

# POWER SUPPLY MONITOR DEVICES

## EML22/UML23N

### ●Features

- 1) Packaging Zener diode and small-signal amplifier transistor
- 2) Using outside connection able to use Power supply monitor device
- 3) When use Power supply monitor device,  
Temperature drift characteristics of detect voltage is about 150 ppm/°C.

### ●Applications

Protection of over load of power supply.

### ●Packaging specifications and Marking

| Type                         | EML22 | UML23N |
|------------------------------|-------|--------|
| Package                      | EMT6  | UMT6   |
| Marking                      | L22   | L23    |
| Code                         | T2R   | TR     |
| Basic ordering unit (pieces) | 8000  | 3000   |

### ●Absolute maximum ratings (Ta=25°C)

**Tr**

| Parameter                 | Symbol     | Limits | Unit |
|---------------------------|------------|--------|------|
| Collector-base voltage    | $V_{CBO}$  | 60     | V    |
| Collector-emitter voltage | $V_{CEO}$  | 50     | V    |
| Emitter-base voltage      | $V_{EBO}$  | 7      | V    |
| Collector current         | $I_C$      | 150    | mA   |
| Power dissipation         | $P_D^{*1}$ | 120    | mW   |

**Di**

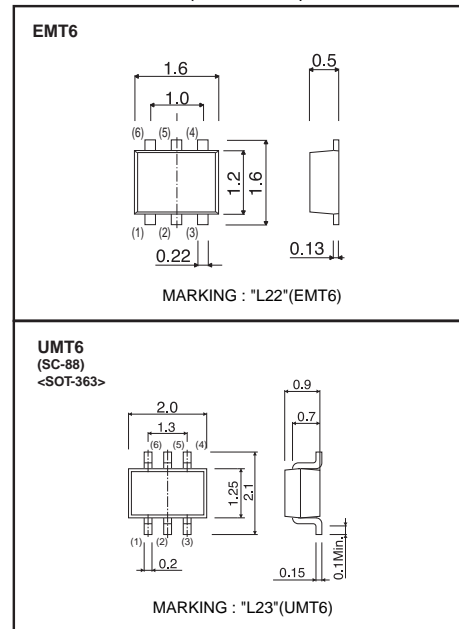
| Parameter         | Symbol     | Limits | Unit |
|-------------------|------------|--------|------|
| Power dissipation | $P_D^{*1}$ | 120    | mW   |

**Tr and Di**

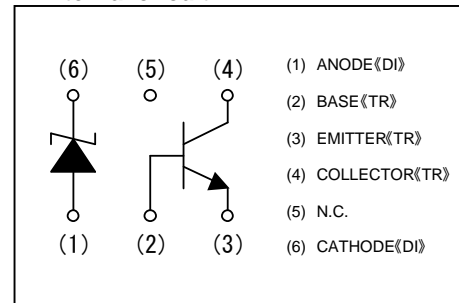
| Parameter                    | Symbol     | Limits      | Unit |
|------------------------------|------------|-------------|------|
| Power dissipation            | $P_D^{*1}$ | 150         | mW   |
| Junction temperature         | $T_j$      | 150         | °C   |
| Range of storage temperature | $T_{stg}$  | -55 to +150 | °C   |

\*1 Mounted on reference land.

### ●Dimensions (Unit : mm)



### ●Internal circuit



## ●Electrical characteristics (Ta = 25°C)

## Tr

| Parameter                            | Symbol        | Min. | Typ. | Max. | Unit | Conditions   |
|--------------------------------------|---------------|------|------|------|------|--|
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | 50   | —    | —    | V    | $I_C=1\text{mA}$   |
| Collector-base breakdown voltage     | $BV_{CBO}$    | 60   | —    | —    | V    | $I_C=50\mu\text{A}$  |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | 7    | —    | —    | V    | $I_E=50\mu\text{A}$  |
| Collector cut-off current            | $I_{CBO}$     | —    | —    | 100  | nA   | $V_{CB}=60\text{V}$  |
| Emitter cut-off current              | $I_{EBO}$     | —    | —    | 100  | nA   | $V_{EB}=7\text{V}$   |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | —    | —    | 400  | mV   | $I_C/I_B=50\text{mA}/5\text{mA}$                           |
| DC current gain                      | $h_{FE}$      | 120  | —    | 390  | —    | $V_{CE}=6\text{V}, I_C=1\text{mA}$                         |
| Transition frequency                 | $f_T$         | —    | 180  | —    | MHz  | $V_{CE}=12\text{V}, I_E=-2\text{mA},$<br>$f=100\text{MHz}$ |
| Output capacitance                   | $C_{ob}$      | —    | 2    | —    | pF   | $V_{CB}=12\text{V}, I_E=0\text{A},$<br>$f=1\text{MHz}$     |

## Di

| Parameter       | Symbol | Min. | Typ. | Max. | Unit | Conditions        |
|-----------------|--------|------|------|------|------|-------------------|
| Zener voltage   | $V_Z$  | 6.58 | 6.80 | 7.00 | V    | $I_Z=5\text{mA}$  |
| Reverse current | $I_R$  | —    | —    | 0.5  | mA   | $V_R=3.5\text{V}$ |

●Electrical characteristic curves

<Tr>

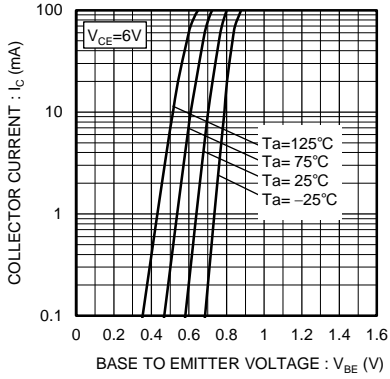


Fig. 1 GROUNDED EMITTER PROPAGATION CHARACTERISTICS

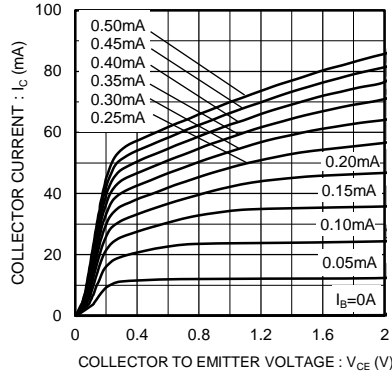


Fig. 2 GROUNDED EMITTER OUTPUT CHARACTERISTICS ( I )

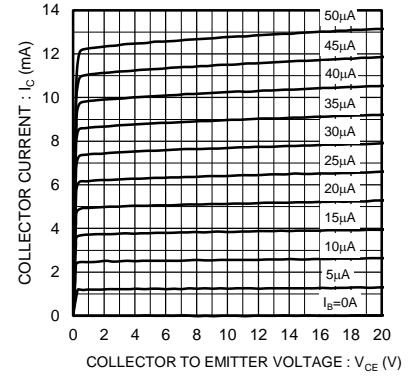


Fig. 3 GROUNDED EMITTER OUTPUT CHARACTERISTICS ( II )

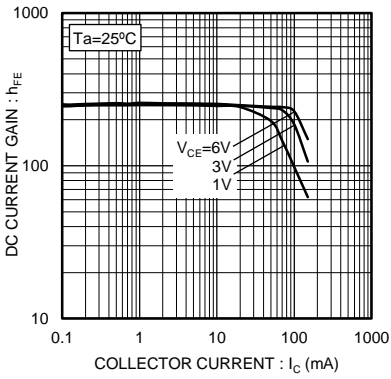


Fig.4 DC CURRENT GAIN vs. COLLECTOR CURRENT CHARACTERISTICS ( I )

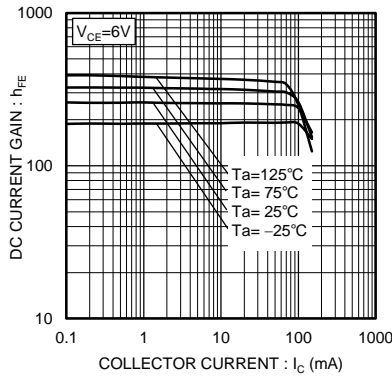


Fig. 5 DC CURRENT GAIN vs. COLLECTOR CURRENT CHARACTERISTICS ( II )

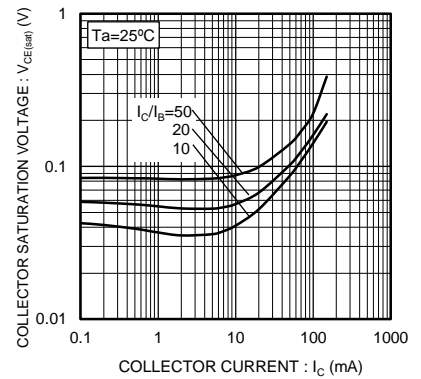


Fig. 6 COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT CHARACTERISTICS( 1 )

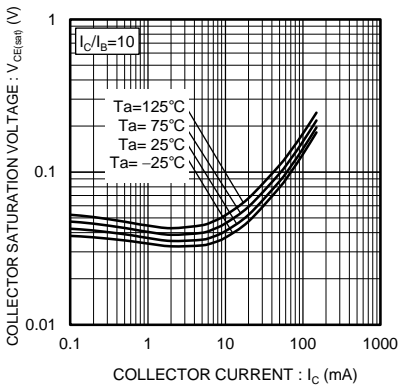


Fig. 7 COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT CHARACTERISTICS(II)

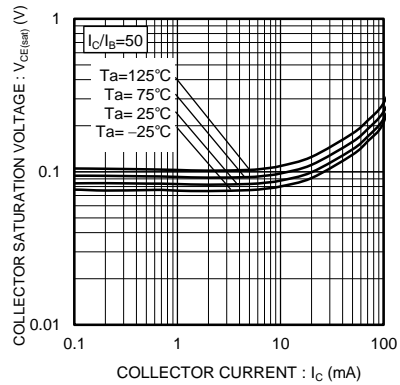


Fig. 8 COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT CHARACTERISTICS(III)

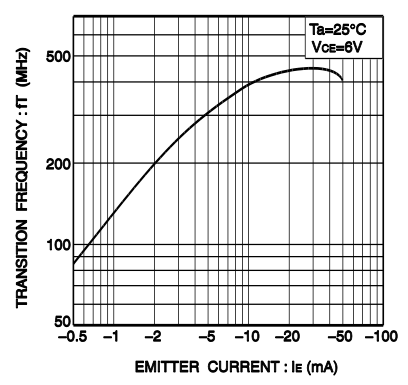


Fig.9 Gain bandwidth product vs. emitter current

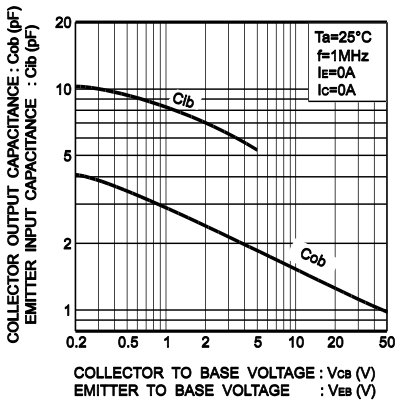


Fig.10 Collector output capacitance vs. collector-base voltage  
Emitter input capacitance vs. emitter-base voltage

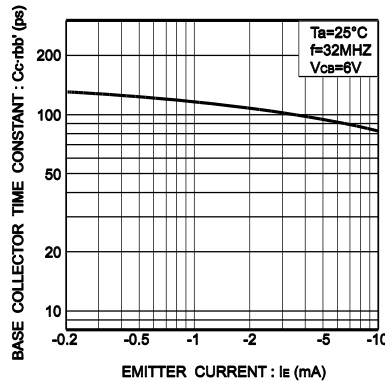


Fig.11 Base-collector time constant vs. emitter current

<Di>

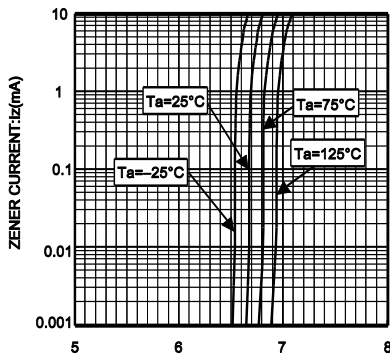


Fig.12 ZENER VOLTAGE :  $V_z$  (V)  
 $V_z$ - $I_z$  CHARACTERISTICS

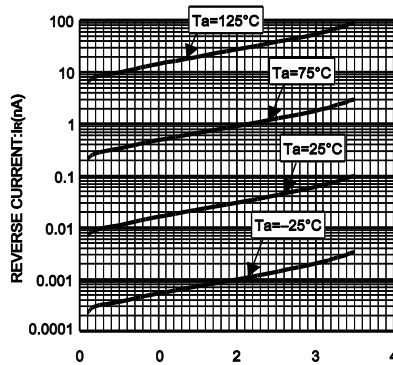


Fig.13 REVERSE VOLTAGE :  $V_R$  (V)  
 $V_R$ - $I_R$  CHARACTERISTICS

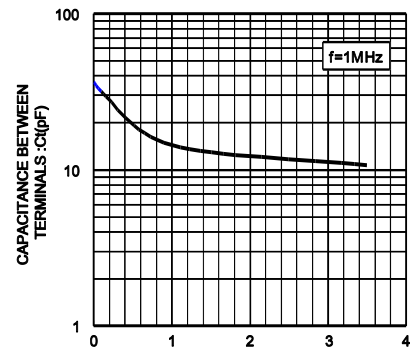


Fig.14 REVERSE VOLTAGE :  $V_R$  (V)  
 $V_R$ - $C_t$  CHARACTERISTICS

<Tr+Di>

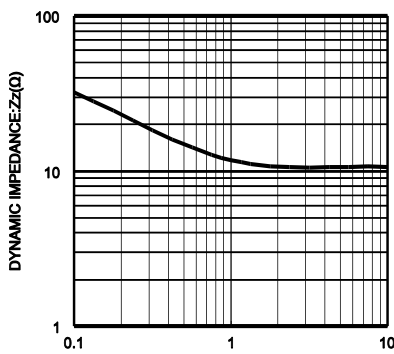


Fig.15 ZENER CURRENT :  $I_z$  (mA)  
 $Z_z$ - $I_z$  CHARACTERISTICS

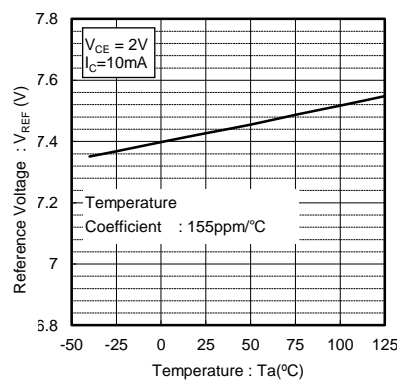


Fig.16 Reference Voltage vs Temperature Characteristics

●Measurement circuits

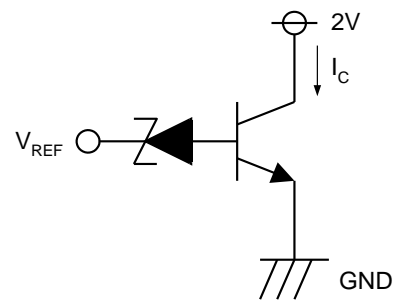


Fig 17 Reference Voltage vs Temperature Characteristics Measurement Circuit

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