

## Descriptions

This is 650V 10A N-Channel Enhancement Mode Power MOSFET in a TO-220FPL/TO-252T package.

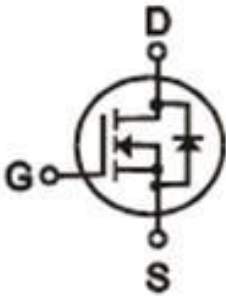
## Features

- $V_{DS}=650V, R_{DS(ON)}=0.95\Omega, I_D=10A$
- LOW THERMAL RESISTANCE
- FAST SWITCHING
- HIGH INPUT RESISTANCE
- RoHS COMPLIANT

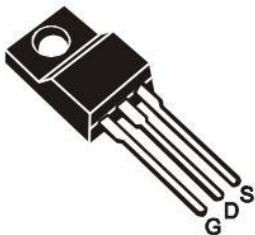
## Applications

- ELECTRONIC BALLAST
- ELECTRONIC TRANSFORMER
- SWITCH MODE POWER SUPPLY

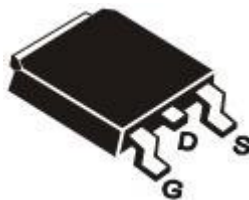
## Equivalent Circuit



## Pinning



TO-220FPL



TO-252T

## Absolute Maximum Ratings (TC=25°C)

| PARAMETER                          | SYMBOL | VALUE        | UNIT |
|------------------------------------|--------|--------------|------|
| Drain-source Voltage               | VDS    | 650          | V    |
| gate-source Voltage                | VGS    | ±30          | V    |
| Continuous Drain Current TC=25°C   | ID     | 10           | A    |
| Continuous Drain Current TC= 100°C | ID     | 6.3          | A    |
| Drain Current - Pulsed ①           | IDM    | 40           | A    |
| Power Dissipation                  | Ptot   | TO-252T:150  | W    |
|                                    |        | TO-220FPL:50 |      |
| Junction Temperature               | Tj     | 150          | °C   |
| Storage Temperature                | TSTG   | -55-150      | °C   |
| Single Pulse Avalanche Energy ②    | EAS    | 700          | mJ   |

## Electronic Characteristics (Tc=25°C)

| PARAMETER                                 | SYMBOL                      | TEST CONDITION                   | MIN | TYP  | MAX | UNIT  |
|-------------------------------------------|-----------------------------|----------------------------------|-----|------|-----|-------|
| Drain-source Breakdown Voltage            | BVDSS                       | VGS=0V, ID=250μA                 | 650 |      |     | V     |
| Breakdown Voltage Temperature Coefficient | $\Delta BVDSS / \Delta T_j$ | ID=250uA, Referenced to 25° C    |     | 0.65 |     | V/° C |
| Gate Threshold Voltage                    | VGS(TH)                     | VGS=VDS, ID=250μA                | 2   |      | 4   | V     |
| Drain-source Leakage Current              | IDSS                        | VDS =700V,<br>VGS =0V, Tj=25° C  |     |      | 1   | μA    |
|                                           |                             | VDS =560V,<br>VGS =0V, Tj=125° C |     |      | 100 | μA    |
| Forward Transconductance                  | gfs                         | VDS =15V, ID=3.0A ③              |     | 6.0  |     | S     |

## Electronic Characteristics (Tc=25°C)

| PARAMETER                           | SYMBOL  | TEST CONDITION                       | MIN | TYP  | MAX  | UNIT |
|-------------------------------------|---------|--------------------------------------|-----|------|------|------|
| Gate-body Leakage Current (VDS = 0) | IGSS    | VGS = ±30V                           |     |      | ±100 | nA   |
| Static Drain-source On Resistance   | RDS(ON) | VGS = 10V, ID=5A③                    |     | 0.95 | 1.25 | Ω    |
| Input Capacitance                   | Ciss    | VGS = 0V,<br>VDS = 25V<br>F = 1.0MHZ |     | 1422 |      | pF   |
| Output Capacitance                  | Coss    |                                      |     | 145  |      |      |
| Reverse transfer Capacitance        | Crss    |                                      |     | 18   |      |      |
| Turn -On Delay Time                 | Td(on)  | VDD=325V,<br>ID = 10A<br>RG= 27Ω③    |     | 31   |      | ns   |
| Rise Time                           | Tr      |                                      |     | 33   |      |      |
| Turn -Off Delay Time                | Td(off) |                                      |     | 76   |      |      |
| Fall Time                           | Tf      |                                      |     | 40   |      |      |
| Total Gate Charge                   | Qg      | ID = 5A,<br>VDS = 20V<br>VGS = 10V③  |     | 14   |      | nC   |
| Gate-to-Source Charge               | Qgs     |                                      |     | 3.3  |      |      |
| Gate-to-Drain Charge                | Qgd     |                                      |     | 5.0  |      |      |
| Continuous Diode Forward Current    | IS      |                                      |     |      | 10   | A    |
| Diode Forward Voltage               | VSD     | Tj=25°C,<br>Is=10A VGS = 0V ③        |     |      | 1.4  | V    |
| Reverse Recovery Time               | trr     | Tj=25°C,<br>If= 10A di/dt= 100A/μs③  |     | 374  |      | ns   |
| Reverse Recovery Charge             | Qrr     |                                      |     | 4.7  |      | μC   |

## Thermal Characteristics

| PARAMETER                           | SYMBOL | MAX     |           | UNIT |
|-------------------------------------|--------|---------|-----------|------|
|                                     |        | TO-252T | TO-220FPL |      |
| Thermal Resistance Junction-case    | RthJC  | 0.83    | 2.5       | °C/W |
| Thermal Resistance Junction-ambient | RthJA  | 62.5    | 62.5      | °C/W |

(1)  $I_D$  &  $P_D$  base on maximum allowable junction temperature, test at Tc=25°C

(2) Starting Tj=25°C, VDD =50V, L=14mH, RG =25Ω, IAS=10A

(3) Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

## Electrical Characteristics

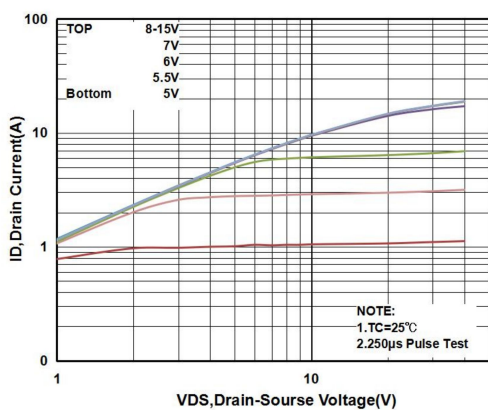


图 1 输出特性曲线

Fig1 Typical Output Characteristics

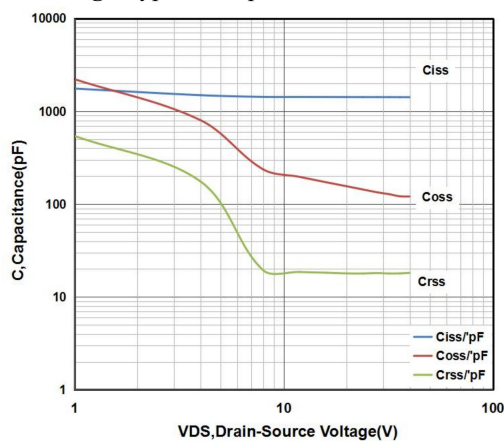


图 3 结电容曲线

Fig3 Capacitance Characteristics

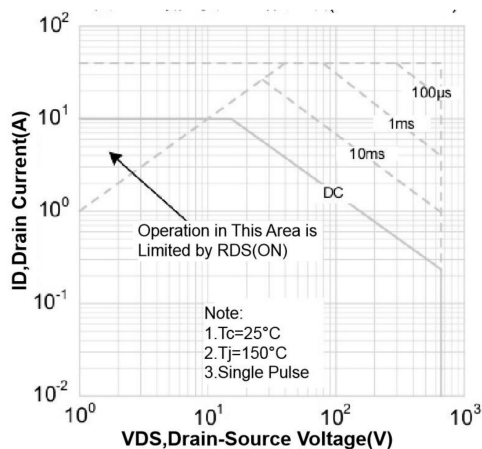


图 5 最大安全工作区曲线 (TO-252T)

Fig5 Maximum Safe Operating Area(TO-252T)

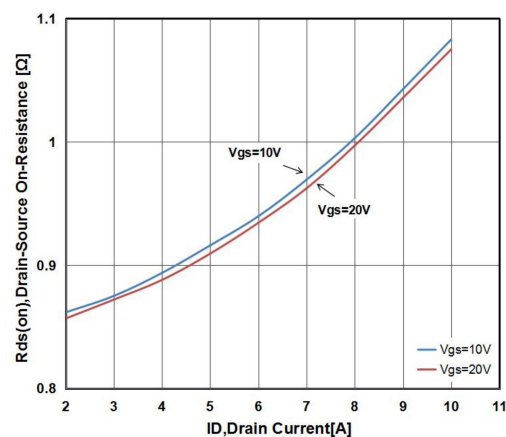


图 2 漏级电流与导电电阻曲线

Fig2 On-Resistance Vs.Drain Current and Gate Voltage

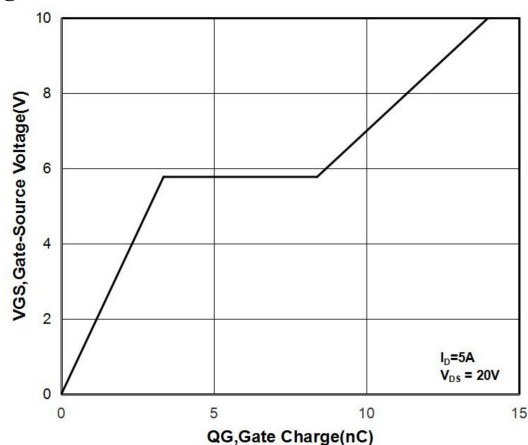


图 4 电荷曲线

Fig4 Gate Charge VS Gate to Source Voltage

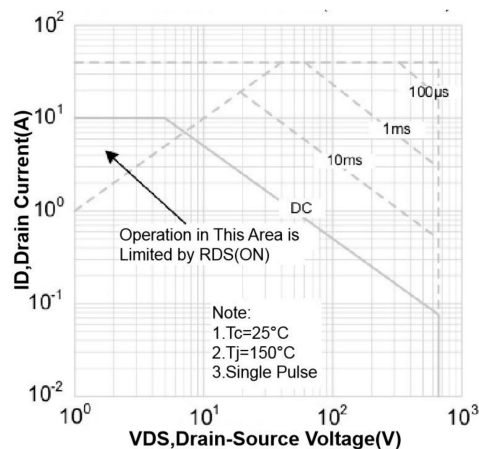
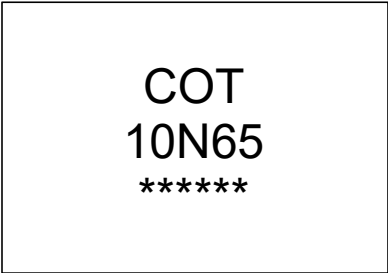


图 5 最大安全工作区曲线 (TO-220FPL)

Fig5 Maximum Safe Operating Area(TO-220FPL)

Marking Information



Note:  
COT: Company Code  
10N65: Product Type.  
\*\*\*\*\*: \*: Inner Code \* : Year Code \*\*: Week Code \*\*: Lot Code.

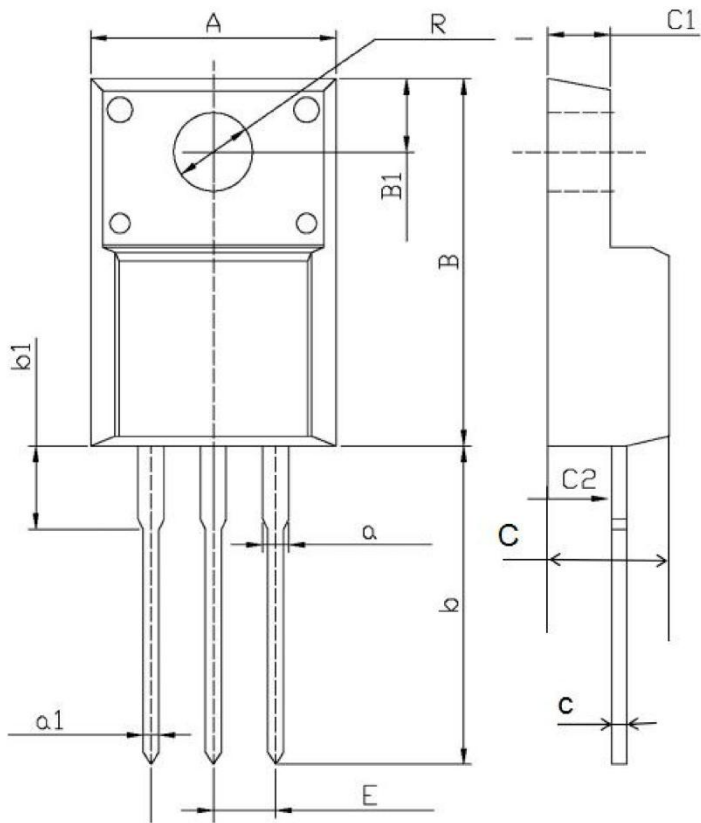
Ordering Information

| Part       | Package   | Marking | Packing method |
|------------|-----------|---------|----------------|
| CT10N65DPT | TO-252T   | 10N65   | TAPE & REEL    |
| CT10N65FPL | TO-220FPL | 10N65   | TUBE           |

Mechanical Dimensions for TO-220FPL

单位:毫米/UNIT: mm

| 符号<br>SYMBOL | 最小值<br>min | 典型值<br>nom | 最大值<br>max | 符号<br>SYMBOL | 最小值<br>min | 典型值<br>nom | 最大值<br>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       |              |            |            |            |



Mechanical Dimensions for TO-252T TUBE

单位:毫米/UNIT: mm

| 符号<br>SYMBOL | 最小值<br>min | 最大值<br>max | 符号<br>SYMBOL | 最小值<br>min | 最大值<br>max |
|--------------|------------|------------|--------------|------------|------------|
| A            | 2.20       | 2.40       | B            | 0.85       | 1.25       |
| b            | 0.50       | 0.80       | C            | 0.45       | 0.70       |
| b1           | 0.45       | 0.70       | D            | 6.30       | 6.70       |
| D1           | 5.10       | 5.50       | E            | 5.30       | 6.20       |
| L1           | 9.20       | 10.60      | F            | 0.50       | 0.90       |
| L2           | 0.90       | 1.50       | e1           | 2.25       | 2.35       |
| L3           | 0.60       | 1.10       | e2           | 4.50       | 4.70       |
|              |            |            | K            | 0.00       | 0.18       |

