

## Descriptions

This is 800V 8A N-Channel Multi-EPI Super Junction Power MOSFET.

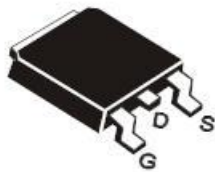
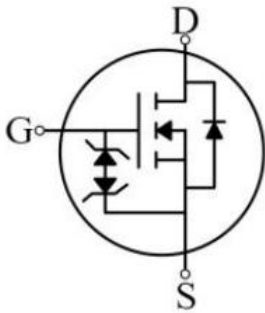
## Features

- New technology for high voltage device
- Low on-resistance and low
- Conduction losses
- Ultra low gate charge cause lower driving requirements
- 100% Avalanche tested
- Rohs compliant

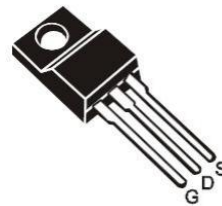
## Applications

- Power factor correction (PFC)
- Switched mode power supplies(SMPS)

## Equivalent Circuit & Pinning



TO-252



TO-220FPL

## Absolute Maximum Ratings(Ta=25°C)

| PARAMETER                                  | SYMBOL    | VALUE        | UNIT |
|--------------------------------------------|-----------|--------------|------|
| Drain-source Voltage                       | $V_{DS}$  | 800          | V    |
| gate-source Voltage                        | $V_{GS}$  | ±20          | V    |
| Continuous Drain Current<br>Tc=25°C        | $I_D$     | 8            | A    |
| Continuous Drain Current<br>Tc=100°C       | $I_D$     | 5.05         | A    |
| Pulsed Drain Current <sup>①</sup>          | $I_{DM}$  | 24*          | A    |
| Total Power Dissipation                    | $P_{tot}$ | TO-252:116   | W    |
|                                            |           | TO-220FPL:29 |      |
| Junction Temperature                       | $T_j$     | 150          | °C   |
| Storage Temperature                        | $T_{STG}$ | -55~ 150     | °C   |
| Single Pulse Avalanche Energy <sup>②</sup> | $E_{AS}$  | 280          | mJ   |

## Electrical Characteristics(Ta=25°C)

| PARAMETER                      | SYMBOL       | TEST CONDITION                            | MIN | TYP | MAX | UNIT |
|--------------------------------|--------------|-------------------------------------------|-----|-----|-----|------|
| Drain-source Breakdown Voltage | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                 | 800 |     |     | V    |
| Gate Threshold Voltage         | $V_{GS(TH)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$             | 2.5 | 3.5 | 4.5 | V    |
| Drain-source Leakage Current   | $I_{DSS}$    | $V_{DS}=800V, V_{GS}=0V, T_j=25.^\circ C$ |     |     | 1   | μA   |
| Internal gate resistance       | $R_g$        | f= 1MHz, $V_{GS}=0V$                      |     | 28  |     | Ω    |

## Electrical Characteristics(Ta=25°C)

| PARAMETER                         | SYMBOL       | TEST CONDITION                                                     | MIN | TYP | MAX      | UNIT       |
|-----------------------------------|--------------|--------------------------------------------------------------------|-----|-----|----------|------------|
| Gate-body Leakage Current         | $I_{GSS}$    | $V_{GS} = \pm 20V, V_{DS} = 0V$                                    |     |     | $\pm 10$ | $\mu A$    |
| Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 5.1A$                                         |     | 560 | 650      | m $\Omega$ |
| Input Capacitance                 | $C_{iss}$    | $V_{GS} = 0V, V_{DS} = 100V, F = 400kHz$                           |     | 615 |          | pF         |
| Output Capacitance                | $C_{oss}$    |                                                                    |     | 28  |          |            |
| Reverse Transfer Capacitance      | $C_{rss}$    |                                                                    |     | 1.1 |          |            |
| Turn-On Delay Time                | $T_{d(on)}$  | $V_{DD} = 400V, I_D = 8A, V_{GS} = 10V, R_G = 25\Omega^{\text{③}}$ |     | 19  |          | ns         |
| Rise time                         | $T_r$        |                                                                    |     | 34  |          |            |
| Turn -Off Delay Time              | $T_{d(off)}$ |                                                                    |     | 121 |          |            |
| Fall time                         | $T_f$        |                                                                    |     | 20  |          |            |
| Total Gate Charge                 | $Q_g$        | $I_D = 8A, V_{DS} = 640V, V_{GS} = 10V^{\text{③}}$                 |     | 18  |          | nC         |
| Gate-to-Source Charge             | $Q_{gs}$     |                                                                    |     | 5.5 |          |            |
| Gate-to-Drain Charge              | $Q_{gd}$     |                                                                    |     | 6.7 |          |            |
| Continuous Diode Forward Current  | $I_S$        |                                                                    |     |     | 8        | A          |
| Diode Forward Voltage             | $V_{SD}$     | $T_j = 25^\circ C, I_F = 8A, V_{GS} = 0V^{\text{③}}$               |     |     | 1.4      | V          |
| Reverse Recovery Charge           | $Q_{rr}$     |                                                                    |     | 3.8 |          | $\mu C$    |
| Reverse recovery Current          | $I_{rr}$     |                                                                    |     | 19  |          | A          |

## Thermal Characteristics

| PARAMETER                           | SYMBOL        | MAX       |        | UNIT         |
|-------------------------------------|---------------|-----------|--------|--------------|
|                                     |               | TO-220FPL | TO-252 |              |
| Thermal Resistance Junction-case    | $R_{th_{JC}}$ | 4.3       | 1.08   | $^\circ C/W$ |
| Thermal Resistance Junction-ambient | $R_{th_{JA}}$ | 75        | 100    | $^\circ C/W$ |

## Notes:

- 1、 Repetitive rating: Pulse width limited by maximum junction temperature
- 2、 Starting  $T_j = 25^\circ C$ ,  $V_{DD} = 50V$ ,  $L = 30mH$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 3.9A$
- 3、 Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$

## Electrical Characteristic Curve

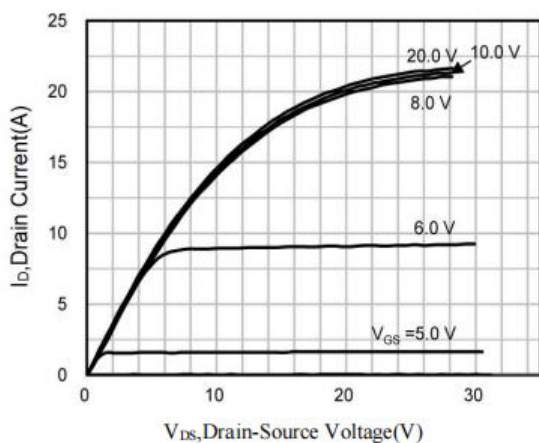


图1 输出特性曲线

Fig.1 Output Characteristics

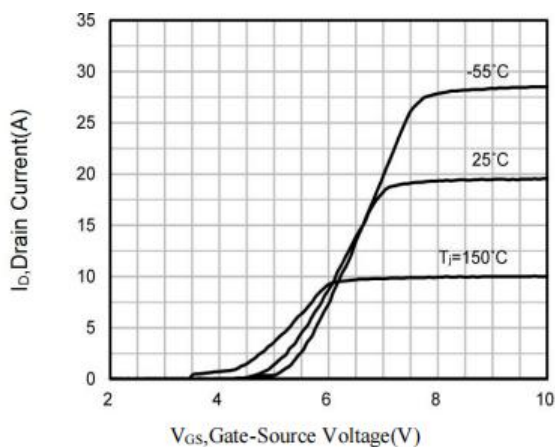


图2 传输特性曲线

Fig.2 Transfer Characteristics

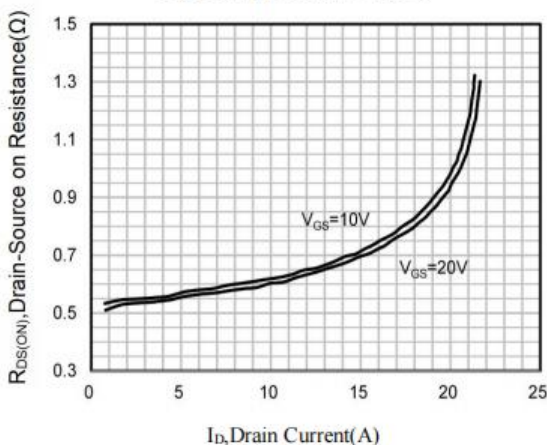


图3 导通电阻与漏级电流和栅极电压曲线

Fig.3 On-Resistance Vs. Drain Current and Gate Voltage

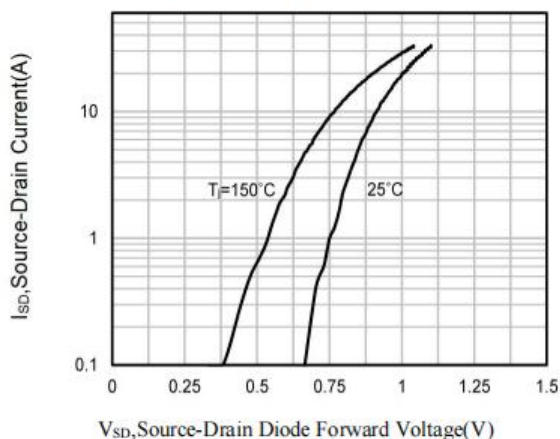


图4 体二极管正向压降与源漏电流和温度曲线

Fig.4 Body Diode Forward Voltage Vs. Source-Drain Current and Temperature

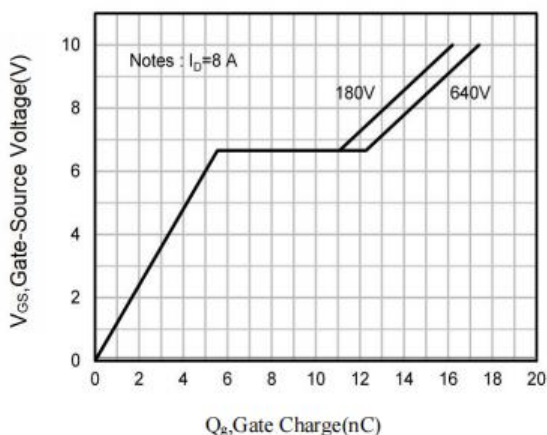


图5 栅电荷曲线

Fig.5 Gate Charge Characteristics

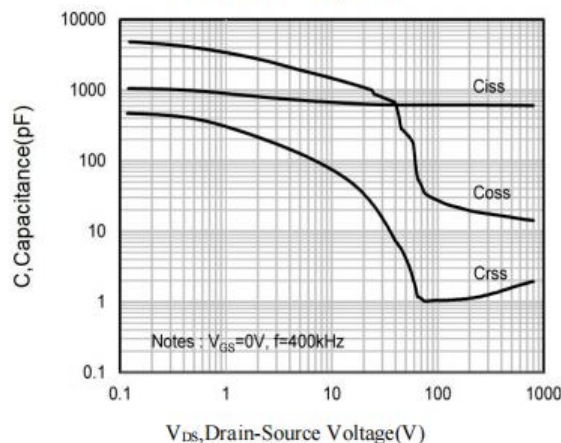


图6 电容曲线

Fig.6 Capacitance Characteristics

Electrical Characteristic Curve

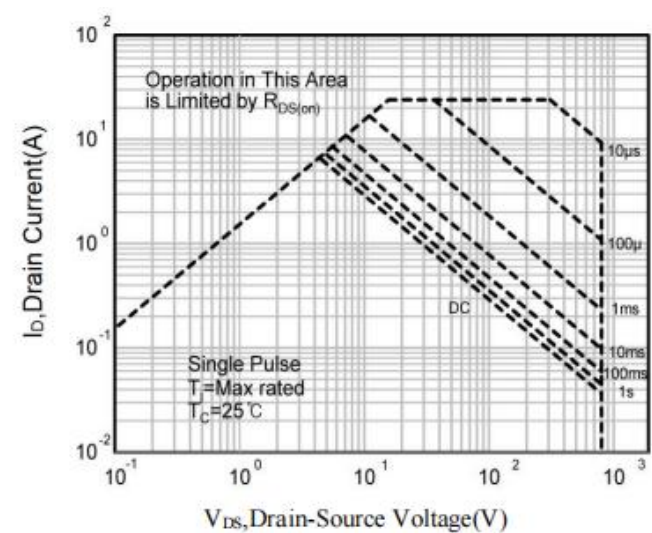


图 7 最大安全工作区域 (TO-220FPL)  
Fig.7 Maximum Safe Operating Area (TO-220FPL)

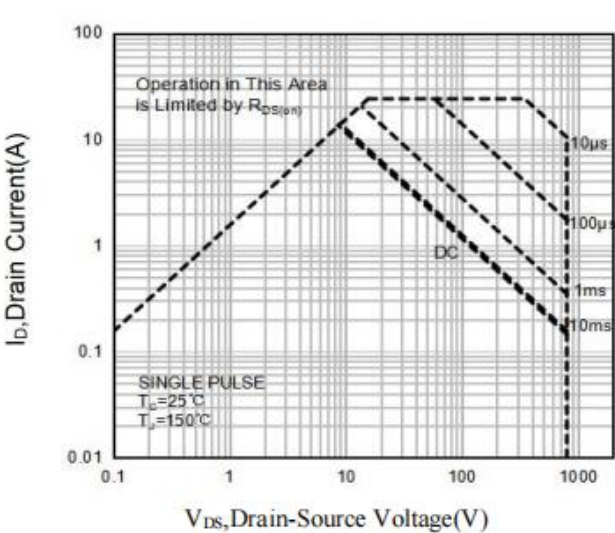


图 8 最大安全工作区域 (TO-252)  
Fig.8 Maximum Safe Operating Area (TO-252)

Marking Instructions



Note:  
COT: Company Code  
80R650: Product Type.  
\*\*\*\*\*: \*: Inner Code \* : Year Code \*\*: Week Code \*\*: Lot Code.

Packaging SPEC

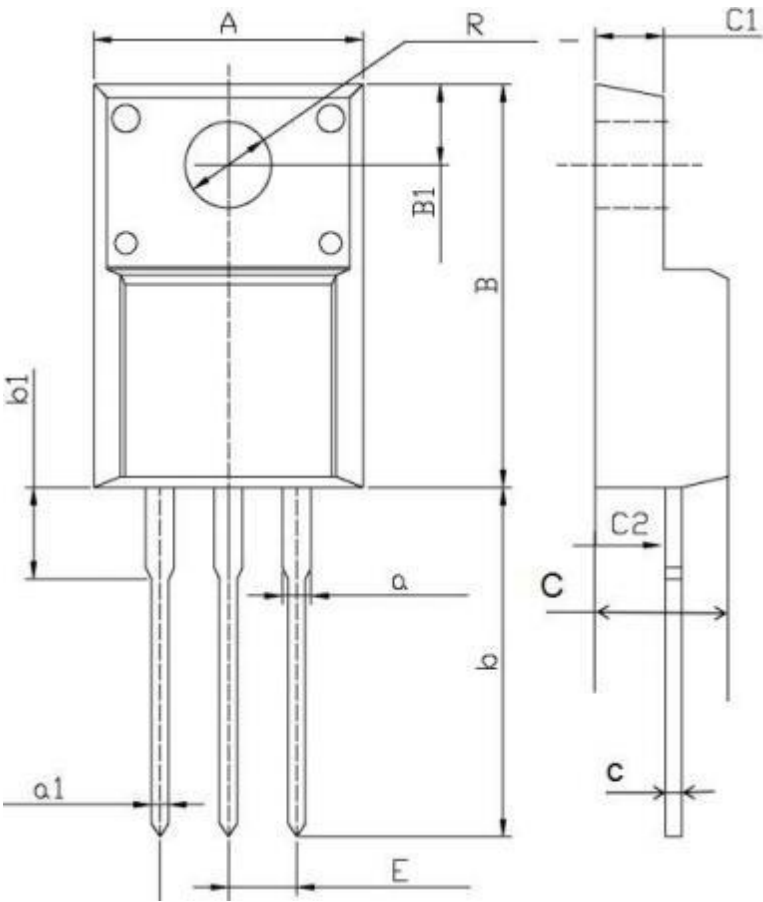
| Part        | Package   | Marking | Packing method |
|-------------|-----------|---------|----------------|
| CT80R650EDP | TO-252    | 80R650  | TAPE & REEL    |
| CT80R650EFP | TO-220FPL | 80R650  | TUBE           |

Package Outline Dimensions

TO-220FPL MECHANICAL DATA

UNIT: mm

| symbol | min   | nom | max   | symbol | min  | nom | max  |
|--------|-------|-----|-------|--------|------|-----|------|
| A      | 9.90  |     | 10.36 | a      | 1.08 |     | 1.48 |
| B      | 15.40 |     | 16.40 | a1     | 0.70 |     | 0.90 |
| B1     | 3.05  |     | 3.55  | E      | 2.34 |     | 2.75 |
| C      | 4.40  |     | 5.00  | C1     | 2.25 |     | 2.85 |
| c      | 0.40  |     | 0.60  | C2     | 2.45 |     | 3.05 |
| b      | 12.40 |     | 13.50 | R      | 2.90 |     | 3.35 |
| b1     | 2.60  |     | 3.60  |        |      |     | ⌒    |

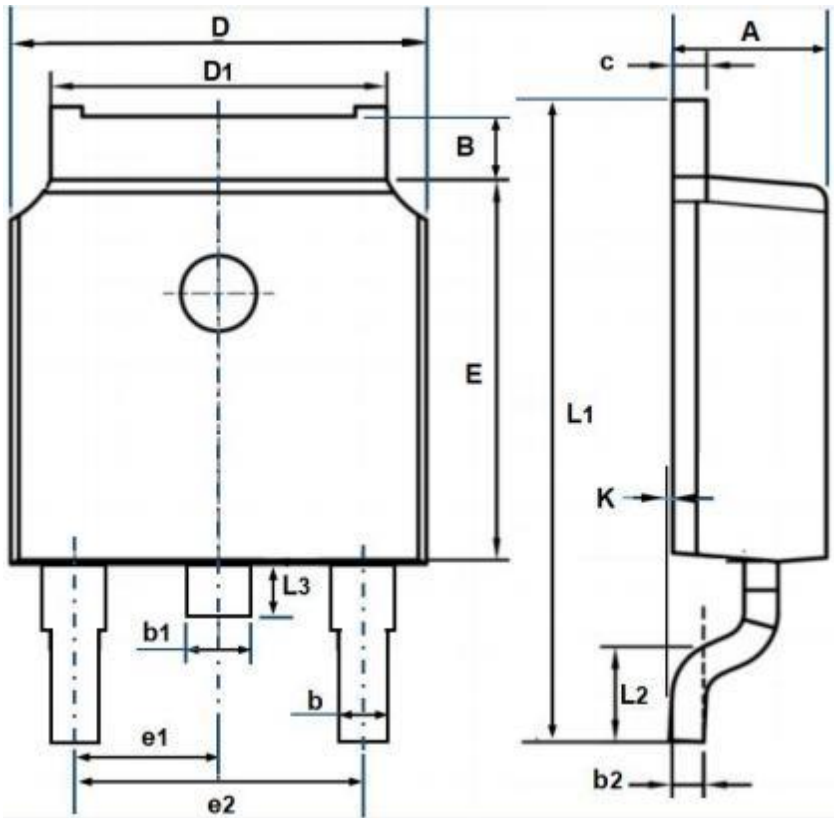


Package Outline Dimensions

TO-252 MECHANICAL DATA

UNIT: mm

| symbol | min         | max         | symbol | min         | max         |
|--------|-------------|-------------|--------|-------------|-------------|
| A      | 2.10        | 2.50        | B      | 0.85        | 1.25        |
| b      | <b>0.50</b> | <b>0.85</b> | b1     | <b>0.90</b> | <b>1.15</b> |
| b2     | 0.45        | 0.70        | C      | 0.45        | 0.70        |
| D      | 6.30        | 6.75        | D1     | 5.10        | 5.50        |
| E      | 5.30        | 6.30        | e1     | 2.25        | 2.35        |
| L1     | 9.20        | 10.60       | e2     | 4.45        | 4.75        |
| L2     | 0.90        | 1.75        | L3     | 0.60        | 1.10        |
| K      | 0.00        | 0.23        |        |             |             |

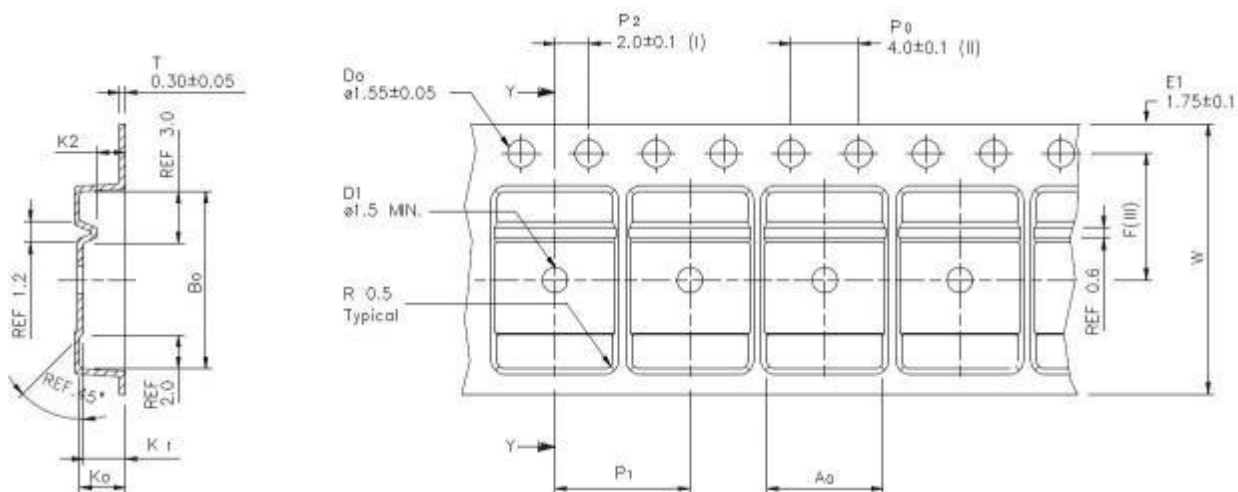


## Package Outline Dimensions

## TO-252 TAPE AND REEL DATA

UNIT: mm

| symbol | min   | nom   | max   | symbol | min   | nom   | max   |
|--------|-------|-------|-------|--------|-------|-------|-------|
| A0     | 6.80  | 6.90  | 7.00  | B0     | 10.40 | 10.50 | 10.60 |
| K0     | 2.60  | 2.70  | 2.90  | K1     | 2.40  | 2.50  | 2.60  |
| F      | 7.40  | 7.50  | 7.60  | K2     | 1.60  | 1.70  | 1.80  |
| W      | 15.90 | 16.00 | 16.10 | P1     | 7.90  | 8.00  | 8.10  |



USER DIRECTION OF FEED

