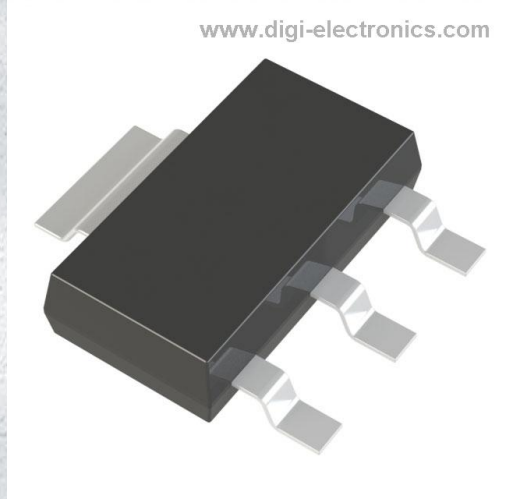
# FZT694BTC Datasheet




https://www.DiGi-Electronics.com

| | |
|---|---|
| DiGi Electronics Part Number | FZT694BTC-DG |
| Manufacturer | Diodes Incorporated |
| Manufacturer Product Number | FZT694BTC |
| Description | TRANS NPN 120V 1A SOT223-3 |
| Detailed Description | Bipolar (BJT) Transistor NPN 120 V 1 A 130MHz 2 W Surface Mount SOT-223-3 |

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

## Purchase and inquiry

| Manufacturer Product Number: | Manufacturer: |
| --- | --- |
| FZT694BTC | Diodes Incorporated |
| Series: | Product Status: |
| - | Obsolete |
| Transistor Type: | Current - Collector (Ic) (Max): |
| NPN | 1 A |
| Voltage - Collector Emitter Breakdown (Max): | Vce Saturation (Max) @ Ib, Ic: |
| 120 V | 500mV @ 5mA, 400mA |
| Current - Collector Cutoff (Max): | DC Current Gain (hFE) (Min) @ Ic, Vce: |
| 100nA (ICBO) | 150 @ 400mA, 2V |
| Power - Max: | Frequency - Transition: |
| 2 W | 130MHz |
| Operating Temperature: | Mounting Type: |
| -55°C ~ 150°C (TJ) | Surface Mount |
| Package / Case: | Supplier Device Package: |
| TO-261-4, TO-261AA | SOT-223-3 |
| Base Product Number: | |
| FZT694 | |

## Environmental & Export classification

| RoHS Status: | Moisture Sensitivity Level (MSL): |
| --- | --- |
| ROHS3 Compliant | 1 (Unlimited) |
| REACH Status: | ECCN: |
| REACH Affected | EAR99 |
| HTSUS: | |
| 8541.29.0075 | |

**FZT694B**

## 120V NPN MEDIUM POWER HIGH GAIN TRANSISTOR IN SOT223

## Features

- $BV_{CEO}$ > 120V
- $BV_{CBO}$ > 120V
- $I_C$ = 1A Continuous Current
- $h_{FE}$ > 400 for High Gain @ 0.2A
- Very Low Saturation Voltage
- Complementary PNP Type: FZT795A
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

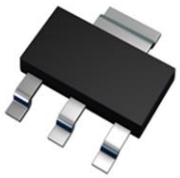
## Mechanical Data

- Package: SOT223
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

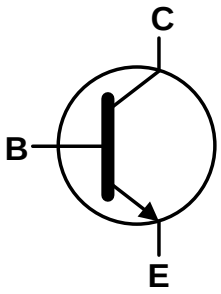
## Applications

- Darlington replacements
- Relay and solenoid drivers

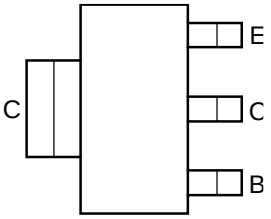
SOT223 (Type DN)



Top View




Device Symbol




Top View
Pin-Out

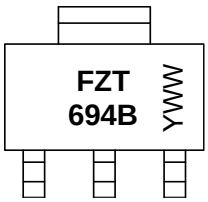
## Ordering Information (Note 4)

| Part Number | Compliance | Package | Marking | Reel Size (inches) | Tape Width (mm) | Packing | |
|---|---|---|---|---|---|---|---|
| | | | | | | Qty. | Carrier |
| FZT694BTA | Standard | SOT223 (Type DN) | FZT694B | 7 | 12 | 1,000 | Reel |

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

## Marking Information

SOT223 (Type DN)




FZT 694B = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 2 = 2022)
WW or $\overline{WW}$ = Week Code (01 to 53)

## Absolute Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 120 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 120 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 7 | V |
| Continuous Collector Current | $I_C$ | 1 | A |
| Peak Pulse Current | $I_{CM}$ | 2 | A |

## Thermal Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

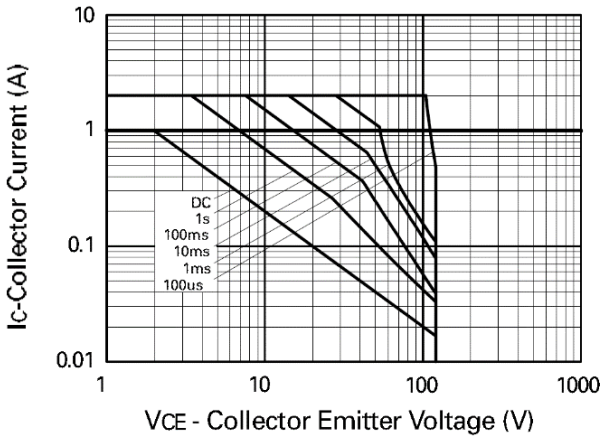
| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Power Dissipation | (Note 5) | $P_D$ | 3 | W |
| | (Note 6) | | 2 | |
| | (Note 7) | | 1.6 | |
| | (Note 8) | | 1.2 | |
| Thermal Resistance, Junction to Ambient | (Note 5) | $R_{\theta JA}$ | 41.7 | °C/W |
| | (Note 6) | | 62.5 | |
| | (Note 7) | | 78.1 | |
| | (Note 8) | | 104 | |
| Thermal Resistance Junction to Lead | (Note 9) | $R_{\theta JL}$ | 12.9 | |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## ESD Ratings (Note 10)

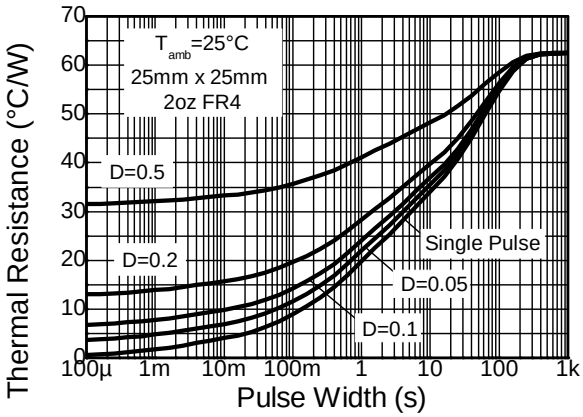
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

Notes:
5. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
7. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
8. Same as Note 5, except the device is mounted on minimum recommended pad layout.
9. Thermal resistance from junction to solder-point (at the end of the collector lead).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

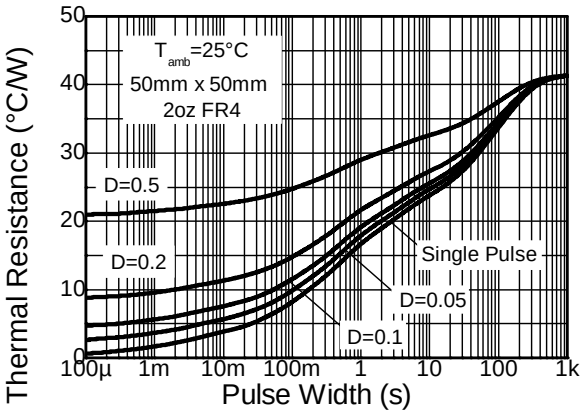
## Thermal Characteristics and Derating Information



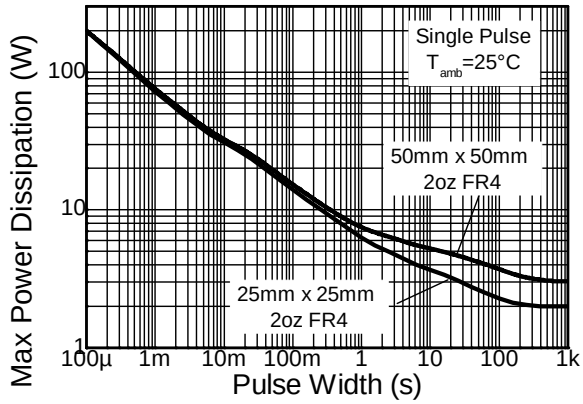

**Safe Operating Area**



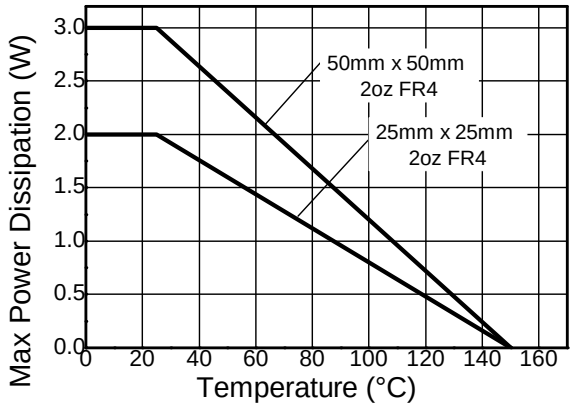

**Transient Thermal Impedance**




**Transient Thermal Impedance**




**Pulse Power Dissipation**



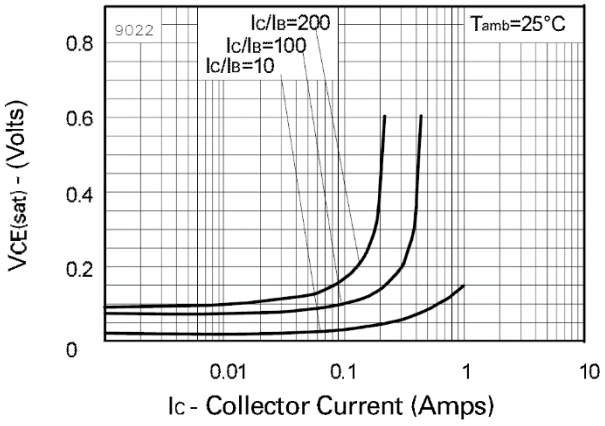

**Derating Curve**

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

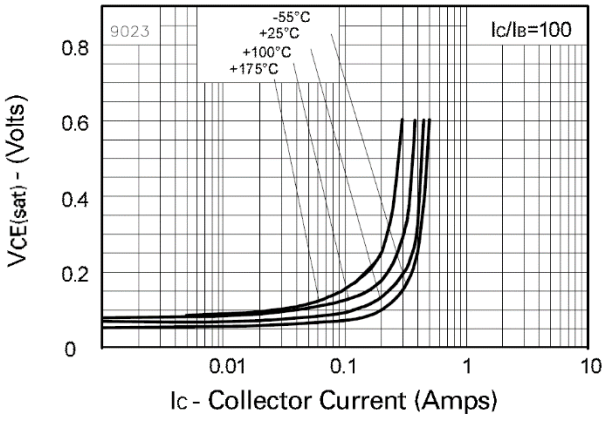
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | 120 | — | — | V | $I_C$ = 100µA |
| Collector-Emitter Breakdown Voltage (Note 11) | $BV_{CEO}$ | 120 | — | — | V | $I_C$ = 10mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | 7 | — | — | V | $I_E$ = 100µA |
| Collector-Base Cutoff Current | $I_{CBO}$ | — | — | 100 | nA | $V_{CB}$ = 100V |
| Collector-Emitter Cutoff Current | $I_{CES}$ | — | — | 100 | nA | $V_{CE}$ = 100V |
| Emitter Cutoff Current | $I_{EBO}$ | — | — | 100 | nA | $V_{EB}$ = 6V |
| DC Current Gain (Note 11) | $h_{FE}$ | 500<br>400<br>150 | —<br>—<br>— | —<br>—<br>— | — | $I_C$ = 100mA, $V_{CE}$ = 2V<br>$I_C$ = 200mA, $V_{CE}$ = 2V<br>$I_C$ = 400mA, $V_{CE}$ = 2V |
| Collector-Emitter Saturation Voltage (Note 11) | $V_{CE(sat)}$ | —<br>— | —<br>— | 250<br>500 | mV | $I_C$ = 100mA, $I_B$ = 0.5mA<br>$I_C$ = 400mA, $I_B$ = 5mA |
| Base-Emitter Saturation Voltage (Note 11) | $V_{BE(sat)}$ | — | — | 0.9 | V | $I_C$ = 1A, $I_B$ = 10mA |
| Base-Emitter Turn-On Voltage (Note 11) | $V_{BE(on)}$ | — | — | 0.9 | V | $I_C$ = 1A, $V_{CE}$ = 2V |
| Input Capacitance | $C_{ibo}$ | — | 200 | — | pF | $V_{EB}$ = 0.5V, f = 1MHz |
| Output Capacitance | $C_{obo}$ | — | 9 | — | pF | $V_{CB}$ = 10V, f = 1MHz |
| Current Gain-Bandwidth Product | $f_T$ | 130 | — | — | MHz | $V_{CE}$ = 5V, $I_C$ = 50mA, f = 50MHz |
| Turn-On Time | $t_{on}$ | — | 80 | — | ns | $V_{CC}$ = 50V, $I_C$ = 100mA |
| Turn-Off Time | $t_{off}$ | — | 2,900 | — | ns | $I_{B1}$ = -$I_{B2}$ = 10mA |

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

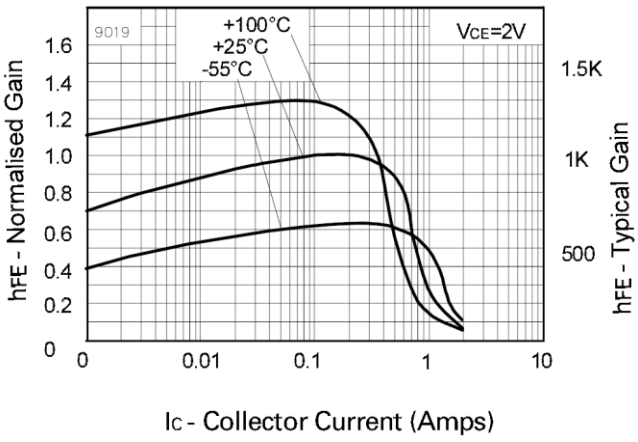
## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)



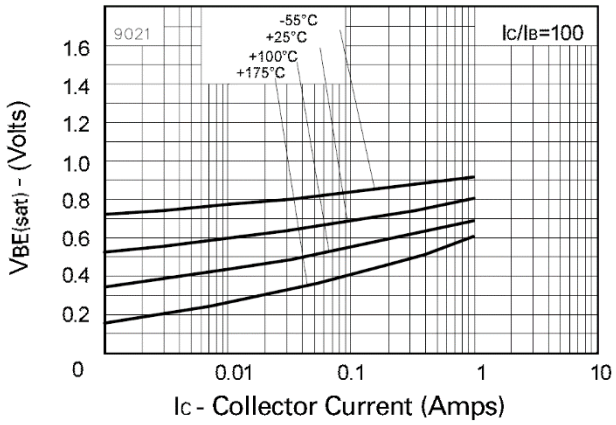

**VCE(sat) v IC**



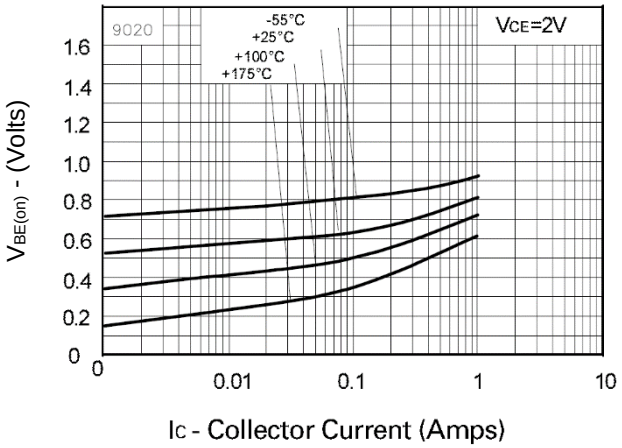

**VCE(sat) v IC**




**hFE v IC**




**VBE(sat) v IC**

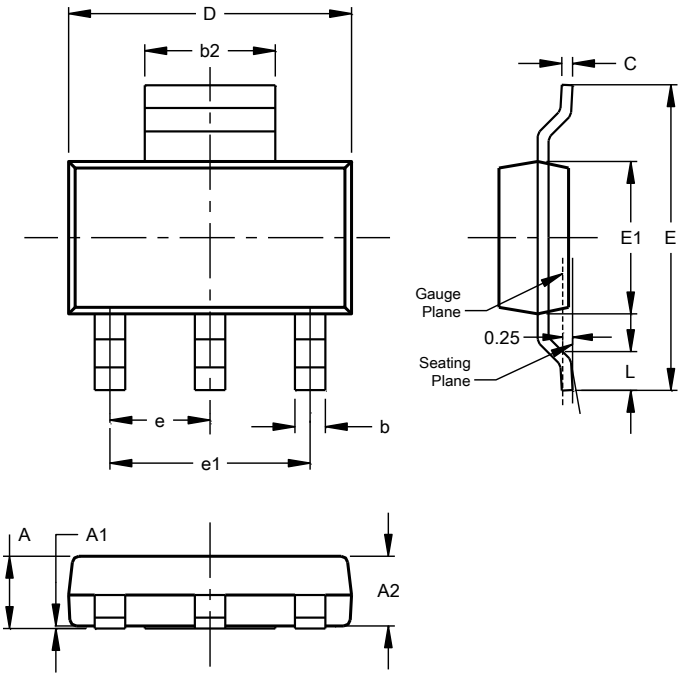



**VBE(on) v IC**

## Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

**SOT223 (Type DN)**

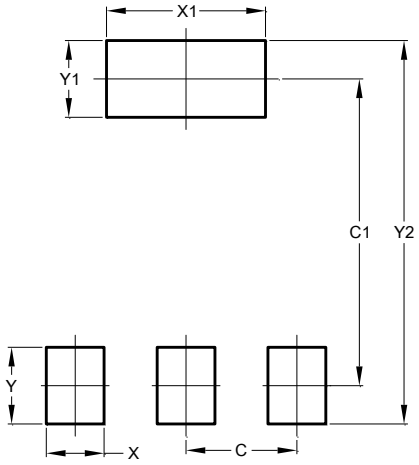



| SOT223 (Type DN) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | -- | 1.70 | -- |
| **A1** | 0.01 | 0.15 | -- |
| **A2** | 1.50 | 1.68 | 1.60 |
| **b** | 0.60 | 0.80 | 0.70 |
| **b2** | 2.90 | 3.10 | -- |
| **c** | 0.20 | 0.32 | -- |
| **D** | 6.30 | 6.70 | -- |
| **E** | 6.70 | 7.30 | -- |
| **E1** | 3.30 | 3.70 | -- |
| **e** | -- | -- | 2.30 |
| **e1** | -- | -- | 4.60 |
| **L** | 0.85 | -- | -- |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

**SOT223 (Type DN)**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 2.30 |
| **C1** | 6.40 |
| **X** | 1.20 |
| **X1** | 3.30 |
| **Y** | 1.60 |
| **Y1** | 1.60 |
| **Y2** | 8.00 |

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to voltage spacing between terminals.

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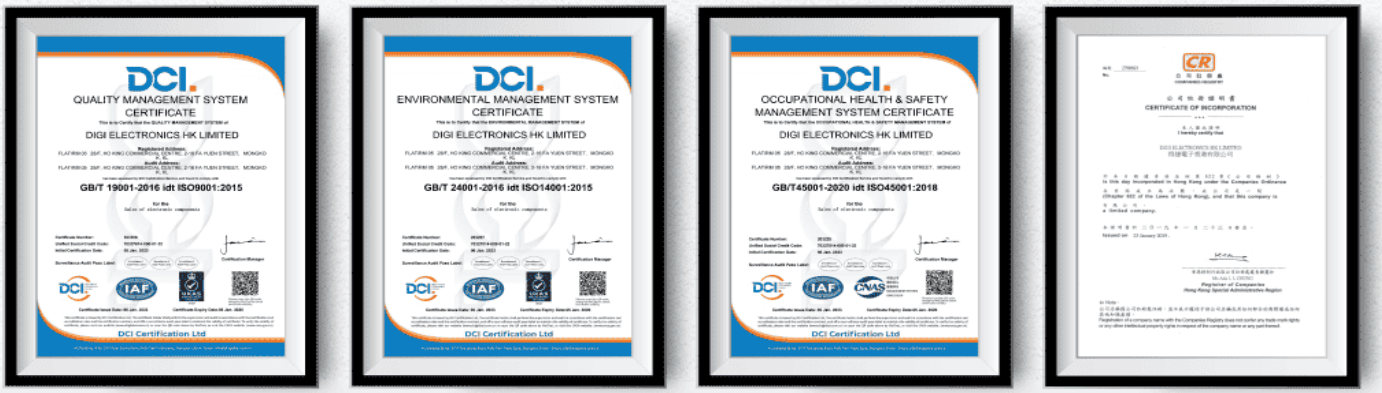



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