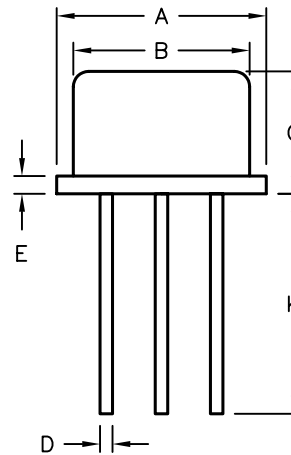
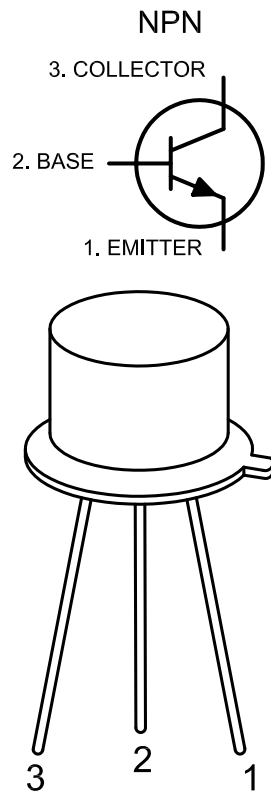


DCP #	REV	DESCRIPTION	DRAWN	DATE	CHECKD	DATE	APPRVD	DATE
1262	A	RELEASED	HO	4/1/03	JWM	4/1/03	DJC	4/1/03
1885	B	UPDATED TO ROHS COMPLIANCE	EO	02/03/06	HO	2/6/06	HO	2/6/06

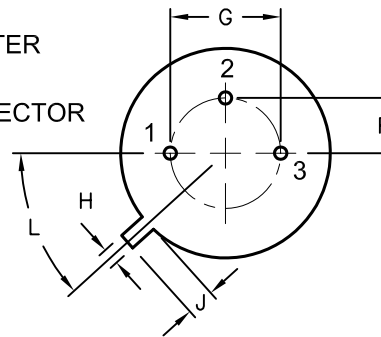
Description: A silicon NPN transistor in a TO-39 case intended for high speed switching applications.

Absolute Maximum Ratings:

- Collector-Emitter Voltage, $V_{CE0} = 40V$
- Collector-Base Voltage, $V_{CBO} = 75V$
- Emitter-Base Voltage, $V_{EBO} = 6V$
- Continuous Collector Current, $I_C = 800mA$
- Total Device Dissipation ($T_A = +25^{\circ}C$), $P_D = 400mW$
Derate above $25^{\circ}C = 2.28mW/^{\circ}C$
- Total Device Dissipation ($T_C = +25^{\circ}C$), $P_D = 1.2W$
Derate above $25^{\circ}C = 6.85mW/^{\circ}C$
- Operating Junction Temperature Range, $T_J = -65^{\circ}$ to $+200^{\circ}C$
- Storage Temperature Range, $T_{stg} = -65^{\circ}$ to $+200^{\circ}C$



1. EMITTER
2. BASE
3. COLLECTOR



Dimensions	A	B	C	D	E	F	G	H	J	K	L
Min.	8.50	7.74	6.09	0.40	-	2.41	4.82	0.71	0.73	12.70	42°
Max.	9.39	8.50	6.60	0.53	0.88	2.66	5.33	0.86	1.02	-	48°

SPC-F004.DWG

TOLERANCES: UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE FOR REFERENCE PURPOSES ONLY.	DRAWN BY:	DATE:	DRAWING TITLE:					
	HISHAM ODISH	4/1/03	Transistor, Bipolar, TO-39, NPN, Silicon, High Speed Switching					
	CHECKED BY:	DATE:	SIZE	DWG. NO.		ELECTRONIC FILE		REV
	JEFF MCVICKER	4/1/03	A	2N2219A		35C0689.DWG		B
	APPROVED BY:	DATE:	SCALE: NTS		U.O.M.: Millimeters		SHEET: 1 OF 2	
	DANIEL CAREY	4/1/03						

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Electrical Characteristics: (T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Max	Unit
OFF Characteristics					
Collector–Emitter Breakdown Voltage	V _{(BR)CEO}	I _C = 10mA, I _B = 0	40	–	V
Collector–Base Breakdown Voltage	V _{(BR)CBO}	I _C = 10μA, I _E = 0	75	–	V
Emitter–Base Breakdown Voltage	V _{(BR)EBO}	I _E = 10μA, I _C = 0	6	–	V
Collector Cutoff Current	I _{CBO}	V _{CE} = 60V, I _E = 0	–	0.01	μA
		V _{CE} = 60V, I _E = 0, T _A = +150°C	–	10	μA
	I _{CEX}	V _{CE} = 60V, V _{EB(off)} = 3V	–	10	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} = 3V, I _C = 0	–	10	nA
Base Cutoff Current	I _{BL}	V _{CE} = 60V, V _{EB(off)} = 3V	–	20	nA

ON Characteristics

DC Current Gain	h _{FE}	I _C = 0.1mA, V _{CE} = 10V	35	–	
		I _C = 1mA, V _{CE} = 10V	50	–	
		I _C = 10mA, V _{CE} = 10V	75	–	
		I _C = 10mA, V _{CE} = 10V, T _A = –55°C	35	–	
		I _C = 150mA, V _{CE} = 10V	100	300	
		I _C = 150mA, V _{CE} = 1V	50	–	
		I _C = 500mA, V _{CE} = 10V	40	–	
Collector–Emitter Saturation Voltage (Note 1)	V _{CE(sat)}	I _C = 150mA, I _B = 5mA	–	0.3	V
		I _C = 500mA, I _B = 50mA	–	1	V
Base–Emitter Saturation Voltage (Note 1)	V _{BE(sat)}	I _C = 150mA, I _B = 15mA	0.6	1.2	V
		I _C = 500mA, I _B = 50mA	–	2	V

Small-Signal Characteristics

Current Gain–Bandwidth Product (Note 2)	f _T	I _C = 20mA, V _{CE} = 20V, f = 100MHz, Note 2	300	–	MHz
Output Capacitance	C _{obo}	V _{CB} = 10V, I _E = 0, f = 100kHz	–	8	pF
Input Capacitance	C _{ibo}	V _{EB} = 0.5V, I _C = 0, f = 100kHz	–	25	pF
Input Impedance	h _{ie}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	2	8	k Ohm
		I _C = 10mA, V _{CE} = 10V, f = 1kHz	0.25	1.25	k Ohm
Voltage Feedback Ratio	H _{re}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	–	8	x 10 ^{–4}
		I _C = 10mA, V _{CE} = 10V, f = 1kHz	–	4	x 10 ^{–4}
Output Admittance	h _{oe}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	5	35	μmhos
		I _C = 1mA, V _{CE} = 10V, f = 1kHz	25	200	μmhos
Collector–Base Time Constant	r _b 'C _c	I _E = 20mA, V _{CB} = 20V, f = 31.8MHz	5	150	ps
Noise Figure	NF	I _C = 100μA, V _{CE} = 10V, R _S = 1k Ohm, f = 1kHz	–	4	dB
Real Part of Common–Emitter High Frequency Input Impedance	Re(h _{ie})	I _C = 20mA, V _{CE} = 20V, f = 300MHz	–	60	Ohm

Switching Characteristics

Delay Time	t _q	V _{CC} = 30V, I _C = 150mA, V _{BE(off)} = 0.5V, I _{B1} = 15mA	–	10	ns
Rise Time	t _r		–	25	ns
Storage Time	t _s	V _{CC} = 30V, I _C = 150mA, I _{B1} = I _{B2} = 15mA	–	225	ns
Fall Time	t _f		–	60	ns
Active Region Time Constant	T _A	I _C = 150mA, V _{CE} = 30V	–	2.5	ns

Note 1: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Note 2: f_T is defined as the frequency at which |h_{fe}| extrapolates to unity.