

**MPS-U01**  
**MPS-U01A**

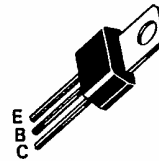
**NOT RECOMMENDED  
 FOR NEW DESIGNS**

**COMMON ANNUULAR TRANSISTORS**

Used for complementary symmetry audio circuits to 10 Watt output.

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

**NPN SILICON  
 AUDIO TRANSISTORS**



**MAXIMUM RATINGS**

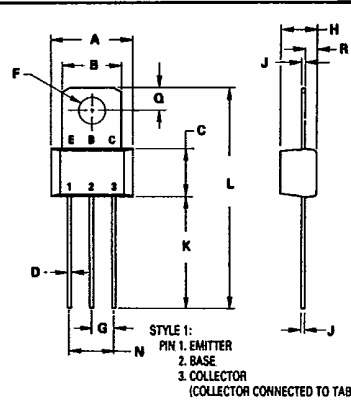
Rating	Symbol	MPS-U01	MPS-U01A	Unit
Collector-Emitter Voltage	$V_{CEO}$	30	40	Vdc
Collector-Base Voltage	$V_{CB}$	40	50	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0		Vdc
Collector Current – Continuous	$I_C$	2.0		A dc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0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

**THERMAL CHARACTERISTICS**

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

(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.



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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.14	3.53	0.360	0.375
B	6.50	7.24	0.260	0.286
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	0.38	0.41	0.014	0.016
K	11.63	12.70	0.458	0.500
L	24.58	26.53	0.968	1.006
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 ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

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

(1) Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

FIGURE 1 — DC CURRENT GAIN

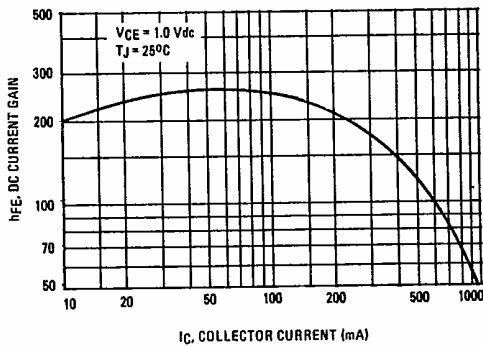


FIGURE 2 — "ON" VOLTAGES

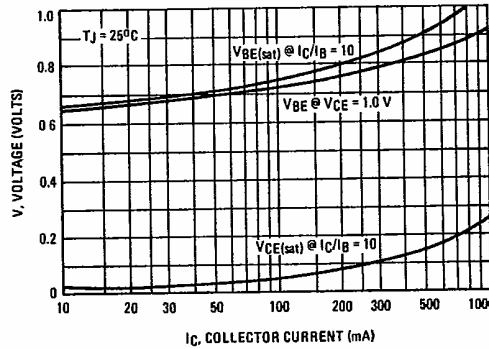
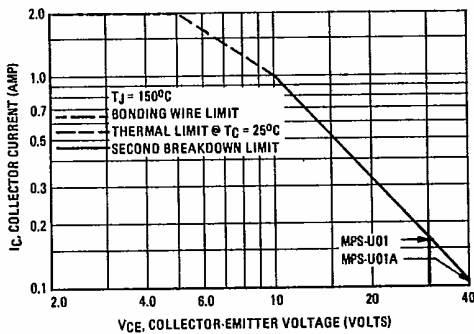


FIGURE 3 — DC SAFE OPERATING AREA



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  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  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.

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