



General Semiconductor Industries, Inc.

SQUARE D COMPANY

**GSRU15030
GSRU15030A
GSRU15035
GSRU15035A
GSRU15040
GSRU15040A**

T-33 -15

HIGH POWER NPN *Switch Plus^{III}* TRANSISTORS

"A" Suffix units have 100° C specifications guaranteed.

The GSRU series of NPN silicon transistors is designed for high speed switching systems. This unique series features General Semiconductor Industries' C²R[®] manufacturing process to provide surface stabilization for high voltage operation and to enhance long term reliability.

- High Speed
- Rugged
- Off-line Power Supplies
- Switching Amplifiers
- Inverters/Converters
- Switching Regulators

MAXIMUM RATINGS (T _c = 25° C unless otherwise noted.)					
SYMBOL	DESCRIPTION	GSRU15030, A	GSRU15035, A	GSRU15040, A	UNIT
V _{CB0}	Collector-Base Voltage	400	450	500	Volts
V _{CE0}	Collector-Emitter Voltage	300	350	400	Volts
V _{EB0}	Emitter-Base Voltage		8.0		Volts
I _c	Collector Current—Continuous		20		Amps
I _{CM}	Peak		30		Amps
I _B	Base Current—Continuous		10		Amps
P _D	Total Power Dissipation @ T _c = 25° C		175		Watts
T _{J(oper)} T _{stg}	Operating and Storage Junction Temperature Range		-65 to +200		° C

ELECTRICAL CHARACTERISTICS (Applies to all types unless otherwise noted.)

SYMBOL	CONDITIONS	PART NO.	T _c = 25° C		T _c = 100° C, A only		UNIT	
			MIN.	MAX.	MIN.	MAX.		
OFF-STATE								
V _{CB0} V _{CE0} V _{CEX}	I _c = 1.0mA V _{EB} = 1.5V (V _{CEX} Only)	GSRU15030, A GSRU15035, A GSRU15040, A	400 450 500				Volts	
V _{CE0}	I _c = 50mA	GSRU15030, A GSRU15035, A GSRU15040, A	300 350 400				Volts	
V _{EB0}	I _E = 1.0mA		8				Volts	
I _{CEX}	V _{CE} = 80% of Rated V _{CB0} , V _{EB} = 1.5V			10		100	μA	
I _{EB0}	V _{EB} = 5.0V			10			μA	
ON-STATE								
h _{FE}	V _{CE} = 5.0V, I _c = 15A†		10					
V _{CE(sat)}	I _c = 15A, I _B = 3A†			1.0		1.0	Volts	
V _{BE(sat)}	I _c = 15A, I _B = 3A†			1.5			Volts	
DYNAMIC								
t _T	V _{CE} = 10V, I _c = 1A,† f = 10MHz		15	50			MHz	
C _{ob0}	V _{CB} = 10V, f = 1MHz		200	500			pF	
t _d	Resistive Load I _c = 15A I _{B1} = I _{B2} = 3A t _p = 50μsec V _{CC} = 250V			0.07			μs	
t _r				0.40			μs	
t _s					2.20			μs
t _f					0.20			μs
t _{sd} (t _r)		V _{CC} = 40V			1.50		2.00	μs
t _{sv}	Inductive Load I _c = 15A I _{B1} = I _{B2} = 3A t _p = 50 μs V _{CLAMP} = 250V L = 100μH			2.40		3.00	μs	
t _{rv}				0.35		0.40	μs	
t _{fl}					0.12		0.20	μs
t _c					0.40		0.60	μs
THERMAL								
R _{θJC}	V _{CE} = 10V, I _c = 10A			1.0			° C/W	

†Pulse measurement conditions Length 300μsec, Duty Cycle 2% (measured using separate current carrying and voltage sensing leads)



**TO-204AA
(TO-3)**

NPN

**400,
350,
300V
V_{CE0}**

**20 A
I_c(MAX.)**

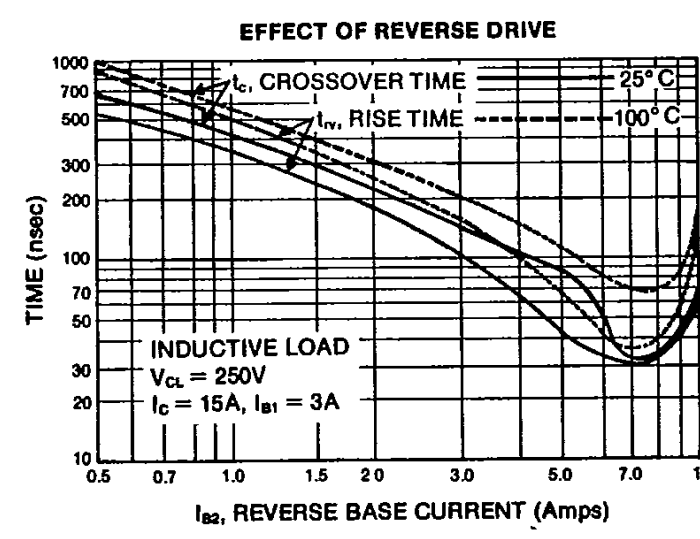
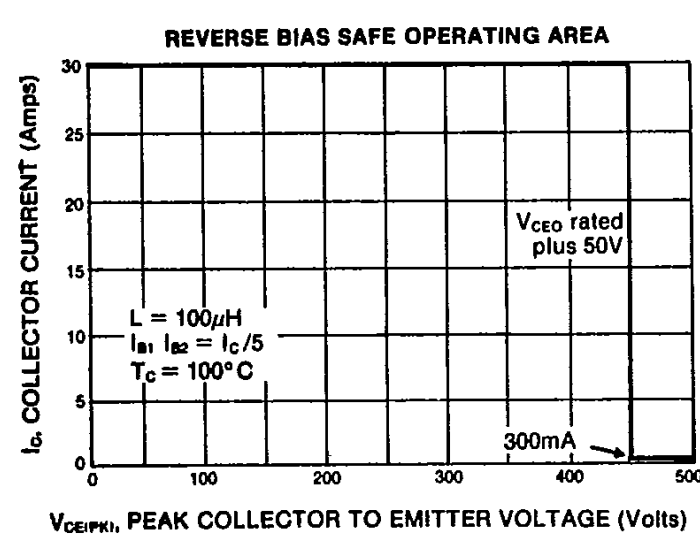
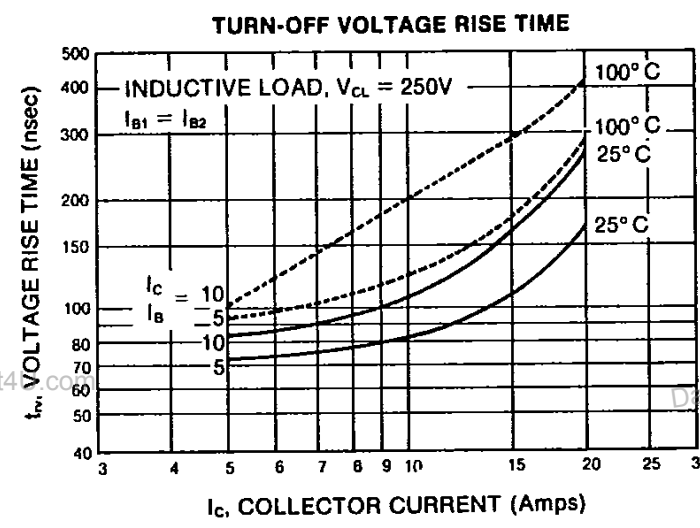
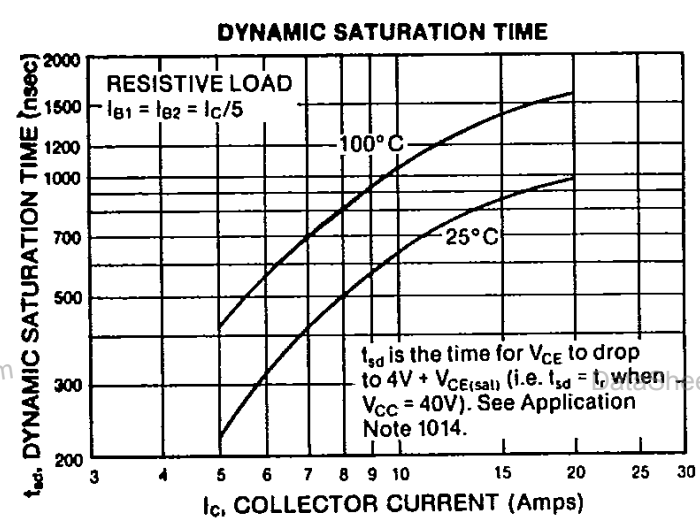
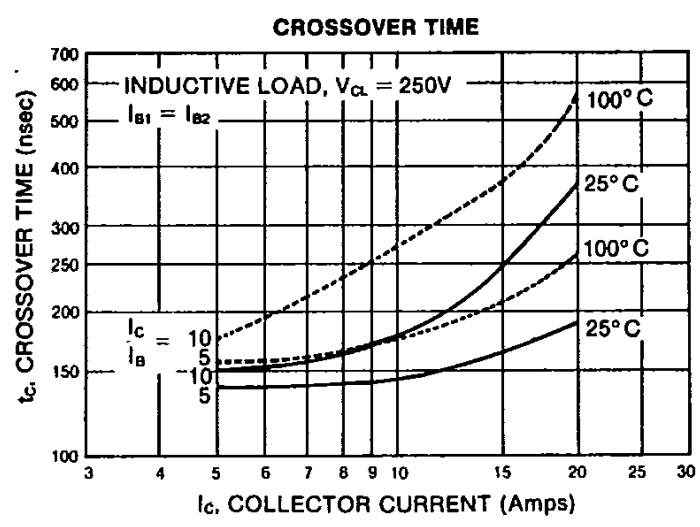
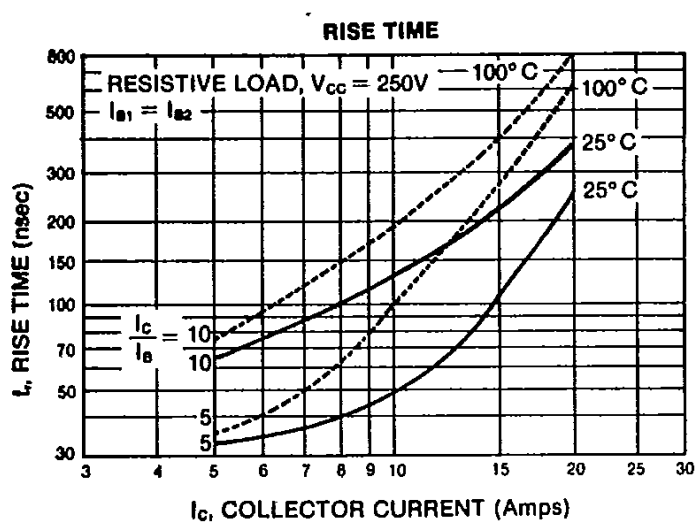
**15 A
SWITCHING**

**35ns
t_c
TYPICAL**

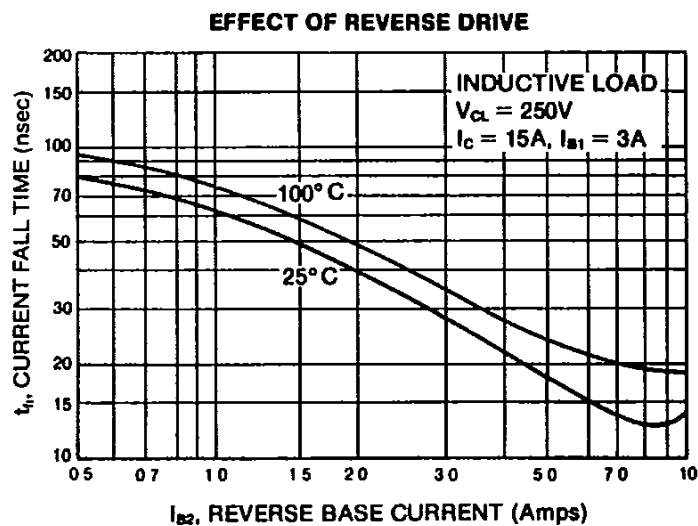
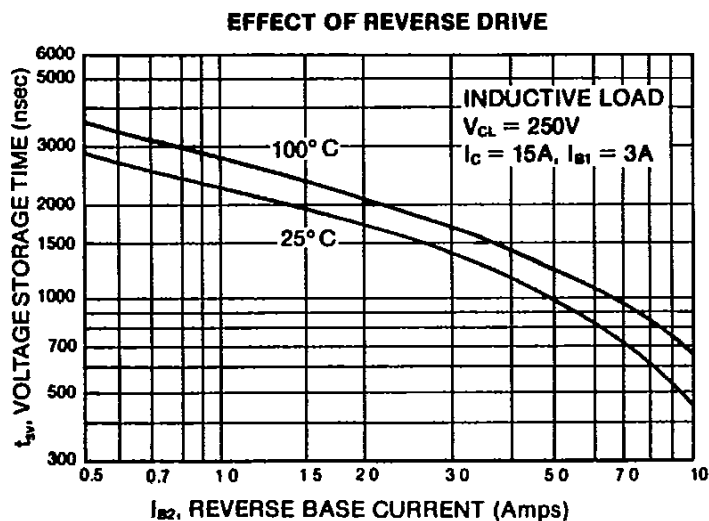
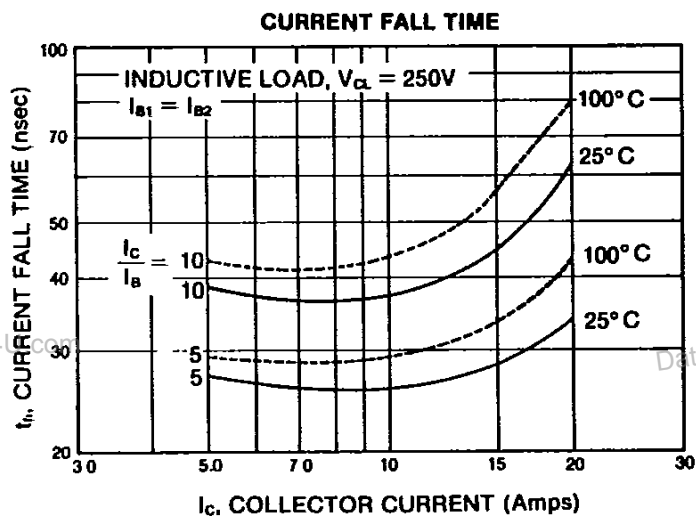
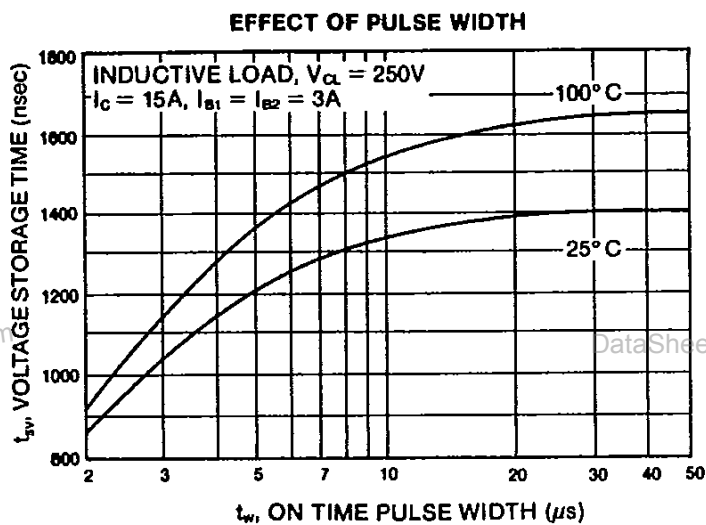
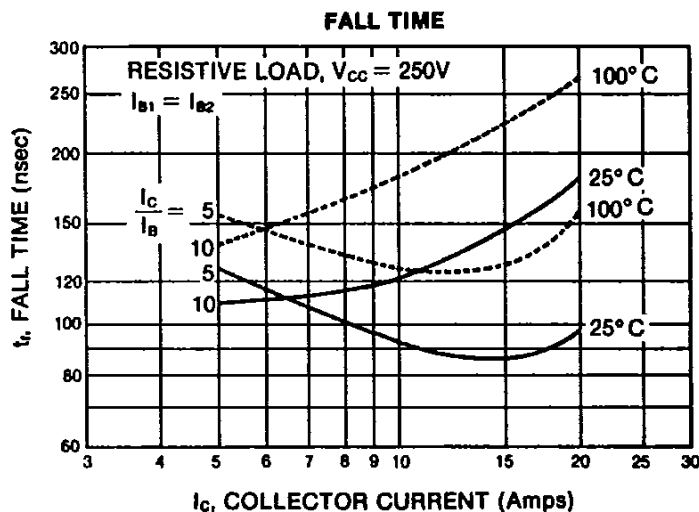
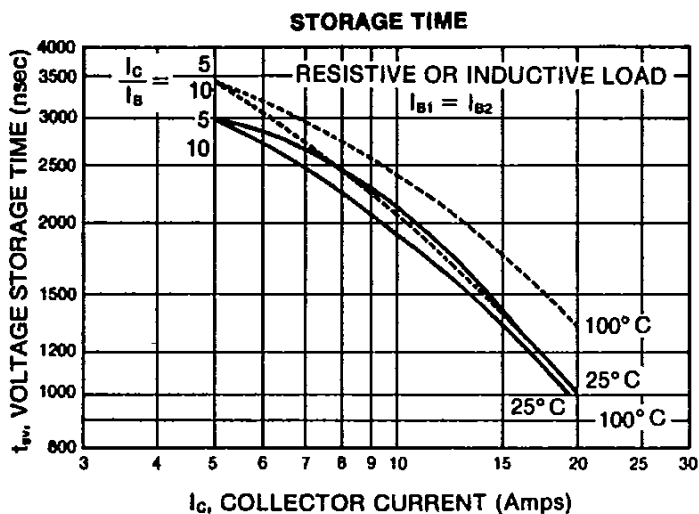
Switch Plus^{III}



TYPICAL SWITCHING CHARACTERISTICS & RATINGS

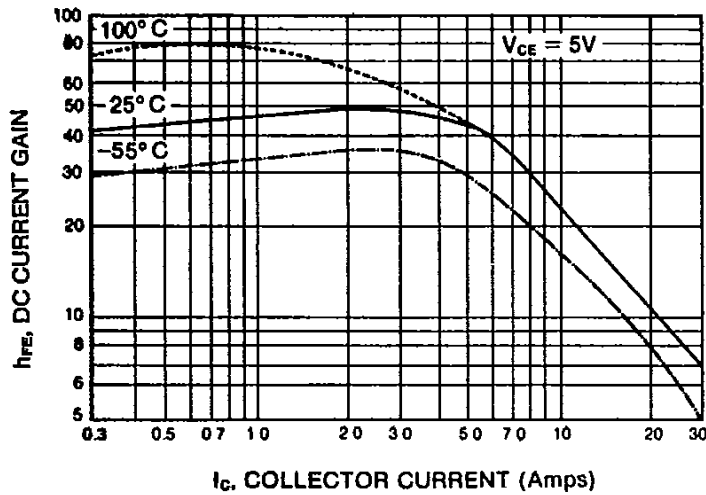


TURN-OFF CHARACTERISTICS

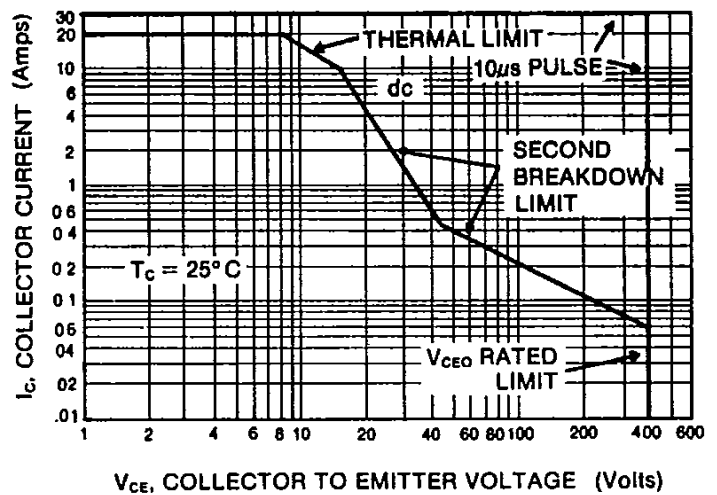


TYPICAL DC CHARACTERISTICS & RATINGS

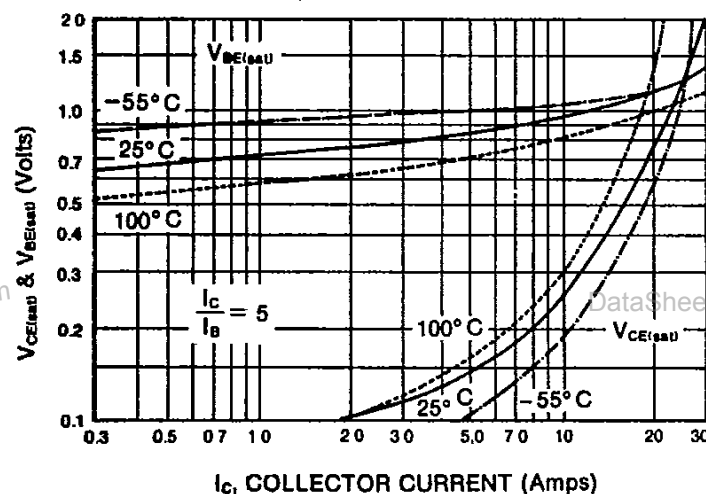
DC CURRENT GAIN



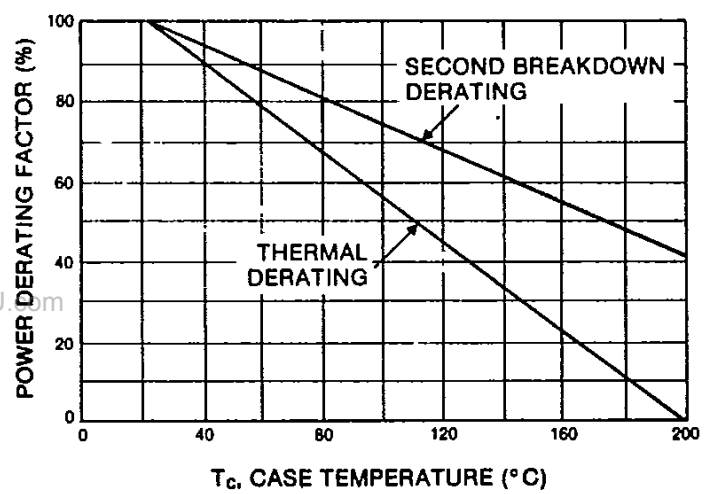
FORWARD BIASED SAFE OPERATING AREA



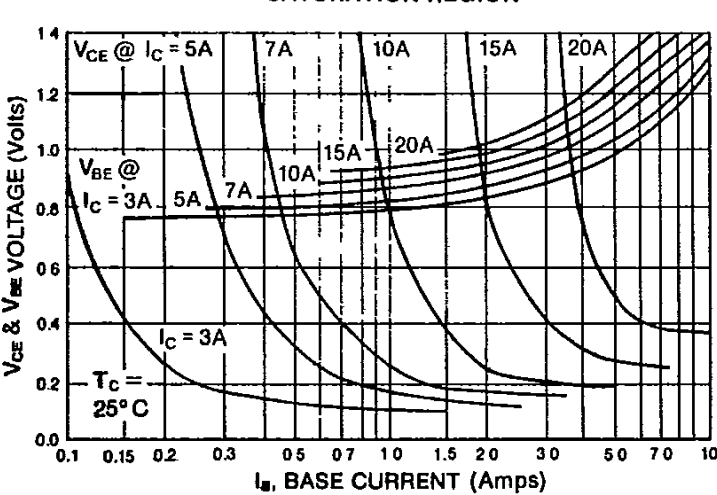
SATURATION VOLTAGE



POWER DERATING



SATURATION REGION



PACKAGE OUTLINE

TO-204AA

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	—	0.875	—	22.23
B	0.250	0.450	6.35	11.43
C	0.038	0.043	0.97	1.09
D	0.312	—	7.92	—
E	—	0.135	—	3.43
F	0.655	0.675	16.64	17.15
G	0.205	0.225	5.21	5.72
H	0.420	0.440	10.67	11.18
J	1.177	1.197	29.90	30.40

Pin 1 Base
2 Emitter
Case Collector

(FORMERLY TO-3)