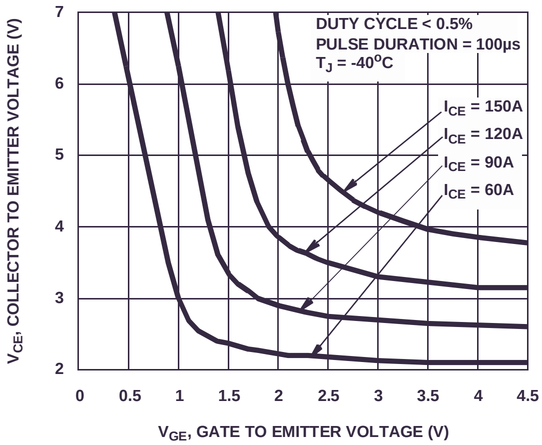


Figure 7. Collector to Emitter On-State Voltage vs Gate to Emitter Voltage

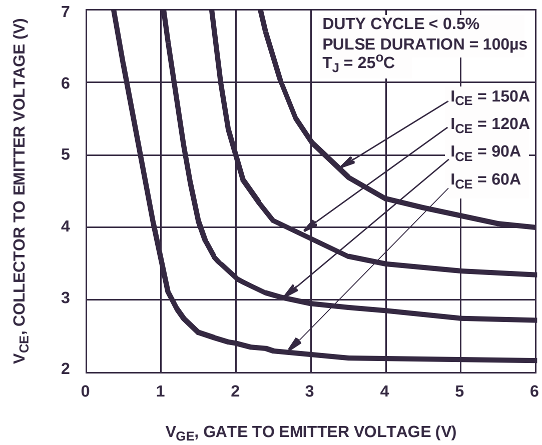


Figure 8. Collector to Emitter On-State Voltage vs Gate to Emitter Voltage

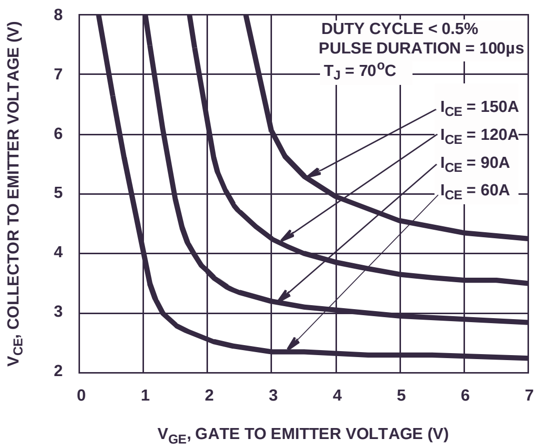


Figure 9. Collector to Emitter On-State Voltage vs Gate to Emitter Voltage

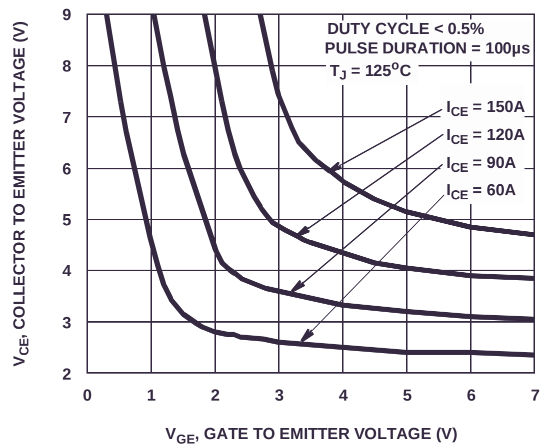


Figure 10. Collector to Emitter On-State Voltage vs Gate to Emitter Voltage

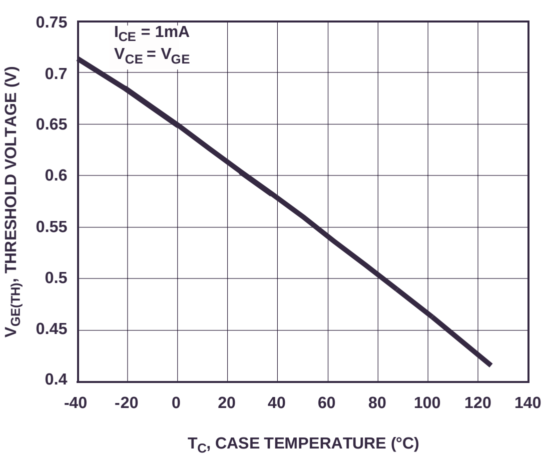


Figure 11. Gate to Emitter Threshold Voltage vs Case Temperature

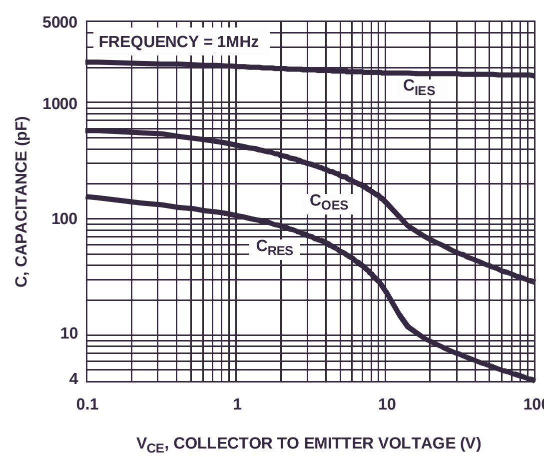


Figure 12. Capacitance vs Collector to Emitter Voltage

Typical Characteristics (Continued)

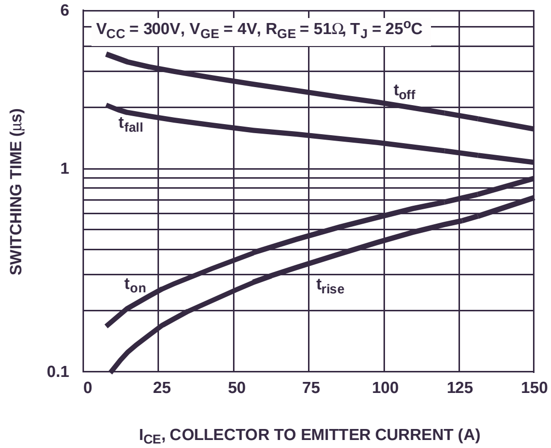


Figure 13. Switching Time vs Collector Current

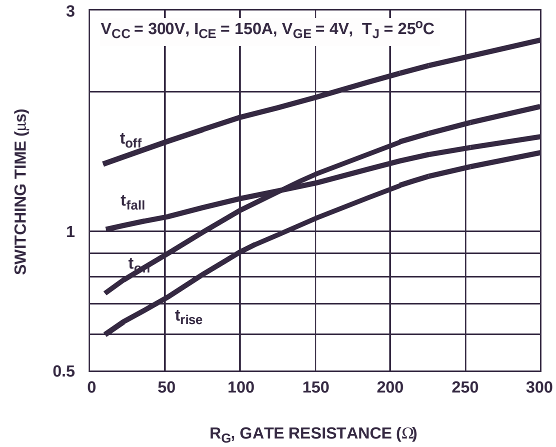


Figure 14. Switching Time vs Gate Resistance

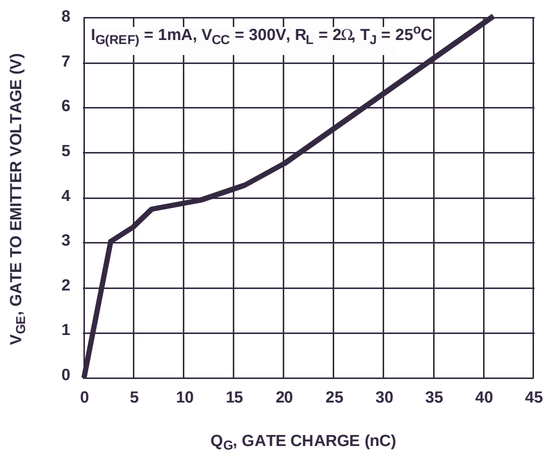


Figure 15. Gate Charge

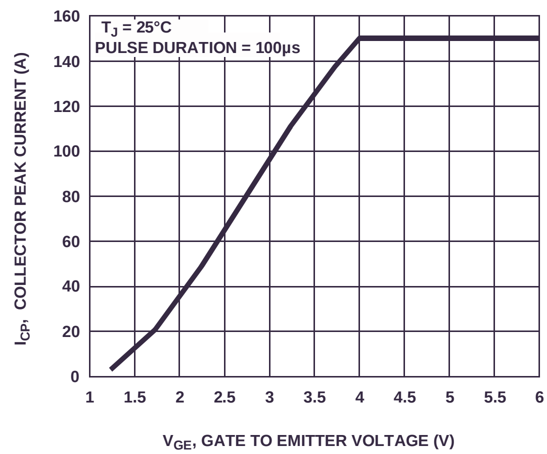


Figure 16. Collector Current Limit vs Gate to Emitter Voltage

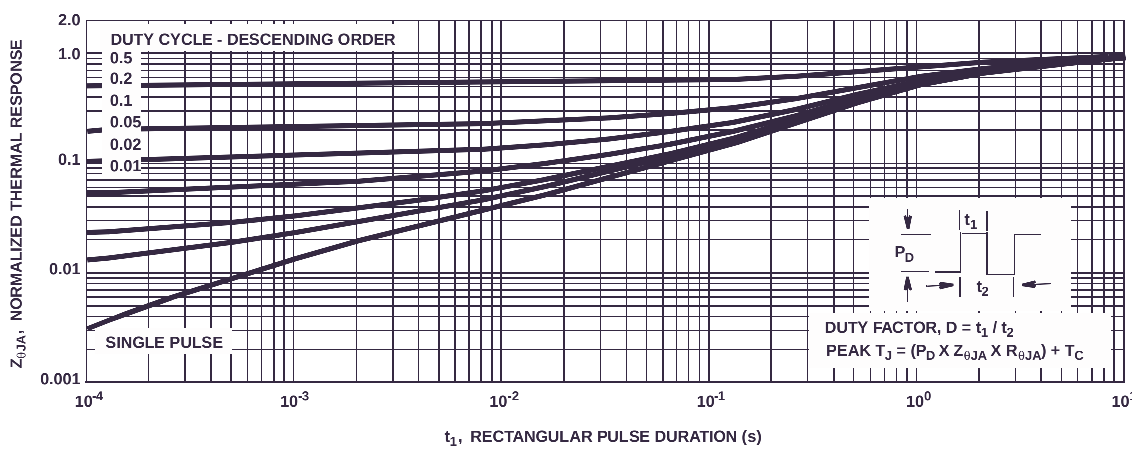


Figure 17. Normalized Transient Thermal Impedance, Junction to Case

TRADEMARKS

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