

# BRD50P06Q

Rev.A Sep.-2024



蓝箭电子  
BLUE ROCKET ELECTRONICS

DATA SHEET

TO-252            P            MOS

P-CHANNEL MOSFET in a TO-252 Plastic Package.

Low  $R_{DS(on)}$ , low gate charge, low  $C_{rss}$

**/ Absolute Maximum Ratings(Ta=25 )**

| Parameter                              |              | Symbol          | Rating     | Unit |
|----------------------------------------|--------------|-----------------|------------|------|
| Drain-Source Voltage                   |              | $V_{DS}$        | -60        | V    |
| Drain Current                          |              | $I_D(T_C=25)$   | -50        | A    |
| Drain Current - Pulsed                 |              | $I_{DM}$        | -200       | A    |
| Gate-Source Voltage                    |              | $V_{GS}$        | $\pm 20$   | V    |
| Power Dissipation                      |              | $P_D(T_C=25)$   | 85         | W    |
| Single Pulsed Avalanche Energy         |              | $E_{AS}$        | 250        | mJ   |
| Avalanche Current(L=0.5mH)             |              | $I_{AS}$        | 25         | A    |
| Junction and Storage Temperature Range |              | $T_j, T_{stg}$  | -55 to 150 |      |
| Thermal resistance, junction - ambient | $t \leq 10s$ | $R_{\theta JA}$ | 25         | / W  |
|                                        | Steady-State |                 | 50         |      |
| Thermal resistance, junction - case    | Steady-State | $R_{\theta JC}$ | 1.5        |      |

**/ Electrical Characteristics(Ta=25 )**

| Parameter                          | Symbol        | Test Conditions                             | Min | Typ  | Max       | Unit      |
|------------------------------------|---------------|---------------------------------------------|-----|------|-----------|-----------|
| Drain-Source Breakdown Voltage     | $BV_{DSS}$    | $V_{GS}=0V$ $I_D=-250\mu A$                 | -60 | -68  |           | V         |
| Zero Gate Voltage Drain Current    | $I_{DSS}$     | $V_{DS}=-60V$ $V_{GS}=0V$                   |     |      | -1.0      | $\mu A$   |
|                                    |               | $V_{DS}=-48V$ $T_C=150$                     |     |      | -10       |           |
| Gate-Body Leakage Current Forward  | $I_{GSS}$     | $V_{GS}=\pm 20V$ $V_{DS}=0V$                |     |      | $\pm 0.1$ | $\mu A$   |
| Gate Threshold Voltage             | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ $I_D=-250\mu A$             | -1  | -1.6 | -3        | V         |
| Static Drain-Source On-Resistance  | $R_{DS(on)}$  | $V_{GS}=-10V$ $I_D=-20A$                    |     | 30   | 35        | $m\Omega$ |
|                                    | $R_{DS(on)}$  | $V_{GS}=-4.5V$ $I_D=-10A$                   |     | 40   | 45        | $m\Omega$ |
| Drain-Source Diode Forward Voltage | $V_{SD}$      | $V_{GS}=0V$ $I_S=-1A$                       |     |      | -1.2      | V         |
| Gate resistance                    | $R_g$         |                                             |     | 10   |           | $\Omega$  |
| Input Capacitance                  | $C_{iss}$     | $V_{DS}=-25V$ $V_{GS}=0V$<br>$f=1.0MHz$     |     | 3200 |           | pF        |
| Output Capacitance                 | $C_{oss}$     |                                             |     | 800  |           | pF        |
| Reverse Transfer Capacitance       | $C_{rss}$     |                                             |     | 270  |           | pF        |
| Total Gate Charge                  | $Q_{g(10V)}$  | $V_{GS}=-10V,$ $V_{DS}=-30V,$<br>$I_D=-20A$ |     | 45   |           | nC        |
| Total Gate Charge                  | $Q_{g(4.5V)}$ |                                             |     | 23   |           |           |
| Gate Source Charge                 | $Q_{gs}$      |                                             |     | 9.3  |           |           |
| Gate Drain Charge                  | $Q_{gd}$      |                                             |     | 10.2 |           |           |

/ Electrical Characteristics(Ta=25 )

| Parameter           | Symbol              | Test Conditions                                                                             | Min | Typ  | Max | Unit |
|---------------------|---------------------|---------------------------------------------------------------------------------------------|-----|------|-----|------|
| Turn-On Delay Time  | t <sub>d(on)</sub>  | V <sub>GS</sub> =-10V<br>V <sub>DS</sub> =-30V R <sub>L</sub> =1.5<br>R <sub>GEN</sub> =3 Ω |     | 12   |     | ns   |
| Turn-On Rise Time   | t <sub>r</sub>      |                                                                                             |     | 14.5 |     |      |
| Turn-Off Delay Time | t <sub>d(off)</sub> |                                                                                             |     | 38   |     |      |
| Turn-Off Fall Time  | t <sub>f</sub>      |                                                                                             |     | 15   |     |      |

## / Electrical Characteristic Curve

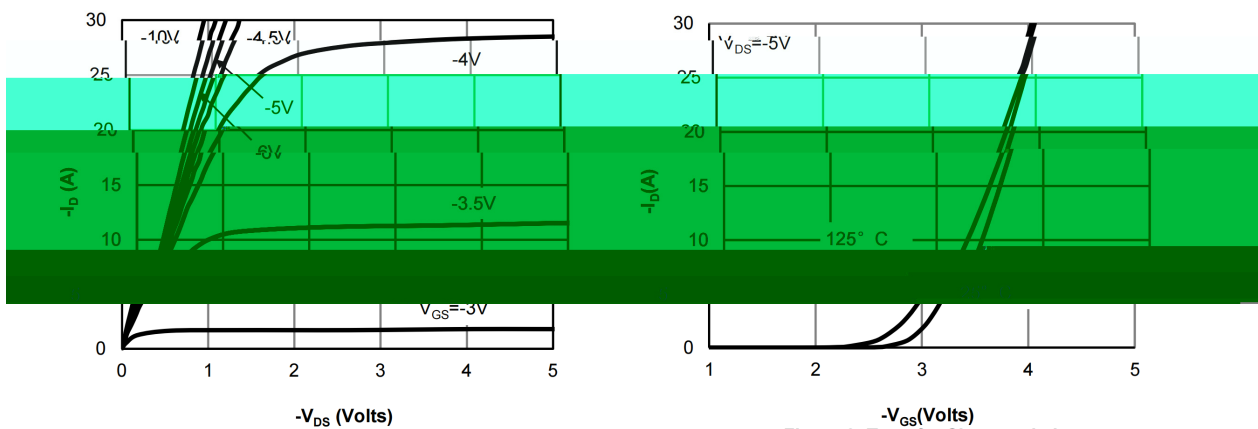
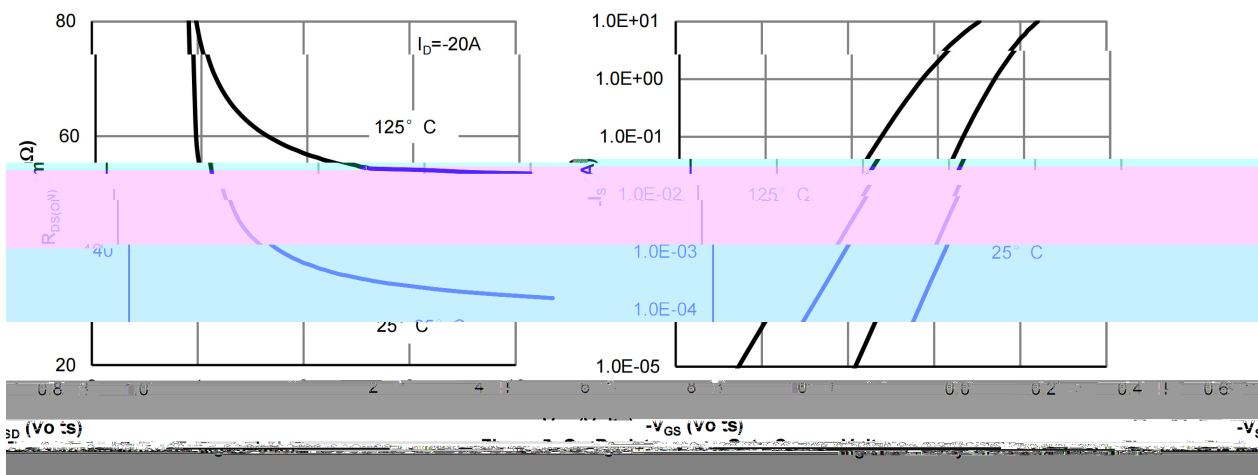
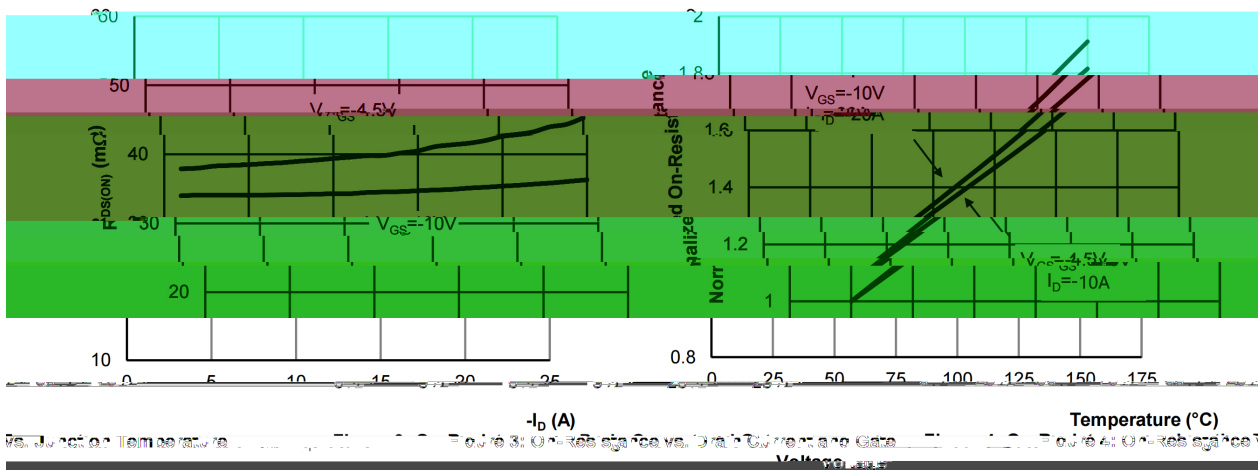


Figure 1: On-Region Characteristics

Figure 2: Transfer Characteristics



/ Electrical Characteristic Curve

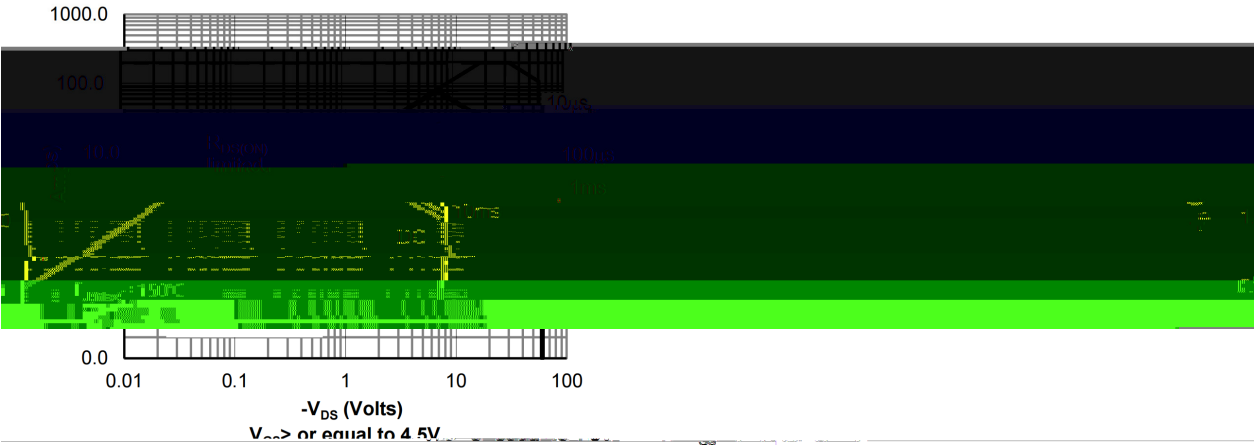
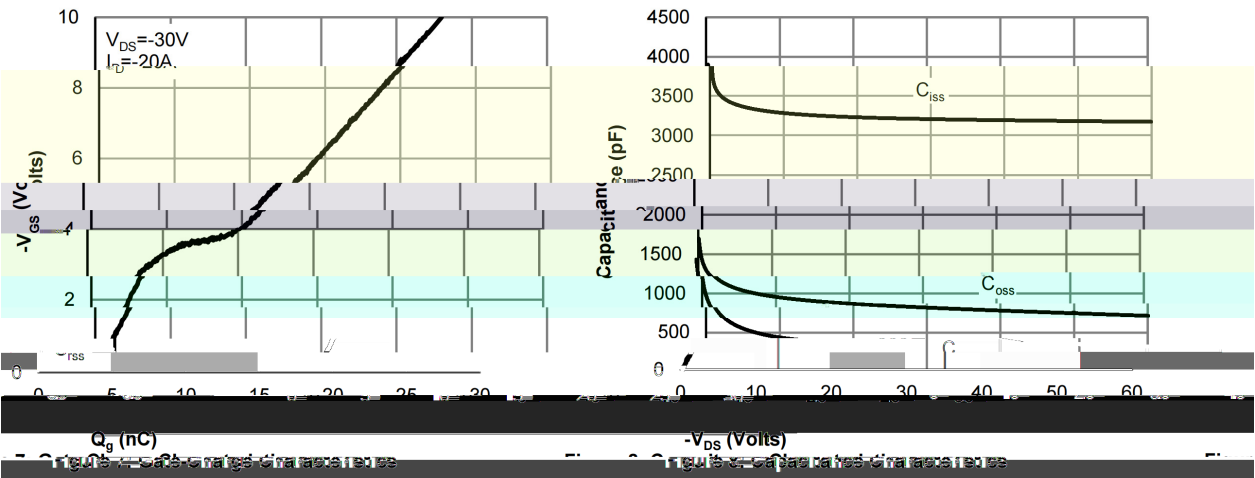


Figure 9: Maximum Forward Biased Safe Operating Area

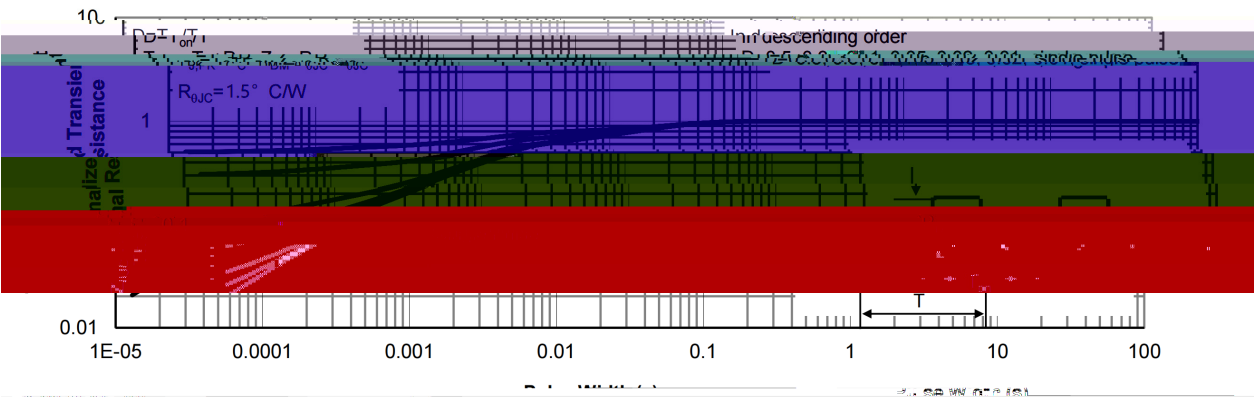
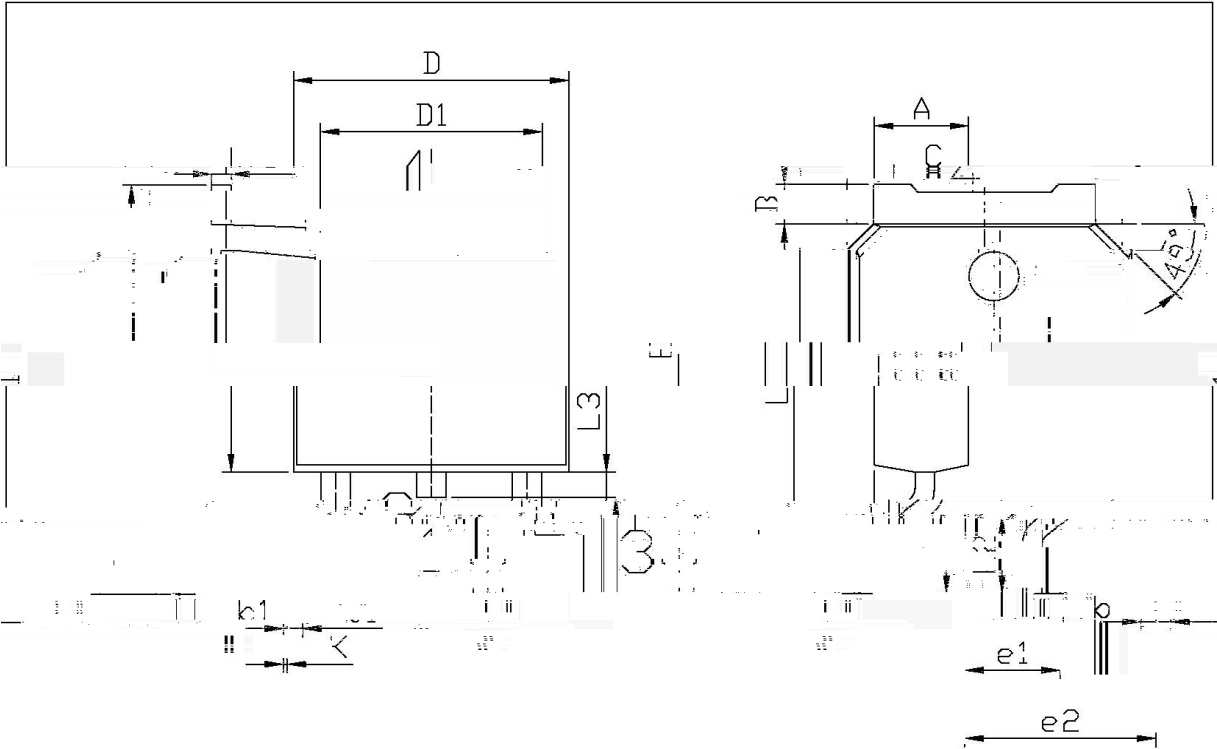


Figure 10: Normalized Maximum Transient Thermal Impedance

/ Package Dimensions



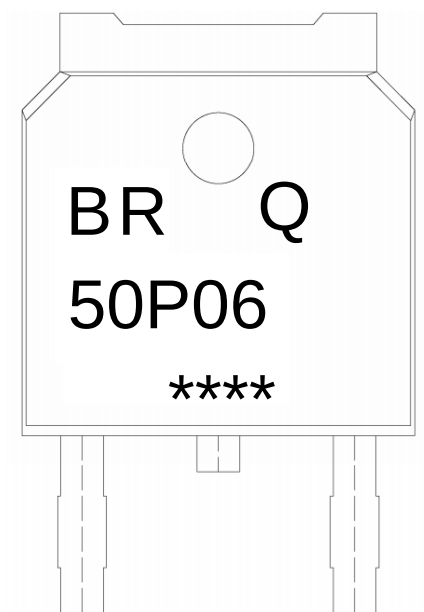
单位: mm

| Dimensions In Millimeters |      |      | Dimensions In Millimeters |      |      |
|---------------------------|------|------|---------------------------|------|------|
| Symbol                    | Min  | Max  | Symbol                    | Min  | Max  |
| A                         | 6.25 | 6.75 | B                         | 0.95 | 1.25 |
| C                         | 0.20 | 0.30 | D                         | 5.10 | 5.50 |
| D                         | 5.10 | 5.50 | E                         | 0.70 | 0.90 |
| D1                        | 5.10 | 5.50 | L3                        | 0.70 | 0.90 |
| E                         | 0.70 | 0.90 | k1                        | 0.45 | 0.55 |
| L3                        | 0.70 | 0.90 | k2                        | 0.45 | 0.55 |
| k1                        | 0.45 | 0.55 | e1                        | 0.70 | 0.90 |
| k2                        | 0.45 | 0.55 | e2                        | 0.70 | 0.90 |
| e1                        | 0.70 | 0.90 |                           |      |      |
| e2                        | 0.70 | 0.90 |                           |      |      |

-252

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**/ Marking Instructions**



BR

Q

Note:

BR: Company Code

Q: Automobile halogen-free product Code

50P06: Product Type Code

\*\*\*\*: Lot No. Code, code change with Lot No

(     ) / Temperature Profile for IR Reflow Soldering(Pb-Free)

|  |
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|  |
|  |
|  |
|  |
|  |
|  |
|  |

Note:

- 1

150 200

60 120sec;

1.Preheating:150~200 , Time:60~120sec.
- 2

255 5

5 0.5sec;

2.Peak Temp.:255 5 , Duration:5 0.5sec.
- 3

2 10

/sec.

3. Cooling Speed: 2~10 /sec.

/ Resistance to Soldering Heat Test Conditions

260 5                      10 1 sec.                      Temp.:260±5                      Time:10±1 sec

/ Packaging SPEC.

/ REEL

| Package Type | Units         |   |         |   |              | Dimension (unit mm <sup>3</sup> ) |                  |        |
|--------------|---------------|---|---------|---|--------------|-----------------------------------|------------------|--------|
| TO-252       | 2,e/(/Tj/TT11 | 1 | Tf.2316 | 0 | TD.00/TT1448 | .96(2w04963                       | (5,00/TT14422003 | (6w095 |