

PRELIMINARY
ENGINEERING
DATA



Series PTC 401, PTC 402

High Voltage NPN Transistors

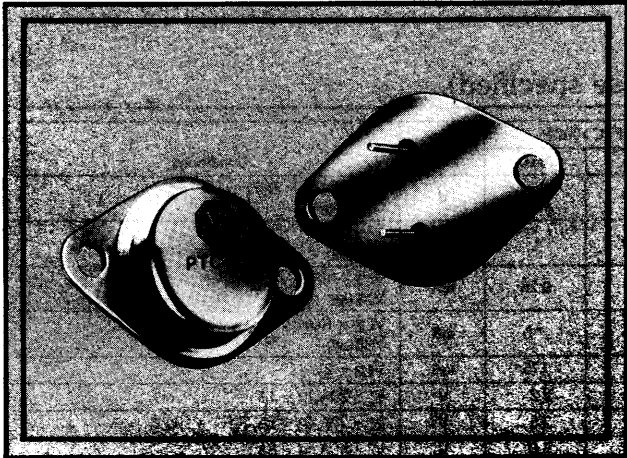
3 Amperes • 700 Volts

FEATURES

- High Voltage Rating – 700 Volts
- Industrial and Military Applications
- Superior Resistance to Thermal Fatigue

APPLICATIONS

- Switching Regulators
- PWM Inverters
- Deflection Circuits
- Motor Controls
- Solenoid Drivers



SPECIFICATIONS

General

The PTC 401 and PTC 402 Powermode series transistors are high-voltage, high-gain, NPN, 3 ampere switching transistors for Industrial and Military Service.

The series is particularly well suited to off-line (transformerless) switching power supplies operating as high as 40 KHz. Other applications include PWM Inverters, Motor Controls, Relay and Solenoid Drivers, Deflection Circuits and Pulse Modulators.

Switch time and sustaining test circuit

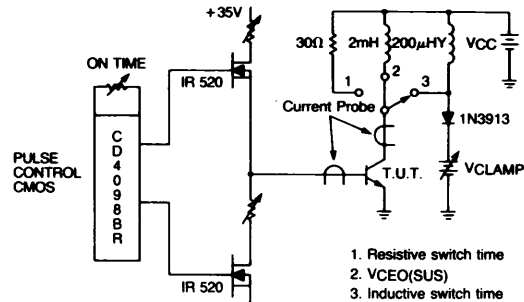
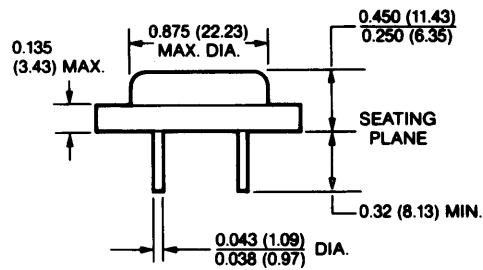
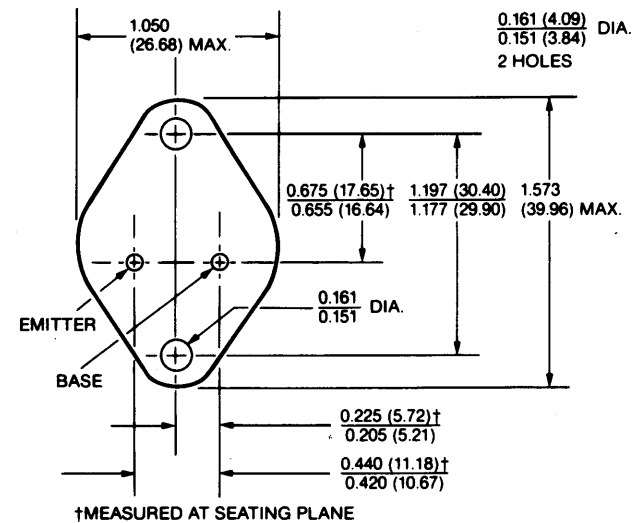


Figure 1



Basic dimensions in inches.

Dimensions shown in PARENTHESES are in millimeters.

Package outline JEDEC TO-204MA
(Formerly JEDEC TO-3)

SERIES PTC 401, PTC 402

High Voltage Fast Switching NPN Transistors

Absolute maximum ratings

Description	PTC 401	PTC 402	Unit	Conditions
V _{CBO} Collector-Base Voltage	400	700	Volts	
V _{CEO} Collector-Emitter Voltage	300	325	Volts	
V _{CEV} Collector-Emitter Voltage	400	700	Volts	
I _C Collector Current Continuous	2	3.5	A	
I _C Collector Current Peak	5	10	A	
I _B Base Current Continuous	1	2	A	
I _B Base Current Peak	3	5	A	
P _D Maximum Power Dissipation	75	100	W	T _C = 25°C
I _E Emitter Current Continuous	2	3.5	A	
I _E Emitter Current Peak	5	10	A	

Electrical characteristics at 25°C (unless otherwise specified)

Description	Min.	Max.	Min.	Max.	Unit	Conditions
V _{CEO(sus)} Collector-Emitter Sustaining Voltage 1	300		325		V	I _C = .2A, L = 2mH See Figure 1 I _B = 0
I _{CEV} Collector Cutoff Current 1		0.1		0.1	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V
		1.0		1.0	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V, T _C = +125°C
I _{EBO} Emitter Cutoff Current 1		5		5	mA	V _{EB} = 5 Volts
V _{CE(sat)} Collector-Emitter Saturation Voltage 1 2		0.8			V	I _C = 0.5A I _B = 0.05A
				2.0	V	I _C = 3A I _B = 0.6A
V _{BE(sat)} Base-Emitter Saturation Voltage 1 2		1.5			V	I _C = 0.5A I _B = 0.05A
				2.5	V	I _C = 3A I _B = 0.6A
h _{FE} DC Current Gain 1 2	20	100				I _C = 0.5A, V _{CE} = 5V
f _T Gain-Bandwidth Product 1	2.2		2.2		MHz	I _C = .2, V _{CE} = 10V f _{test} = 5MHz
I _{s/b} Second Breakdown Collector Current		7.5		10	A	V _{CE} = 10V Non Rep. tp = 1s

Thermal and mechanical characteristics

Description	Type	Min.	Typ.	Max.	Unit	Conditions
R _{θJC} Thermal Resistance Junction to Case	All			.75	°C/W	
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds				275	°C	
t _J , t _{STG} Operating and Storage Junction Temperature Range		-65		150	°C	

1 IN ACCORDANCE WITH JEDEC REGISTRATION DATA.

2 PULSE TEST: PW = 300 μs, DUTY CYCLE ≤ 2%

PRELIMINARY
ENGINEERING
DATA



Series PTC 403, PTC 409

High Voltage NPN Transistors

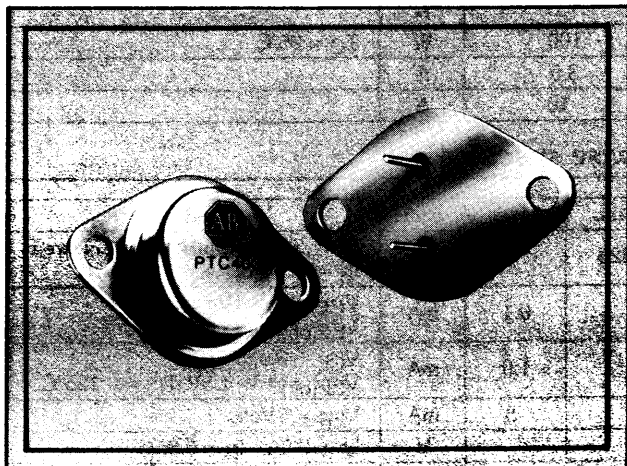
3.5 Amperes • 400 Volts

FEATURES

- High Voltage Rating – 400 Volts
- Industrial and Military Applications
- Superior Resistance to Thermal Fatigue

APPLICATIONS

- Switching Regulators
- PWM Inverters
- Deflection Circuits
- Motor Controls
- Solenoid Drivers



SPECIFICATIONS

General

The PTC 403 and PTC 409 Powermode series transistors are high-voltage, high-gain, NPN, 3.5 ampere switching transistors for Industrial and Military Service.

The series is particularly well suited to off-line (transformerless) switching power supplies operating as high as 40 KHz. Other applications include PWM Inverters, Motor Controls, Relay and Solenoid Drivers, Deflection Circuits and Pulse Modulators.

Switch time and sustaining test circuit

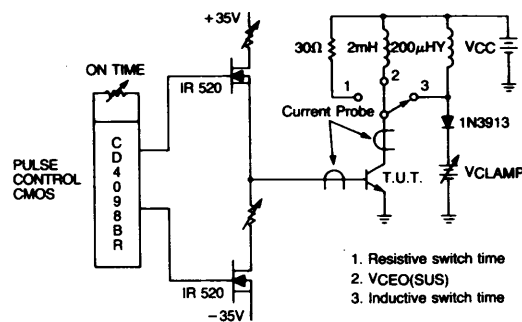
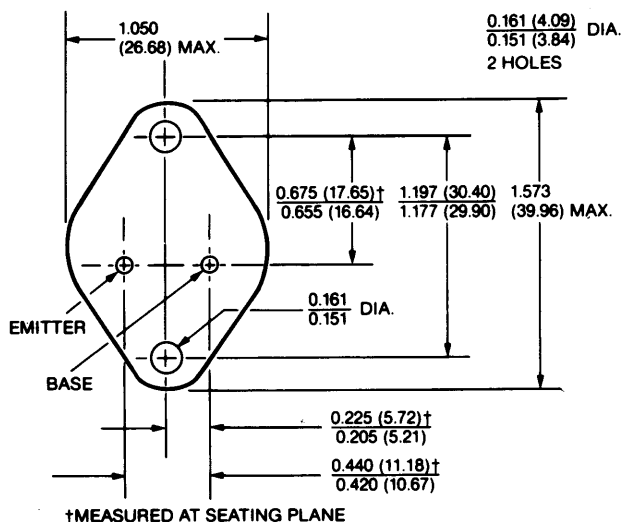
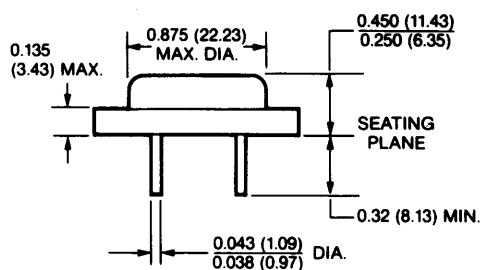


Figure 1

1. Resistive switch time
2. VCEO(SUS)
3. Inductive switch time



†MEASURED AT SEATING PLANE



Basic dimensions in inches.

Dimensions shown in PARENTHESES are in millimeters.

Package outline JEDEC TO-204MA
(Formerly JEDEC TO-3)

SERIES PTC 403, PTC 409

High Voltage Fast Switching NPN Transistors

Absolute maximum ratings

Description	PTC 403	PTC 409	Unit	Conditions
V _{CBO} Collector-Base Voltage	400	400	Volts	
V _{CEO} Collector-Emitter Voltage	325	325	Volts	
V _{CEV} Collector-Emitter Voltage	400	400	Volts	
I _C Collector Current Continuous	3.5		A	
I _C Collector Current Peak	10		A	
I _B Base Current Continuous	2		A	
I _B Base Current Peak	5		A	
P _D Maximum Power Dissipation	100		W	T _C = 25°C
I _E Emitter Current Continuous	3.5		A	
I _E Emitter Current Peak	10		A	

Electrical characteristics at 25°C (unless otherwise specified)

Description	Min.	Max.	Min.	Max.	Unit	Conditions
V _{CEO(sus)} Collector-Emitter Sustaining Voltage ¹	325		325		V	I _C = .2A, L = 2mH See Figure 1 I _B = 0
I _{CEV} Collector Cutoff Current ¹		0.1		0.1	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V
		1.0		1.0	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V, T _C = +125°C
I _{EBO} Emitter Cutoff Current ¹		5		5	mA	V _{EB} = 5V
V _{CE(sat)} Collector-Emitter Saturation Voltage ¹ ²		2.0			V	I _C = 3.5A I _B = 0.8A
				1.2	V	I _C = 1.0A I _B = .167A
V _{BE(sat)} Base-Emitter Saturation Voltage ¹ ²		2.5			V	I _C = 3.5A I _B = 0.8A
				1.5	V	I _C = 1.0A I _B = .167A
f _T Gain-Bandwidth Product ¹	2.2		2.2		MHz	I _C = .2A, V _{CE} = 10V f _{test} = 5MHz
I _{s/b} Second Breakdown Collector Current		10		10	A	V _{CE} = 10V Non Rep. tp = 1s

Thermal and mechanical characteristics

Description	Type	Min.	Typ.	Max.	Unit	Conditions
R _{θJC} Thermal Resistance Junction to Case	All			.75	°C/W	
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds				275	°C	
t _J , t _{STG} Operating and Storage Junction Temperature Range		-65		150	°C	

¹ IN ACCORDANCE WITH JEDEC REGISTRATION DATA.

² PULSE TEST: PW = 300 μs, DUTY CYCLE ≤ 2%

PRELIMINARY
ENGINEERING
DATA



Series PTC 410, PTC 411 High Voltage NPN Transistors

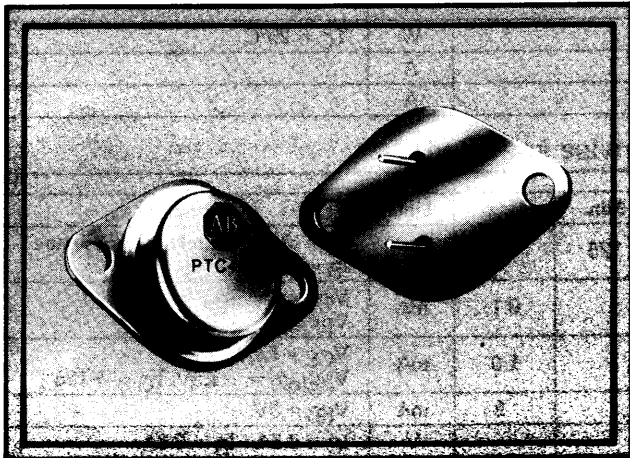
3.5 Amperes • 300 Volts

FEATURES

- High Voltage Rating – 300 Volts
- Industrial and Military Applications
- Superior Resistance to Thermal Fatigue

APPLICATIONS

- Switching Regulators
- PWM Inverters
- Deflection Circuits
- Motor Controls
- Solenoid Drivers



SPECIFICATIONS

General

The PTC 410 and PTC 411 Powermode series transistors are high-voltage, high-gain, NPN, 3.5 ampere switching transistors for Industrial and Military Service.

The series is particularly well suited to off-line (transformerless) switching power supplies operating as high as 40 KHz. Other applications include PWM Inverters, Motor Controls, Relay and Solenoid Drivers, Deflection Circuits and Pulse Modulators.

Switch time and sustaining test circuit

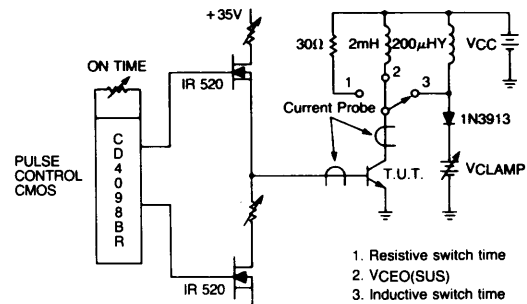
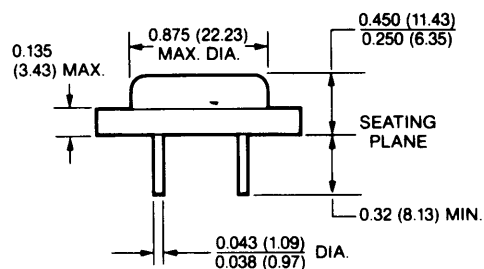
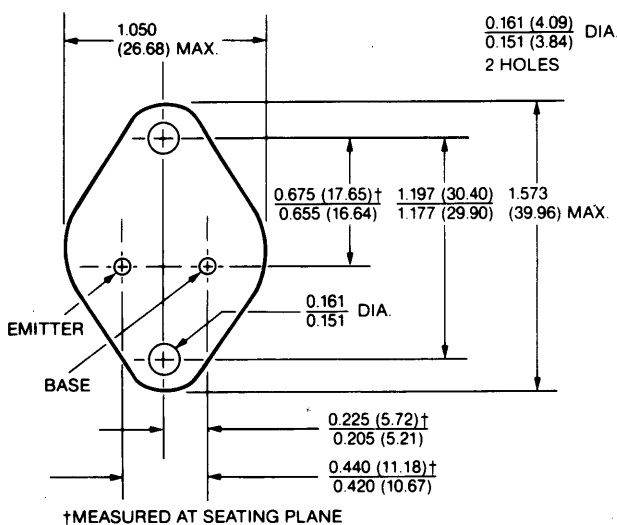


Figure 1



Basic dimensions in inches.

Dimensions shown in PARENTHESES are in millimeters.

Package outline JEDEC TO-204MA
(Formerly JEDEC TO-3)

SERIES PTC 410, PTC 411

High Voltage Fast Switching NPN Transistors

Absolute maximum ratings

Description		PTC 410	PTC 411	Unit	Conditions
V _{CBO}	Collector-Base Voltage	200	300	Volts	
V _{CEO}	Collector-Emitter Voltage	200	300	Volts	
V _{CEV}	Collector-Emitter Voltage	200	300	Volts	
I _C	Collector Current Continuous	3.5		A	
I _C	Collector Current Peak	10		A	
I _B	Base Current Continuous	2		A	
I _B	Base Current Peak	5		A	
P _D	Maximum Power Dissipation	100		W	T _C = 25°C
I _E	Emitter Current Continuous	3.5		A	
I _E	Emitter Current Peak	10		A	

Electrical characteristics at 25°C (unless otherwise specified)

Description		Min.	Max.	Min.	Max.	Unit	Conditions
V _{CEO(sus)}	Collector-Emitter Sustaining Voltage 1	200		300		V	I _C = .2A, L = 2mH I _B = 0 See Figure 1
I _{CEV}	Collector Cutoff Current 1		0.1		0.1	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V
			1.0		1.0	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V, T _C = +125°C
I _{EBO}	Emitter Cutoff Current 1		5		5	mA	V _{EB} = 5V
V _{CE(sat)}	Collector-Emitter Saturation Voltage 1 2		0.8		0.8	V	I _C = 1.0A I _B = 0.1A
V _{BE(sat)}	Base-Emitter Saturation Voltage		1.5		1.5	V	I _C = 1.0A I _B = 0.1A
h _{FE}	DC Current Gain 1 2	30	90	30	90		I _C = 1.0A, V _{CE} = 5V
h _{FE}	DC Current Gain 1 2	10		10			I _C = 2.5A, V _{CE} = 5V
f _T	Gain-Bandwidth Product 1	2.2		2.2		MHz	I _C = .2A, V _{CE} = 10V f _{test} = 5MHz
I _{s/b}	Second Breakdown Collector Current		10		10	A	V _{CE} = 10V Non Rep. tp = 1s

Thermal and mechanical characteristics

Description	Type	Min.	Typ.	Max.	Unit	Conditions
R _{θJC}	Thermal Resistance Junction to Case	All		.75	°C/W	
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds				275	°C	
t _J , t _{STG}	Operating and Storage Junction Temperature Range		-65	150	°C	

1 IN ACCORDANCE WITH JEDEC REGISTRATION DATA.

2 PULSE TEST: PW = 300 μs, DUTY CYCLE ≤ 2%

SERIES PTC 413, PTC 423

High Voltage Fast Switching NPN Transistors

Absolute maximum ratings

Description	PTC 413	PTC 423	Unit	Conditions
V _{CBO} Collector-Base Voltage	400	400	Volts	
V _{CEO} Collector-Emitter Voltage	325	325	Volts	
V _{CEV} Collector-Emitter Voltage	400	400	Volts	
I _C Collector Current Continuous	2	3.5	A	
I _C Collector Current Peak	5	10	A	
I _B Base Current Continuous	1	2	A	
I _B Base Current Peak	5	5	A	
P _D Maximum Power Dissipation	75	100	W	T _C = 25°C
I _E Emitter Current Continuous	2	3.5	A	
I _E Emitter Current Peak	5	10	A	

Electrical characteristics at 25°C (unless otherwise specified)

Description	Min.	Max.	Min.	Max.	Unit	Conditions
V _{CEO(sus)} Collector-Emitter Sustaining Voltage 1	325		325		V	I _C = .2A, L = 2mH See Figure 1 I _B = 0
I _{CEV} Collector Cutoff Current 1		0.1		0.1	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V
		1.0		1.0	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V, T _C = +125°C
I _{EBO} Emitter Cutoff Current 1		5		5	mA	V _{EB} = 5V
V _{CE(sat)} Collector-Emitter Saturation Voltage 1 2		.8			V	I _C = .5A I _B = .05A
				.8	V	I _C = 1.0A I _B = .1A
V _{BE(sat)} Base-Emitter Saturation Voltage 1 2		1.5			V	I _C = .5A I _B = .05A
				1.5	V	I _C = 1.0A I _B = .1A
h _{FE} DC Current Gain 1 2	20	80				I _C = .5, V _{CE} = 5V
h _{FE} DC Current Gain 1 2			30	90		I _C = 1.0A, V _{CE} = 5V
f _T Gain-Bandwidth Product 1	2.2			2.2	MHz	I _C = .2A, V _{CE} = 10 f _{test} = 5MHz
I _{s/b} Second Breakdown Collector Current		7.5		10	A	V _{CE} = 10V Non Rep. tp = 1s

Thermal and mechanical characteristics

Description	Type	Min.	Typ.	Max.	Unit	Conditions
R _{θJC} Thermal Resistance Junction to Case	All			.75	°C/W	
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds				275	°C	
t _J , t _{STG} Operating and Storage Junction Temperature Range		-65		150	°C	

1 IN ACCORDANCE WITH JEDEC REGISTRATION DATA.

2 PULSE TEST: PW = 300 μs, DUTY CYCLE ≤ 2%

PRELIMINARY
ENGINEERING
DATA



Series PTC 424, PTC 425

High Voltage NPN Transistors

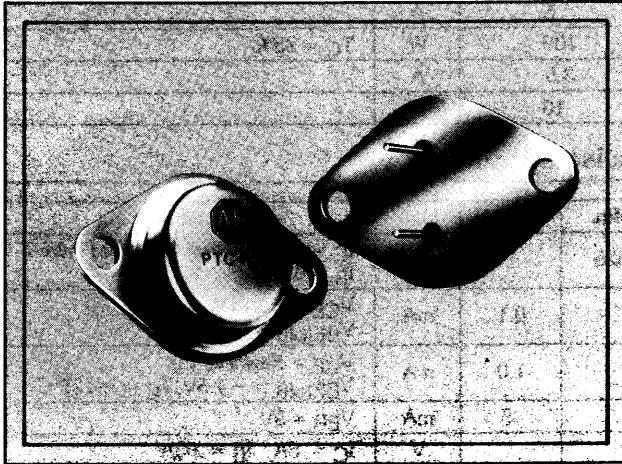
3.5 Amperes • 700 Volts

FEATURES

- High Voltage Rating – 700 Volts
- Industrial and Military Applications
- Superior Resistance to Thermal Fatigue

APPLICATIONS

- Switching Regulators
- PWM Inverters
- Deflection Circuits
- Motor Controls
- Solenoid Drivers



SPECIFICATIONS

General

The PTC 424 and PTC 425 Powermode series transistors are high-voltage, high-gain, NPN, 3.5 ampere switching transistors for Industrial and Military Service.

The series is particularly well suited to off-line (transformerless) switching power supplies operating as high as 40 KHz. Other applications include PWM Inverters, Motor Controls, Relay and Solenoid Drivers, Deflection Circuits and Pulse Modulators.

Switch time and sustaining test circuit

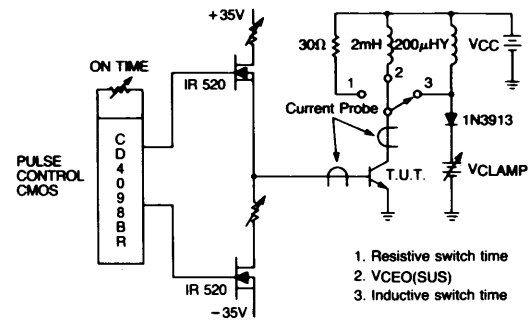
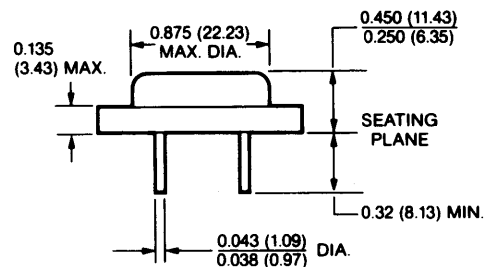
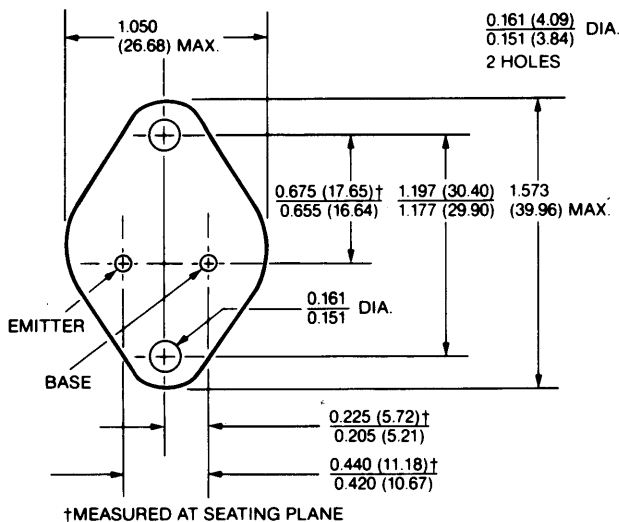


Figure 1



Basic dimensions in inches.

Dimensions shown in PARENTHESES are in millimeters.

Package outline JEDEC TO-204MA
(Formerly JEDEC TO-3)

SERIES PTC 424, PTC 425

High Voltage Fast Switching NPN Transistors

Absolute maximum ratings

Description	PTC 424	PTC 425	Unit	Conditions
V _{CBO} Collector-Base Voltage	700	700	Volts	
V _{CEO} Collector-Emitter Voltage	500	500	Volts	
V _{CEV} Collector-Emitter Voltage	700	700	Volts	
I _C Collector Current Continuous	3.5		A	
I _C Collector Current Peak	10		A	
I _B Base Current Continuous	2		A	
I _B Base Current Peak	5		A	
P _D Maximum Power Dissipation	100		W	T _C = 25°C
I _E Emitter Current Continuous	3.5		A	
I _E Emitter Current Peak	10		A	

Electrical characteristics at 25°C (unless otherwise specified)

Description	Min.	Max.	Min.	Max.	Unit	Conditions
V _{CEO(sus)} Collector-Emitter Sustaining Voltage 1	350		400		V	I _C = .2A, L = 2mH See Figure 1 I _B = 0
I _{CEV} Collector Cutoff Current 1		0.1		0.1	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V
		1.0		1.0	mA	V _{CE} = Rated V _{CEV} V _{BE(off)} = -1.5V, T _C = +125°C
I _{EBO} Emitter Cutoff Current 1		5		5	mA	V _{EB} = 6V
V _{CE(sat)} Collector-Emitter Saturation Voltage 1 2		.8		.8	V	I _C = 1. A I _B = .1A
V _{BE(sat)} Base-Emitter Saturation Voltage 1 2		1.5		1.5	V	I _C = 1A I _B = .1A
h _{FE} DC Current Gain 1 2	30	90	30	90		I _C = 1A, V _{CE} = 5V
h _{FE} DC Current Gain 1 2	10		10			I _C = 2.5A, V _{CE} = 5V
f _T Gain-Bandwidth Product 1	2.5			2.5	MHz	I _C = .2A, V _{CE} = 10V f _{test} = 5MHz
I _{s/b} Second Breakdown Collector Current		10		10	A	V _{CE} = 10V Non Rep. tp = 1s

Thermal and mechanical characteristics

Description	Type	Min.	Typ.	Max.	Unit	Conditions
R _{θJC} Thermal Resistance Junction to Case	All			.75	°C/W	
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds				275	°C	
t _J , t _{STG} Operating and Storage Junction Temperature Range		-65		150	°C	

1 IN ACCORDANCE WITH JEDEC REGISTRATION DATA.

2 PULSE TEST: PW = 300 μs, DUTY CYCLE ≤ 2%

PRELIMINARY
ENGINEERING
DATA



Series PTC 430, PTC 431

High Voltage NPN Transistors

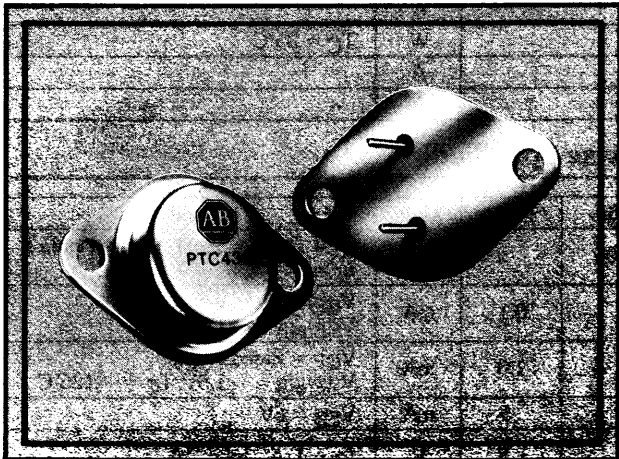
7 Amperes • 400 Volts

FEATURES

- High Voltage Rating – 400 Volts
- Industrial and Military Applications
- Superior Resistance to Thermal Fatigue

APPLICATIONS

- Switching Regulators
- PWM Inverters
- Deflection Circuits
- Motor Controls
- Solenoid Drivers



SPECIFICATIONS

General

The PTC 430 and PTC 431 Powermode series transistors are high-voltage, high-gain, NPN, 7 ampere switching transistors for Industrial and Military Service.

The series is particularly well suited to off-line (transformerless) switching power supplies operating as high as 40 KHz. Other applications include PWM Inverters, Motor Controls, Relay and Solenoid Drivers, Deflection Circuits and Pulse Modulators.

Switch time and sustaining test circuit

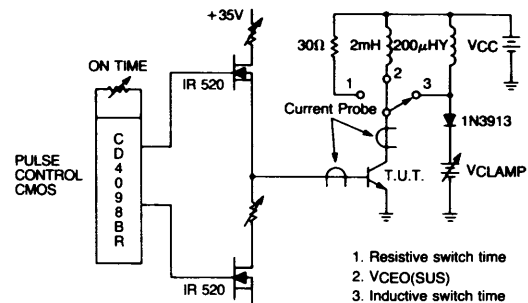
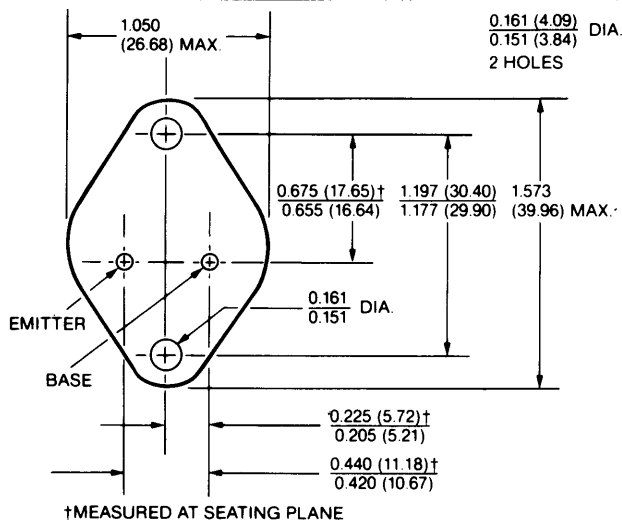
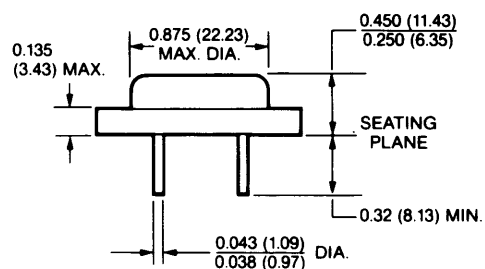


Figure 1



†MEASURED AT SEATING PLANE



Basic dimensions in inches.

Dimensions shown in PARENTHESSES are in millimeters.

Package outline JEDEC TO-204MA
(Formerly JEDEC TO-3)