

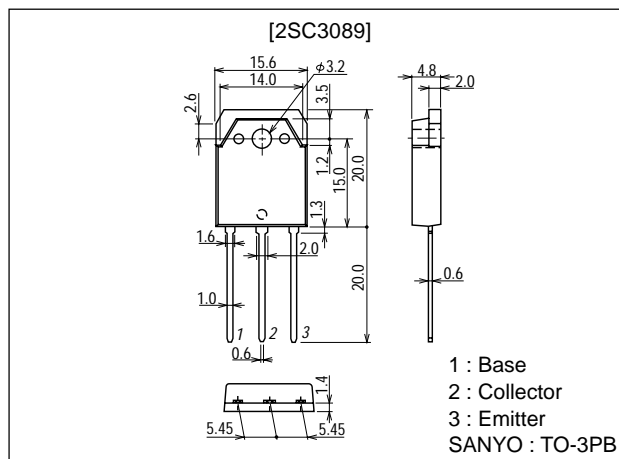
**2SC3089****500V/7A Switching Regulator Applications****Features**

- High breakdown voltage ($V_{CBO} \geq 800V$).
- High-speed switching.
- Wide ASO.

Package Dimensions

unit:mm

2022A

**Specifications****Absolute Maximum Ratings** at $T_a = 25^\circ C$

| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------|-----------|---|-------------|------------|
| Collector-to-Base Voltage | V_{CBO} | | 800 | V |
| Collector-to-Emitter Voltage | V_{CEO} | | 500 | V |
| Emitter-to-Base Voltage | V_{EBO} | | 7 | V |
| Collector Current | I_C | | 7 | A |
| Collector Current (Pulse) | I_{CP} | $PW \leq 300\mu s$, Duty Cycle $\leq 10\%$ | 14 | A |
| Base Current | I_B | | 3 | A |
| Collector Dissipation | P_C | | 2.5 | W |
| | | $T_c = 25^\circ C$ | 80 | W |
| Junction Temperature | T_j | | 150 | $^\circ C$ |
| Storage Temperature | T_{stg} | | -55 to +150 | $^\circ C$ |

Electrical Characteristics at $T_a = 25^\circ C$

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|--------------------------|-----------|------------------------------|---------|-----|-----|---------|
| | | | min | typ | max | |
| Collector Cutoff Current | I_{CBO} | $V_{CB} = 500V$, $I_E = 0$ | | | 10 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = 5V$, $I_C = 0$ | | | 10 | μA |
| DC Current Gain | h_{FE1} | $V_{CE} = 5V$, $I_C = 0.6A$ | 15* | | 50* | |
| | h_{FE2} | $V_{CE} = 5V$, $I_C = 3A$ | 8 | | | |

Continued on next page.

* : The h_{FE1} of the 2SC3089 is classified as follows. When specifying the h_{FE1} rank, specify two ranks or more in principle.

| Rank | L | M | N |
|----------|----------|----------|----------|
| h_{FE} | 15 to 30 | 20 to 40 | 30 to 50 |

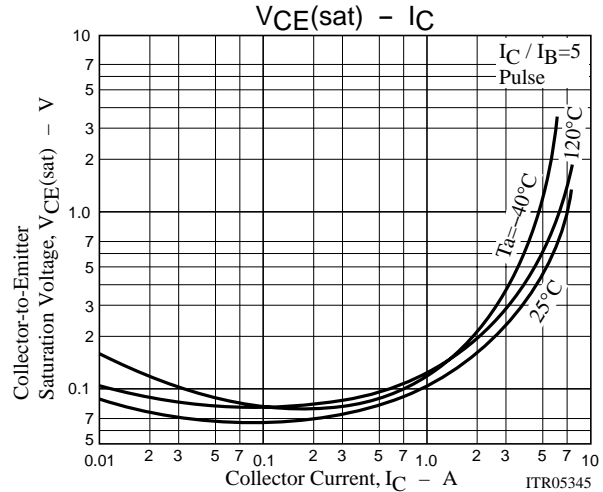
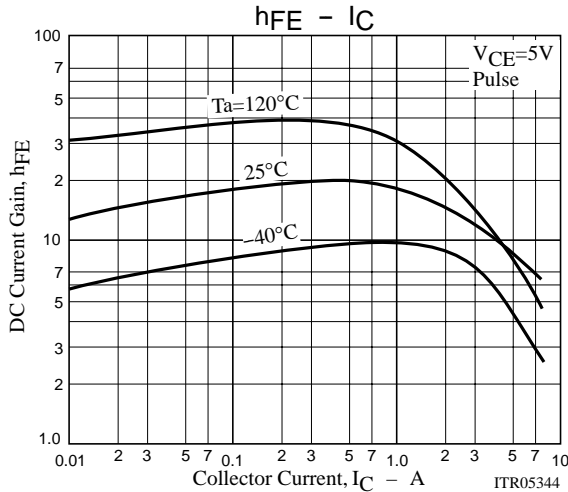
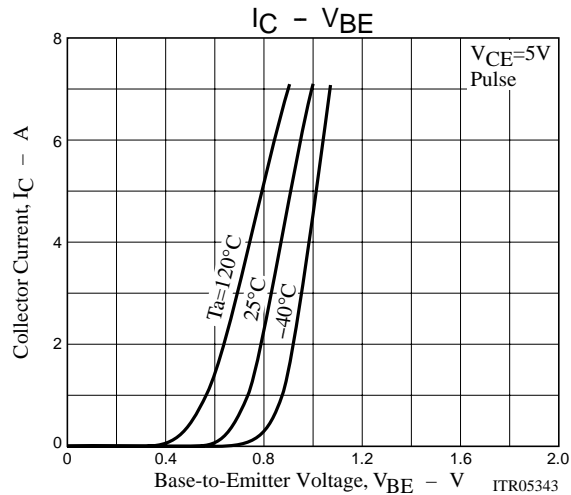
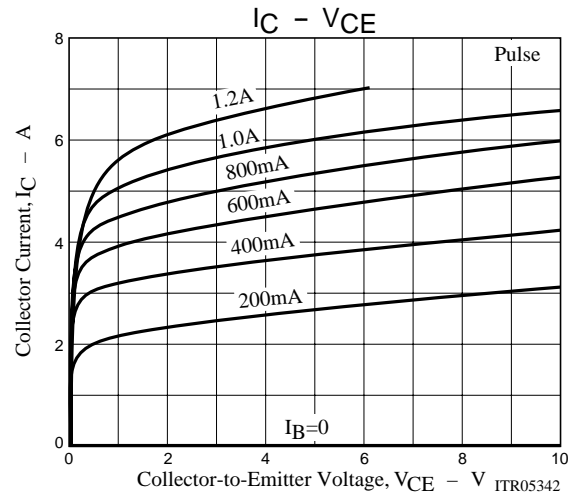
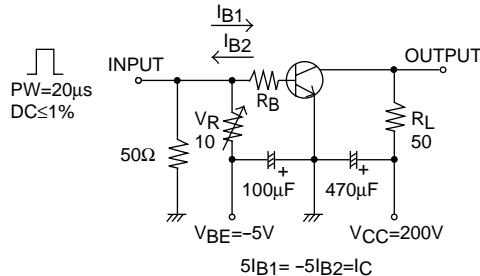
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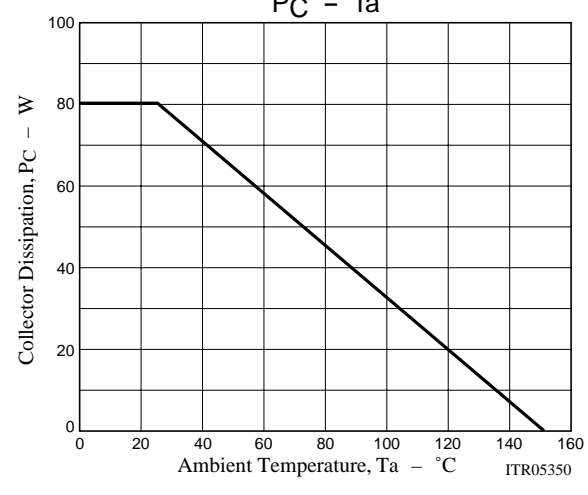
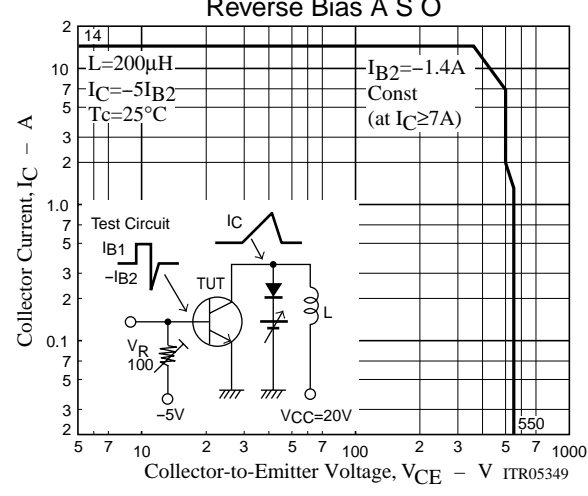
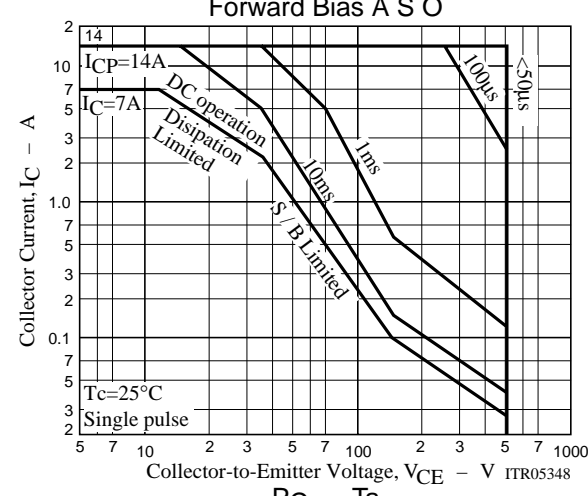
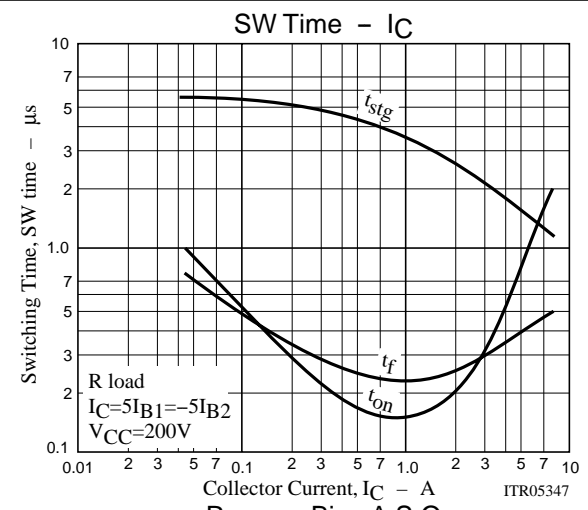
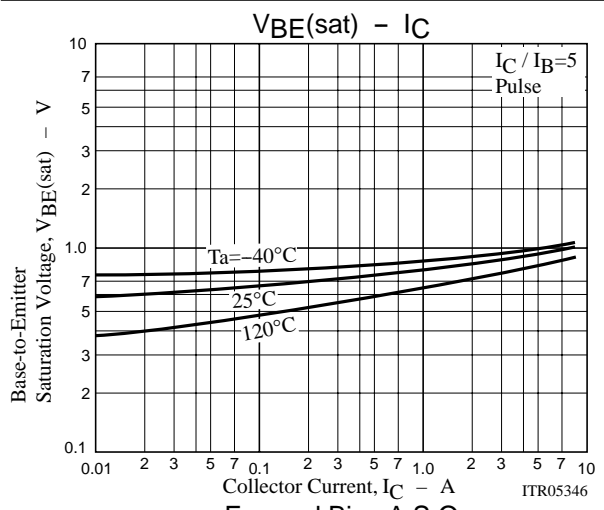
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| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|-----------------|---|---------|-----|-----|---------|
| | | | min | typ | max | |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=3A, I_B=0.6A$ | | | 1.0 | V |
| Base-to-Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C=3A, I_B=0.6A$ | | | 1.5 | V |
| Gain-Bandwidth Product | f_T | $V_{CE}=10V, I_C=0.6A$ | | 18 | | MHz |
| Output Capacitance | C_{ob} | $V_{CB}=10V, f=1MHz$ | | 80 | | pF |
| Collector-to-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C=1mA, I_E=0$ | 800 | | | V |
| Collector-to-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=5mA, R_{BE}=\infty$ | 500 | | | V |
| Emitter-to-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E=1mA, I_C=0$ | 7 | | | V |
| Collector-to-Emitter Sustain Voltage | $V_{CEO(sus)}$ | $I_C=7A, I_B=0.14A, L=50\mu H$ | 500 | | | V |
| Collector-to-Emitter Sustain Voltage | $V_{CEX(sus)1}$ | $I_C=7A, I_{B1}=0.14A, L=200\mu H, I_{B2}=-0.14A, \text{clamped}$ | 500 | | | V |
| | $V_{CEX(sus)2}$ | $I_C=1.2A, I_{B1}=0.24A, L=200\mu H, I_{B2}=-0.24A, \text{clamped}$ | 550 | | | V |
| Turn-ON Time | t_{on} | $I_C=4A, I_{B1}=0.8A, I_{B2}=-0.8A, R_L=50\Omega, V_{CC}=200V$ | | | 1.0 | μs |
| Storage Time | t_{stg} | $I_C=4A, I_{B1}=0.8A, I_{B2}=-0.8A, R_L=50\Omega, V_{CC}=200V$ | | | 3.0 | μs |
| Fall Time | t_f | $I_C=4A, I_{B1}=0.8A, I_{B2}=-0.8A, R_L=50\Omega, V_{CC}=200V$ | | | 1.0 | μs |

Switching Time Test Circuit





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