MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

MPS-U01
MPS-U01A

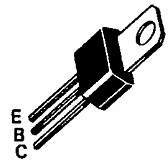
NOT RECOMMENDED FOR NEW DESIGNS

NPN SILICON ANNULAR TRANSISTORS

... designed for complementary symmetry audio circuits to 10 Watts output.

- Low Collector-Emitter Saturation Voltage — $V_{CE(sat)}$ = 0.5 Vdc (Max) @ I_C = 1.0 Adc
- Complements to PNP MPS-U51 and MPS-U51A
- Uniwatt Package for Excellent Thermal Properties — 1.0 Watt @ T_A = 25°C

NPN SILICON
AUDIO TRANSISTORS



MAXIMUM RATINGS

Rating	Symbol	MPS-U01	MPS-U01A	Unit
Collector-Emitter Voltage	V_{CEO}	30	40	Vdc
Collector-Base Voltage	V_{CB}	40	50	Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current — Continuous	I_C	2.0		Adc
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	1.0 8.0		Watt mW/°C
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	10 80		Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	12.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$(1)	125	°C/W

(1) $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.

Uniwatt packages can be To-5 lead formed by adding -5 to the device title and tab formed for flush mounting by adding -1 to the device title.

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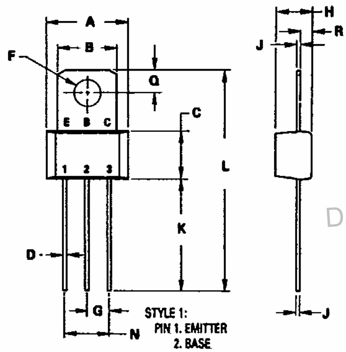


STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR
(COLLECTOR CONNECTED TO TAB)

NOTE:
1. LEADS WITHIN 0.15 mm(0.006) TOTAL OF TRUE POSITION AT CASE, AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	9.14	9.53	0.360	0.375
B	6.60	7.24	0.260	0.285
C	5.41	5.66	0.213	0.223
D	0.38	0.53	0.015	0.021
F	3.18	3.33	0.125	0.131
G	2.54 BSC		0.100 BSC	
H	3.94	4.19	0.155	0.165
J	0.36	0.41	0.014	0.016
K	11.63	12.70	[illegible]	[illegible]
L	24.58	25.53	0.968	1.005
N	5.08 BSC		0.200 BSC	
Q	2.39	2.69	0.094	0.106
R	1.14	1.40	0.045	0.055

CASE 152-02

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (1) (I_C = 10 mAdc, I_B = 0)	MPS-U01 MPS-U01A	$V_{(BR)CEO}$	30 40	– –	Vdc
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	MPS-U01 MPS-U01A	$V_{(BR)CBO}$	40 50	– –	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)		$V_{(BR)EBO}$	5.0	–	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0) (V_{CB} = 40 Vdc, I_E = 0)	MPS-U01 MPS-U01A	I_{CBO}	– –	0.1 0.1	μAdc
Emitter Cutoff Current (V_{BE} = 3.0 Vdc, I_C = 0)		I_{EBO}	–	0.1	μAdc
ON CHARACTERISTICS(1)					
DC Current Gain (I_C = 10 mAdc, V_{CE} = 1.0 Vdc) (I_C = 100 mAdc, V_{CE} = 1.0 Vdc) (I_C = 1.0 Adc, V_{CE} = 1.0 Vdc)		h_{FE}	55 60 50	– – –	–
Collector-Emitter Saturation Voltage (I_C = 1.0 Adc, I_B = 0.1 Adc)		$V_{CE(sat)}$	–	0.5	Vdc
Base-Emitter On Voltage (I_C = 1.0 Adc, V_{CE} = 1.0 Vdc)		$V_{BE(on)}$	–	1.2	Vdc
DYNAMIC CHARACTERISTICS					
Current-Gain—Bandwidth Product (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 20 MHz)		f_T	50	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)		C_{ob}	–	20	pF

(1)Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

FIGURE 1 – DC CURRENT GAIN

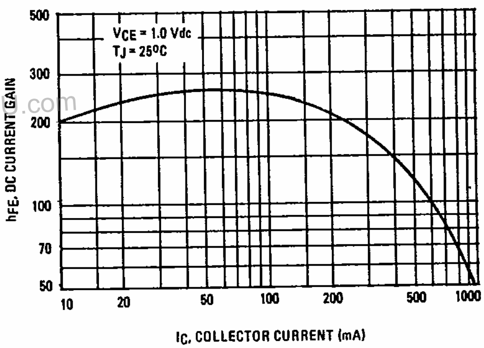


FIGURE 2 – "ON" VOLTAGES

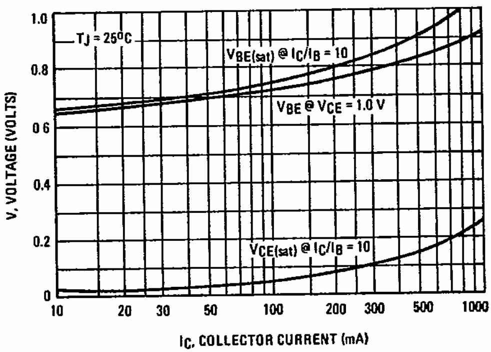
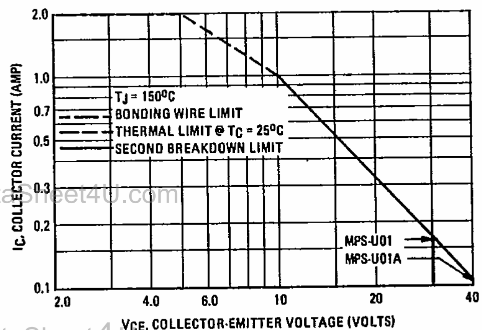


FIGURE 3 – DC SAFE OPERATING AREA



There are two limitations on the power handling ability of a transistor: junction temperature and secondary breakdown. Safe operating area curves indicate I_C–V_{CE} limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 3 is based on $T_{J(pk)}$ = 150°C; T_C is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by secondary breakdown.