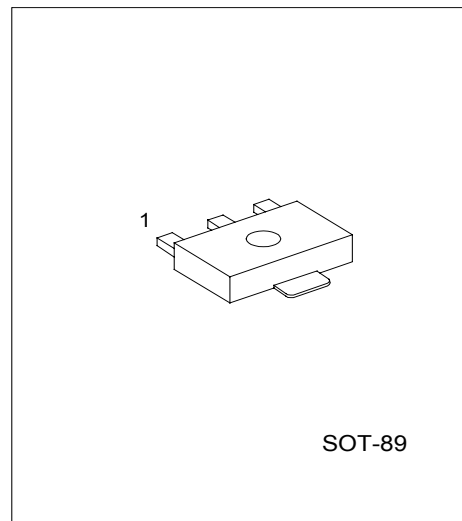


## 2SC3648 *NPN EPITAXIAL SILICON TRANSISTOR*

### HIGH-VOLTAGE SWITCHING PREDRIVER APPLICATIONS

#### ■ FEATURES

- \* High breakdown voltage and large current capacity
- \* Fast switching speed
- \* Over Current Protection Function



\*Pb-free plating product number: 2SC3648L

#### ■ PIN CONFIGURATION

| PIN NO. | PIN NAME  |
|---------|-----------|
| 1       | Emitter   |
| 2       | Collector |
| 3       | Base      |

#### ■ ORDERING INFORMATION

| Order Number  |                | Package | Packing   |
|---------------|----------------|---------|-----------|
| Normal        | Lead free      |         |           |
| 2SC3648-AB3-R | 2SC3648L-AB3-R | SOT-89  | Tape Reel |

# 25C3648 NPN EPITAXIAL SILICON TRANSISTOR

## ■ ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| PARAMETER                    | SYMBOL                                                      | RATINGS    | UNIT |
|------------------------------|-------------------------------------------------------------|------------|------|
| Collector to Base Voltage    | $V_{CBO}$                                                   | 180        | V    |
| Collector to Emitter Voltage | $V_{CEO}$                                                   | 160        | V    |
| Emitter to Base Voltage      | $V_{EBO}$                                                   | 6          | V    |
| Collector Current            | $I_C$                                                       | 0.7        | A    |
| Collector Current (Pulse)    | $I_{CP}$                                                    | 1.5        | A    |
| Collector Dissipation        | $P_C$ (Mounted on ceramic board 250mm <sup>2</sup> × 0.8mm) | 1.3        | W    |
|                              | $P_C$                                                       | 500        | mW   |
| Junction Temperature         | $T_J$                                                       | 150        | °C   |
| Storage Temperature          | $T_{STG}$                                                   | -40 ~ +150 | °C   |

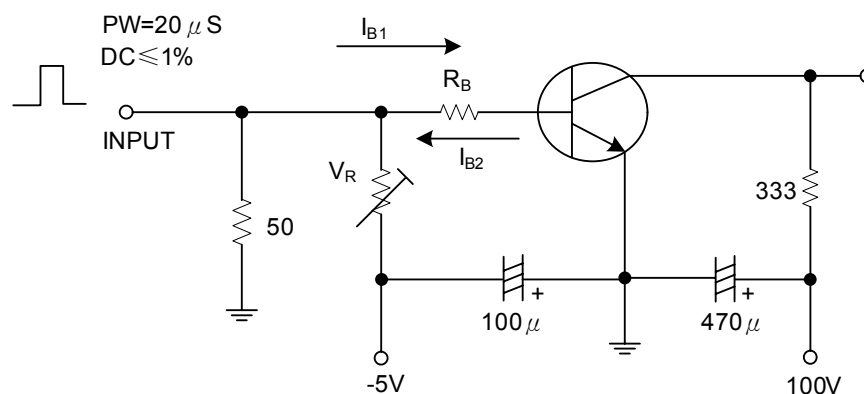
## ■ ELECTRICAL CHARACTERISTICS (Ta = 25°C, unless otherwise specified)

| PARAMETER                | SYMBOL        | TEST CONDITIONS            | MIN | TYP  | MAX | UNIT    |
|--------------------------|---------------|----------------------------|-----|------|-----|---------|
| C-E Saturation Voltage   | $V_{CE(sat)}$ | $I_C = 250mA, I_B = 25mA$  |     | 0.12 | 0.4 | V       |
| B-E Saturation Voltage   | $V_{BE(sat)}$ | $I_C = 250mA, I_B = 25mA$  |     | 0.85 | 1.2 | V       |
| C-B Breakdown Voltage    | $V_{(BR)CBO}$ | $I_C = 10\mu A, I_E = 0$   | 180 |      |     | V       |
| C-E Breakdown Voltage    | $V_{(BR)CEO}$ | $I_C = 1, R_{BE} = \infty$ | 160 |      |     | V       |
| E-B Breakdown Voltage    | $V_{(BR)EBO}$ | $I_E = 10\mu A, I_C = 0$   | 6   |      |     | V       |
| Collector Cutoff Current | $I_{CBO}$     | $V_{CB} = 120V, I_E = 0$   |     |      | 0.1 | $\mu A$ |
| Emitter Cutoff Current   | $I_{EBO}$     | $V_{EB} = 4V, I_C = 0$     |     |      | 0.1 | $\mu A$ |
| Output Capacitance       | $C_{ob}$      | $V_{CB} = 10V, f = 1MHz$   |     | 8    |     | pF      |
| DC Current Gain          | $h_{FE1}$     | $V_{CE} = 5V, I_C = 100mA$ | 100 |      | 400 |         |
|                          | $h_{FE2}$     | $V_{CE} = 5V, I_C = 10mA$  | 90  |      |     |         |
| Turn-on Time             | $t_{ON}$      | See specified Test circuit |     | 50   |     | ns      |
| Storage Time             | $t_{STG}$     | See specified Test circuit |     | 1000 |     | ns      |
| Fall Time                | $t_F$         | See specified Test circuit |     | 60   |     | ns      |
| Gain-Bandwidth Product   | $f_T$         | $V_{CE} = 5V, I_C = 50mA$  |     | 120  |     | MHz     |

## ■ CLASSIFICATION OF $h_{FE} 1$

| RANK  | R         | S         | T         |
|-------|-----------|-----------|-----------|
| RANGE | 100 ~ 200 | 140 ~ 280 | 200 ~ 400 |

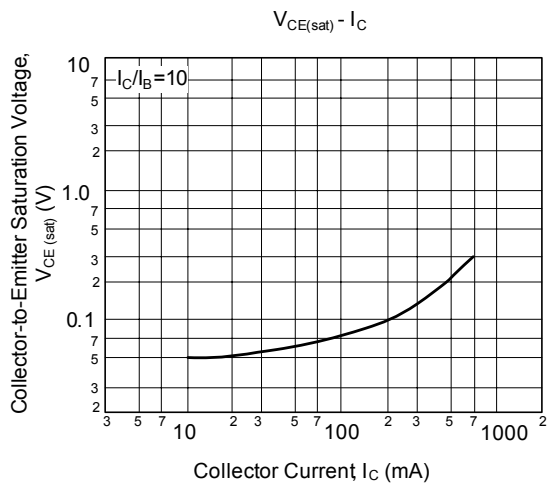
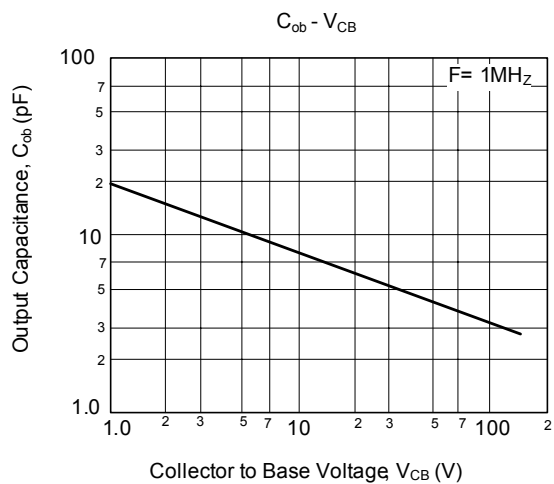
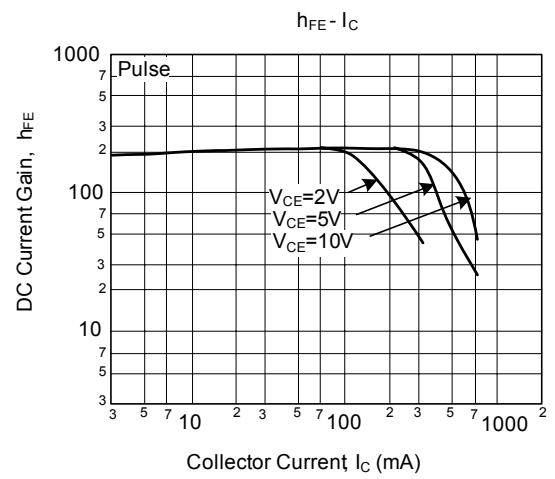
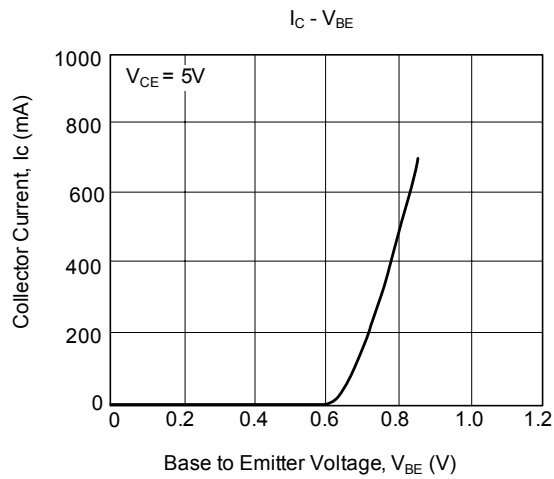
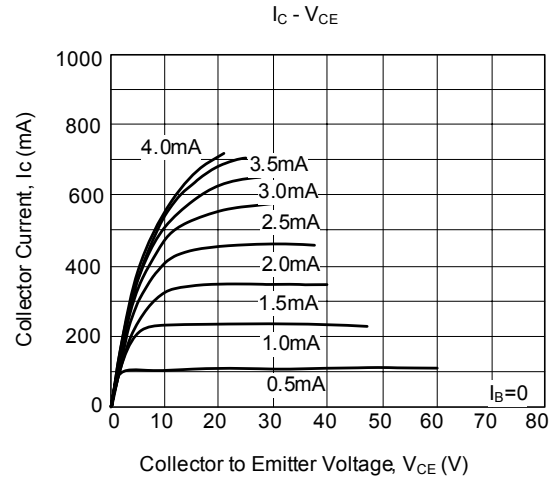
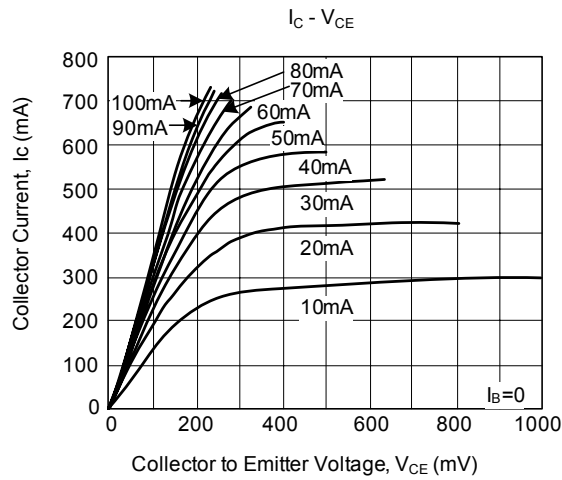
## ■ SWITCHING TIME TEST CIRCUIT



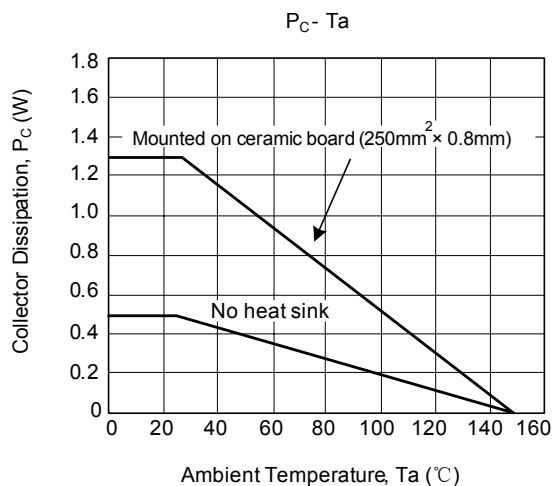
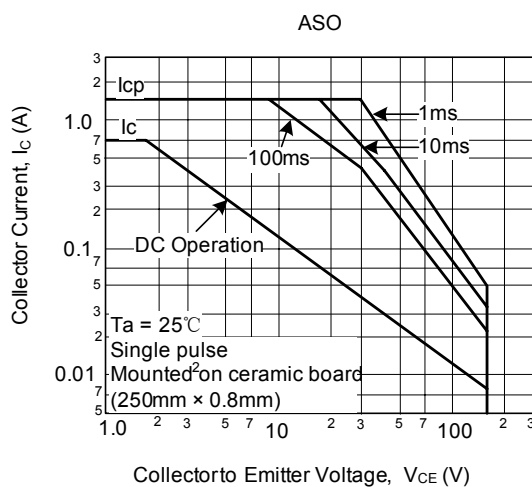
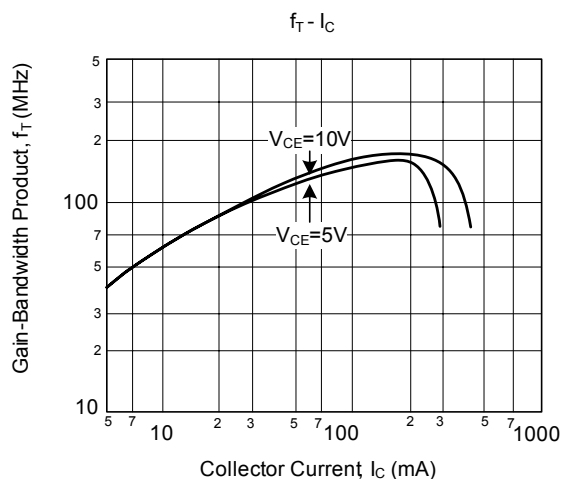
$$20I_{B1} = -20I_{B2} = I_C = 300mA$$

Unit (Resistance:  $\Omega$ , Capacitance: F)

## ■ TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS(Cont.)



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