

**INTEGRATED  
CIRCUITS**  
**UNITRODE**  
Smart Power Transistor

**T-33-29**

UC195  
UC295  
UC395

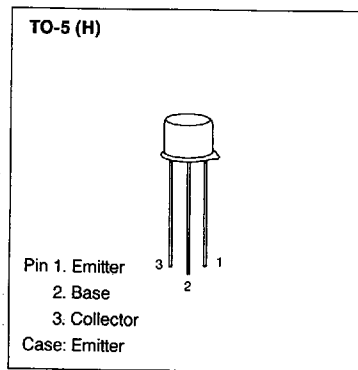
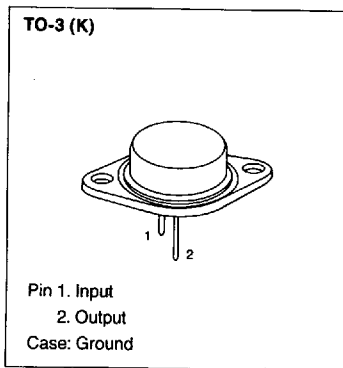
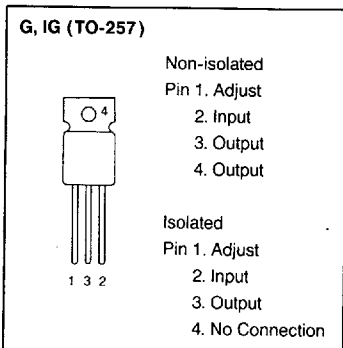
**FEATURES**

- Greater Than 1.0A Output
- 3.0μA Typical Base Current
- 500ns Switching Time
- 2.0V Saturation
- Directly Interfaces with CMOS or TTL
- Internal Thermal Limiting
- Available in TO-257 military package

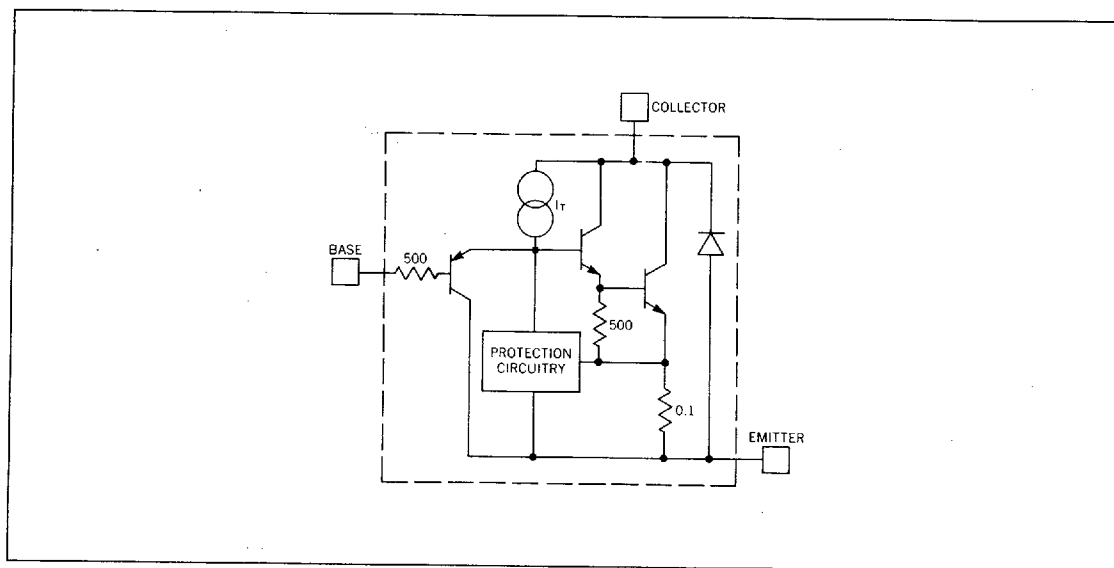
**DESCRIPTION**

The UC195/UC395 family of devices are ultra reliable, fast, monolithic power transistors with complete overload protection. These devices act as high gain power transistors and have on chip, current limiting, power limiting, and thermal overload protection, making them virtually impossible to destroy. The UC195/UC395 offers a significant increase in reliability and simplifies power circuitry designs.

The UC195/UC395 are available in standard TO-3 power packages and solid Kovar TO-5. The UC195 is rated for operation from -55°C to +150°C, the UC295 is rated from -25°C to +125°C, and the UC395 is rated from 0°C to +125°C.



**BLOCK DIAGRAM**



T-33-29

UC195  
UC295  
UC395

**ABSOLUTE MAXIMUM RATINGS**

Collector to Emitter Voltage	
UC195, UC295 .....	42V
UC395 .....	36V
Collector to Base Voltage	
UC195, UC295 .....	42V
UC395 .....	36V
Base to Emitter Voltage (Forward)	
UC195, UC295 .....	42V
UC395 .....	36V
Base to Emitter Voltage (Reverse)	20V
Collector Current	Internally Limited
Power Dissipation	Internally Limited
Operation Temperature Range	
UC195 .....	-55°C to +150°C
UC295 .....	-25°C to +125°C
UC395 .....	0°C to +125°C
Storage Temperature Range	-65°C to +150°C
Lead Soldering Temperature (10 seconds)	300°C

**THERMAL DATA**

TO-3 .....	$\theta_{ja} = 35^\circ\text{C/W}$
TO-5 .....	$\theta_{ja} = 150^\circ\text{C/W}$
TO-257 .....	$\theta_{ja} = 42^\circ\text{C/W}$

**ELECTRICAL CHARACTERISTICS** (Unless otherwise specified these specifications apply for  $-55^\circ\text{C} \leq T_j \leq +125^\circ\text{C}$  for the UC195,  $-25^\circ\text{C} \leq T_j \leq +125^\circ\text{C}$  for the UC295, and  $0^\circ\text{C} \leq T_j \leq +125^\circ\text{C}$  for the UC395.)  $T_A = T_j$

PARAMETERS	SYMBOL	CONDITIONS	UC195, UC295			UNITS
			MIN.	TYP.	MAX.	
Collector-Emitter Operating Voltage	$V_{ce}$	$I_q \leq I_c \leq I_{c\max}$			42	V
Base to Emitter Breakdown Voltage	$BV_{be}$	$0 \leq V_{ce} \leq V_{ce\max}$	42			V
Collector Current TO-3, TO-5, TO-257	$I_c$	$V_{ce} \leq 15\text{V}$ $V_{ce} \leq 7.0\text{V}$	1.2 1.2	2.2 1.8		A A
Saturation Voltage	$V_{sat}$	$I_c \leq 1.0\text{A}$ , $T_A = 25^\circ\text{C}$		1.8	2.0	V
Base Current	$I_b$	$V_{be} = 0\text{V}$ , $V_{ce} = 42\text{V}$ $V_{be} = 42\text{V}$ , $V_{ce} = 0\text{V}$	-50		5	$\mu\text{A}$
Quiescent Current	$I_q$	$V_{be} = 0\text{V}$ $0 \leq V_{ce} \leq V_{ce\max}$		2.0	5.0	mA
Base-Emitter Voltage	$V_{be}$	$I_c = 1.0\text{A}$ , $T_A = 25^\circ\text{C}$		0.9		V
Switching Time	$t_s$	$V_{ce} = 36\text{V}$ , $R_L = 36\Omega$ $T_A = 25^\circ\text{C}$		500		ns
Thermal Resistance Junction to Case	$\theta_{jc}$	TO-3 Package TO-5 Package TO-257 Package Isolated TO-257 Package		2.3 12 2.5 3.0	3.0 15 3.5 4.2	$^\circ\text{C/W}$ $^\circ\text{C/W}$ $^\circ\text{C/W}$ $^\circ\text{C/W}$

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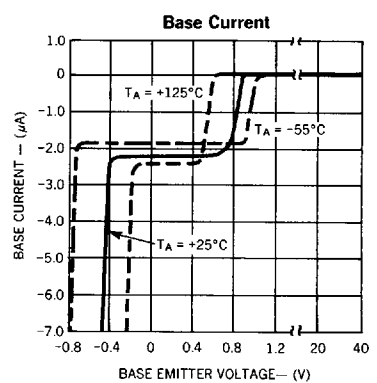
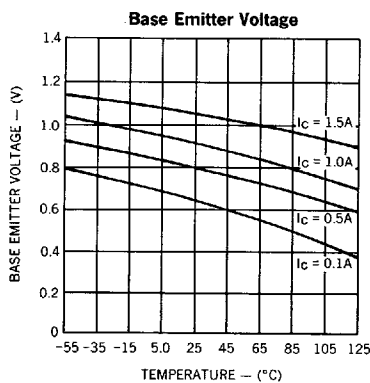
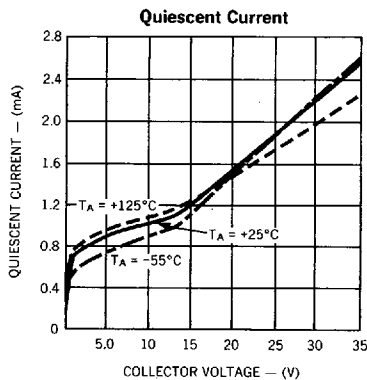
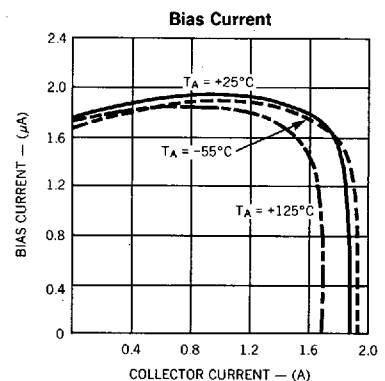
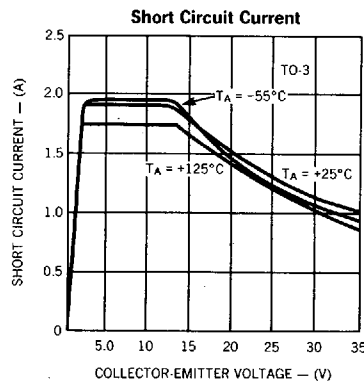
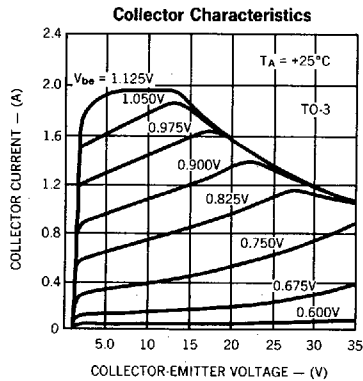
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UC395

**ELECTRICAL CHARACTERISTICS** (Unless otherwise specified these specifications apply for  $-55^{\circ}\text{C} \leq T_j \leq +125^{\circ}\text{C}$  for the UC195,  $-25^{\circ}\text{C} \leq T_j \leq +125^{\circ}\text{C}$  for the UC295, and  $0^{\circ}\text{C} \leq T_j \leq +125^{\circ}\text{C}$  for the UC395.)  $T_A = T_j$

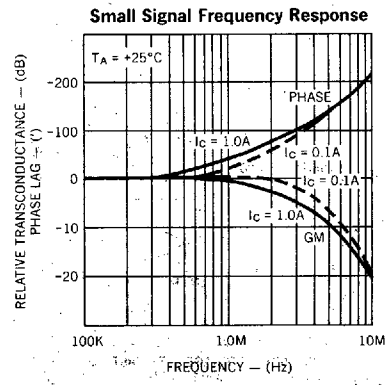
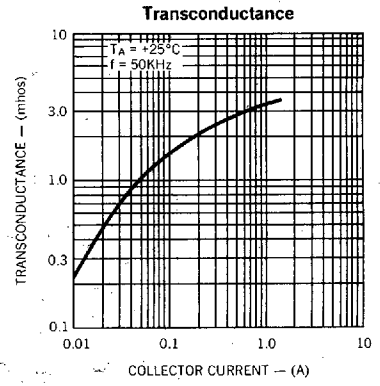
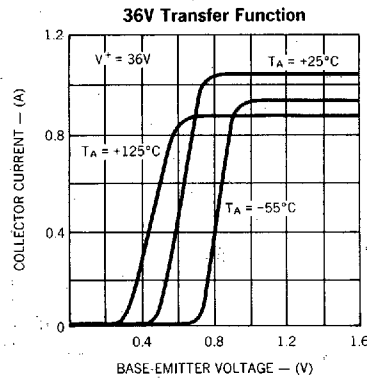
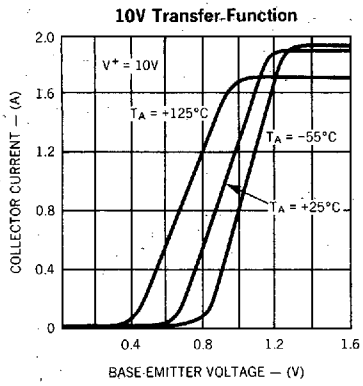
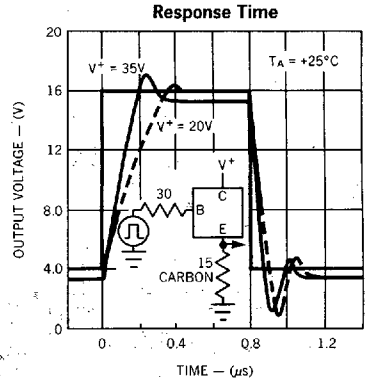
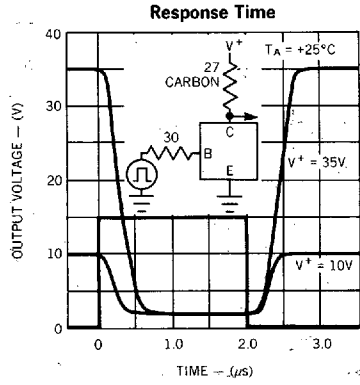
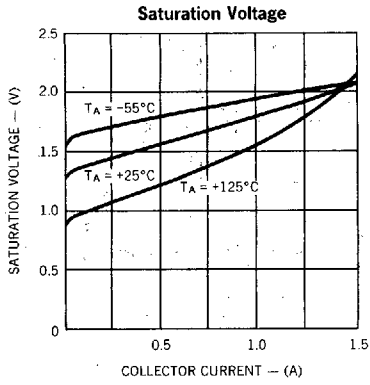
PARAMETERS	SYMBOL	CONDITIONS	UC395			UNITS
			MIN.	TYP.	MAX.	
Collector-Emitter Operating Voltage	$V_{ce}$	$I_q \leq I_c \leq I_{c\text{max}}$			36	V
Base to Emitter Breakdown Voltage	$BV_{be}$	$0 \leq V_{ce} \leq V_{ce\text{max}}$	36	60		V
Collector Current TO-3, TO-5, TO-257	$I_c$	$V_{ce} \leq 15\text{V}$ $V_{ce} \leq 7.0\text{V}$	1.0 1.0	2.2 1.8		A A
Saturation Voltage	$V_{sat}$	$I_c \leq 1.0\text{A}$ , $T_A = 25^{\circ}\text{C}$		1.8	2.2	V
Base Current	$I_b$	$V_{be} = 0\text{V}$ , $V_{ce} = 36\text{V}$ $V_{be} = 36\text{V}$ , $V_{ce} = 0\text{V}$	-50		10	$\mu\text{A}$
Quiescent Current	$I_q$	$V_{be} = 0\text{V}$ $0 \leq V_{ce} \leq V_{ce\text{max}}$		2.0	10.0	mA
Base-Emitter Voltage	$V_{be}$	$I_c = 1.0\text{A}$ , $T_A = 25^{\circ}\text{C}$		0.9		V
Switching Time	$t_s$	$V_{ce} = 36\text{V}$ , $R_L = 36\Omega$ $T_A = 25^{\circ}\text{C}$		500		ns
Thermal Resistance Junction to Case	$\theta_{jc}$	TO-3 Package TO-5 Package TO-257 Package Isolated TO-257 Package		2.3 12 2.5 3.0	3.0 15 3.5 4.2	$^{\circ}\text{C}/\text{W}$ $^{\circ}\text{C}/\text{W}$ $^{\circ}\text{C}/\text{W}$ $^{\circ}\text{C}/\text{W}$

**TYPICAL PERFORMANCE CHARACTERISTICS**



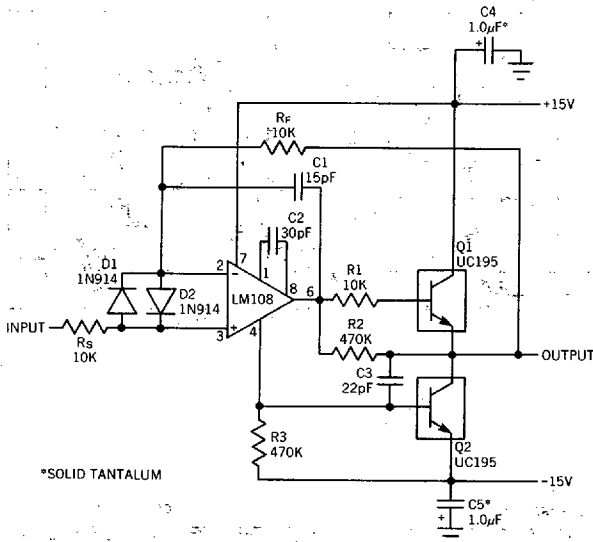
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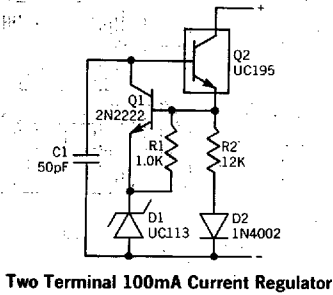


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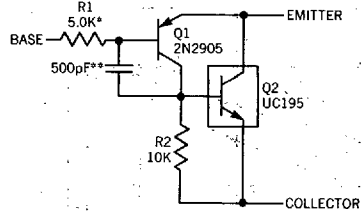
TYPICAL APPLICATIONS



1.0A Voltage Follower

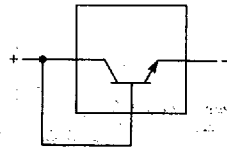


Two Terminal 100mA Current Regulator

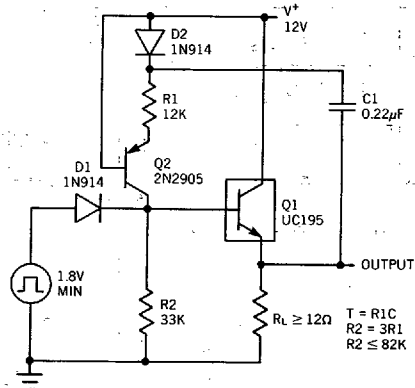


\*PROTECTS AGAINST EXCESSIVE BASE DRIVE.  
\*\*NEEDED FOR STABILITY.

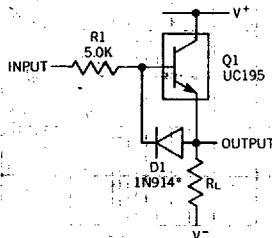
Power PNP



Two Terminal Current Limiter



Power One-Shot



\*PREVENTS STORAGE WITH FAST FALL  
TIME SQUARE WAVE DRIVE

Fast Follower