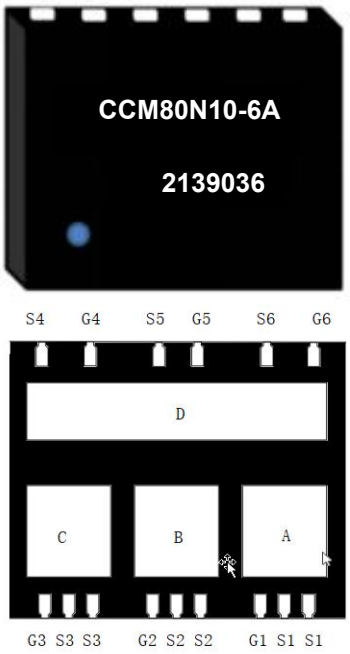
CHONGQING CLOUDCHILD TECHNOLOGY CO.,LTD

# DFN14*12 Plastic-Encapsulate MOSFETS

## CCM80N10-6A Full bridge N Channel MOSFET

| $V_{(BR)DSS}$ | $R_{DS(on)}$TYP | $I_D$ |
|---|---|---|
| 40 V | 8.0mΩ@10V | 80A |




### DESCRIPTION

The CCM80N10-6A provides excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

### FEATURE

- Split Gate Trench Technology
- Low RDS(ON)
- Low Gate Charge
- Low Gate Resistance
- AEC Q101 qualified

### APPLICATION

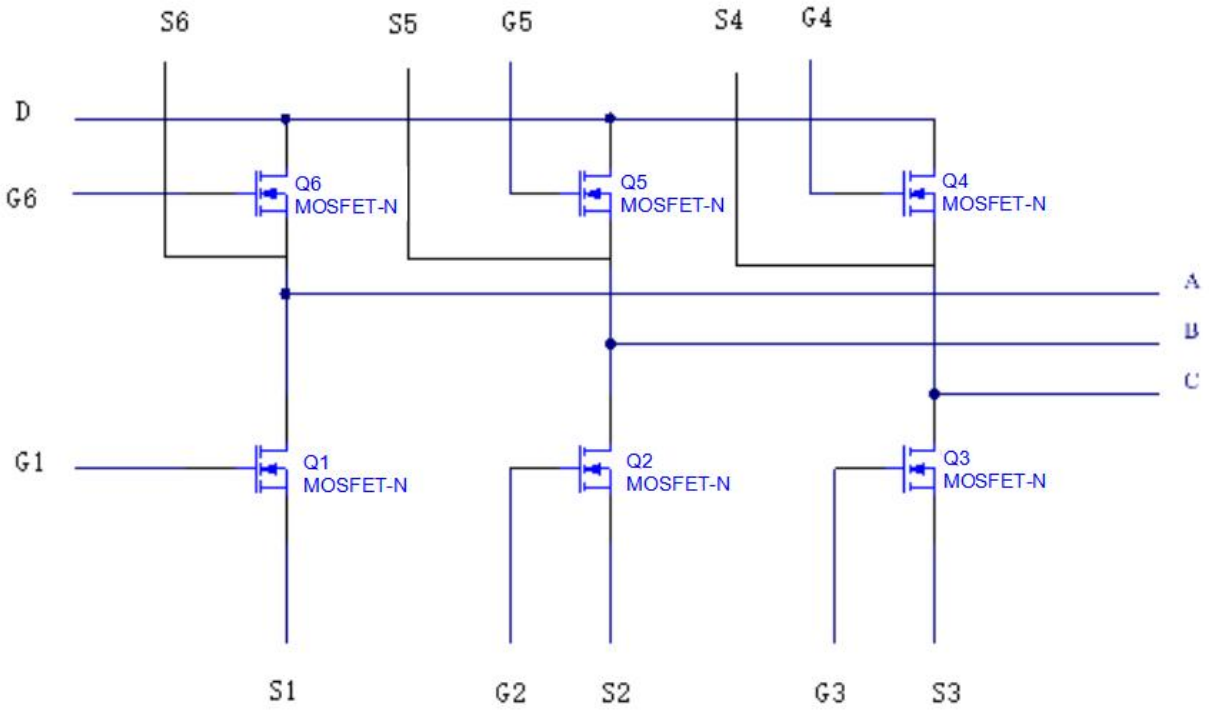
- motor control
- Full bridge module

### MARKING


CCM80N10-6A =Part No.

XXXXXXX = Code

## EQUIVALENT CIRCUIT




### Pin Definition

| Number | Pin Definition | Remark | Number | Pin Definition | Remark |
|---|---|---|---|---|---|
| 1 | S1 | Lower bridge u phase source | 11 | G4 | Upper bridge w gate |
| 2 | S1 | Lower bridge u phase source | 12 | S5 | Upper Bridge v phase source collection |
| 3 | G1 | Lower bridge u phase gate | 13 | G5 | Upper bridge v gate |
| 4 | S2 | Lower bridge v phase source | 14 | S6 | Upper Bridge u phase source collection |
| 5 | S2 | Lower bridge v phase source | 15 | G6 | Upper bridge u gate |
| 6 | G2 | Lower bridge v phase gate | PAD 1 | D | DC Input |
| 7 | S3 | Lower bridge w phase source | PAD 2 | A | A phase output |
| 8 | S3 | Lower bridge w phase source | PAD 3 | B | B phase output |
| 9 | G3 | Lower bridge w phase gate | PAD 4 | C | C phase output |
| 10 | S4 | Upper Bridge w phase source collection | | | |

## ABSOLUTE MAXIMUM RATINGS ($T_a$=25℃ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current [1] | $I_D$ | 80 | A |
| Pulsed Drain Current [2] | $I_{DM}$ | 320 | A |
| Single Pulsed Avalanche Energy [3] | EAS | 240 | mJ |
| Total Power Dissipation | $P_D$ | 115 | W |
| Thermal Resistance from Junction to Case[1] | $R_{thJC}$ | 1.3 | ℃/W |
| Junction Temperature | $T_J$ | 175 | ℃ |
| Storage Temperature | Tstg | -55~+175 | ℃ |
| Soldering Temperature , for 10S(1.6mm from case) | - | 260 | ℃ |

Notes :

1. Current is limited by package; with a Rthjc = 1.3 ℃/W the chip is able to carry 85 A at 25°C.
2. Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.
3. EAS condition: VDD = 20V,VGS = 10V, L = 0.5mH, RG = 25Ω，Ias=31A， Starting TJ = 25°℃.

## MOSFET ELECTRICAL CHARACTERISTICS

### TC=25℃ unless otherwise specified

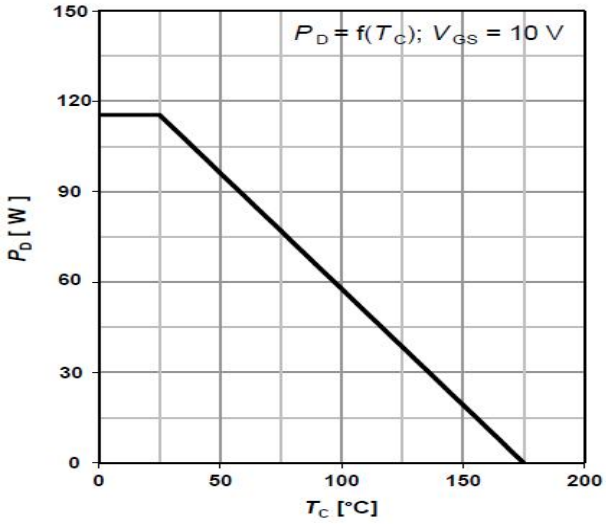
| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain - Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 100 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 100V, $V_{GS}$ = 0V | | | 1 | μA |
| Gate - Body Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | | | ±100 | nA |
| **On Characteristics[3]** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2.0 | 3.3 | 4.0 | V |
| Drain-source On-resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 40A | | 8.0 | 10 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$ = 10V, $I_D$ = 40A | | 65 | | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 25V, $V_{GS}$ = 0V, f = 1MHz | | 2183 | 2850 | pF |
| Output Capacitance | $C_{oss}$ | | | 1007 | 1350 | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 89 | 120 | |
| Gate Resistance | $R_g$ | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz | | 2.1 | | Ω |
| **Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DD}$ = 20V, $V_{GS}$ = 10V, $I_D$ = 80A | | 43 | | nC |
| Gate-source Charge | $Q_{gs}$ | | | 15 | | |
| Gate-drain Charge | $Q_{gd}$ | | | 9 | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$ = 20V, $V_{GS}$ = 10V, $R_L$ = 1Ω , $R_G$ = 3Ω | | 18 | | ns |
| Turn-on Rise Time | $t_r$ | | | 42 | | |
| Turn-off Delay Ttime | $t_{d(off)}$ | | | 31 | | |
| Turn-off Fall Time | $t_f$ | | | 8 | | |
| **Source - Drain Diode Characteristics** | | | | | | |
| Diode Forward Voltage[3] | $V_{SD}$ | $V_{GS}$ = 0V, $I_S$ = 80A | | | 1.2 | V |
| Continuous drain-source diode forward Current[1] | Is | - | | | 80 | A |
| Pulsed drain-source diode forward current[2] | $I_{SM}$ | - | | | 320 | A |
| Reverse recovery time | Trr | Vr=50V ,IF=80A，dI/dt=100A/us | | 71 | | ns |
| Reverse recovery charge | Qrr | | | 123 | | nC |

Notes :

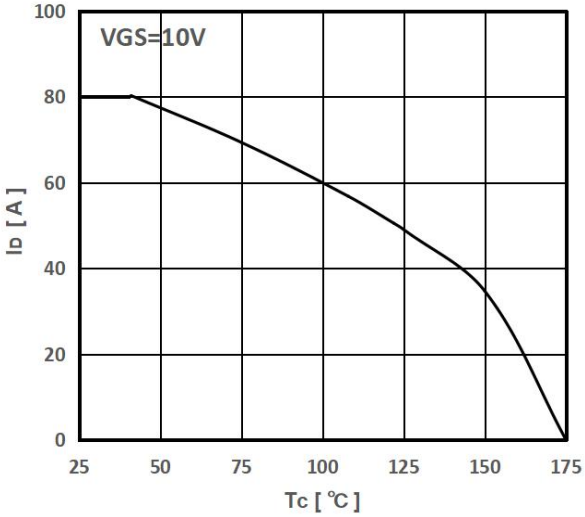
1. Current is limited by package; with a Rthjc = 1.3 ℃/W the chip is able to carry 85 A at 25°C.
2. $P_W$≤10μs, Duty cycle≤1%.
3. Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

## Typical Characteristics

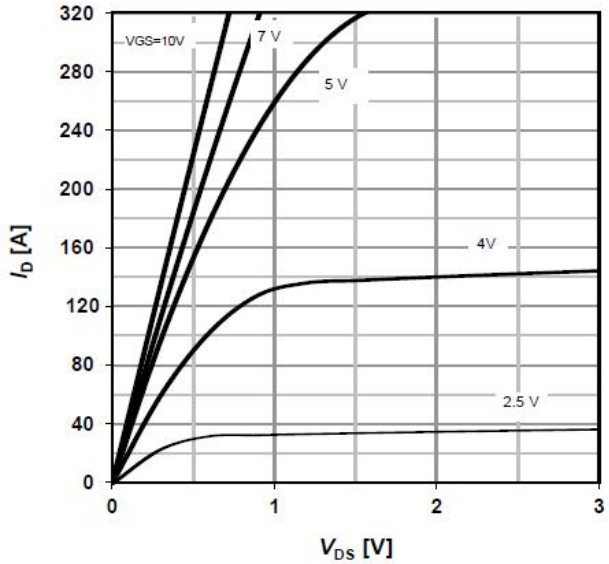
**PD--Tc**



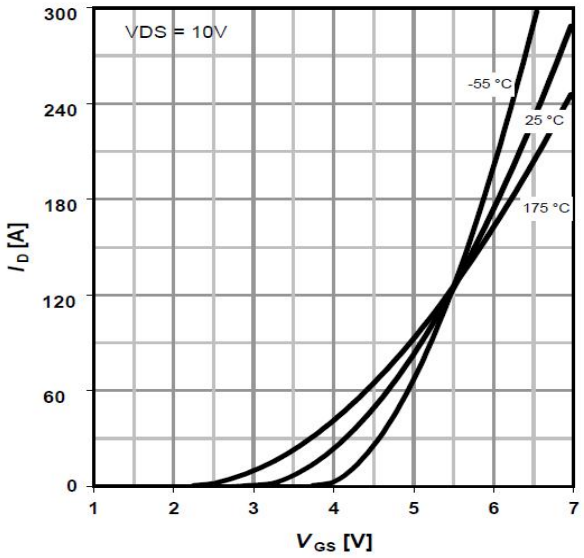

**ID --- Tc**



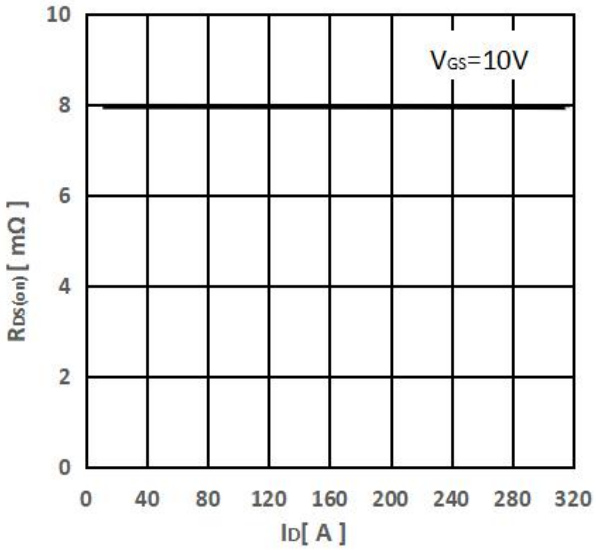

**ID --- VDS**



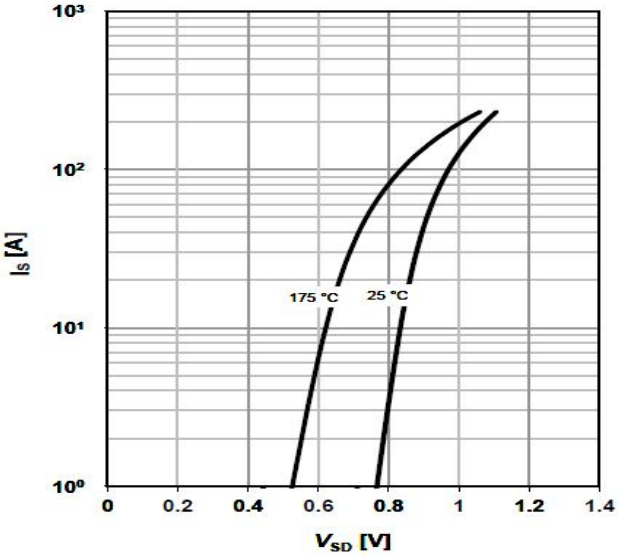

**ID --- VGS**



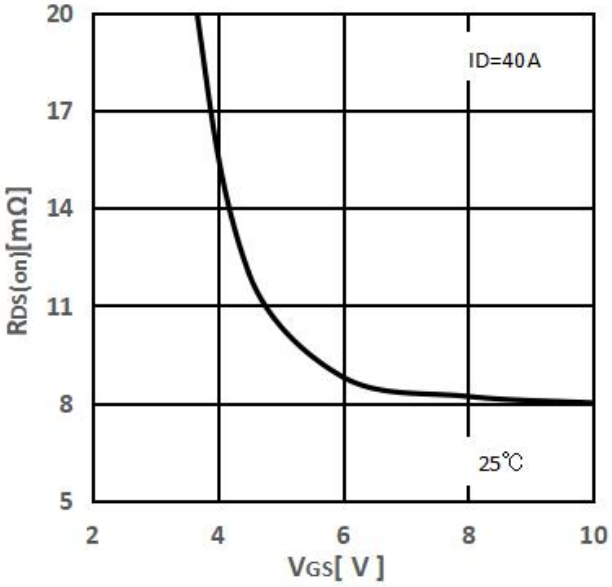

**RDS(on) – ID**



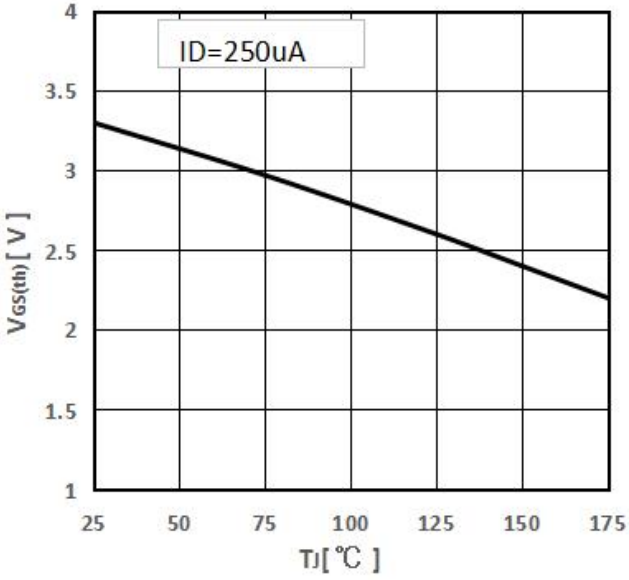

**Is – VSD**



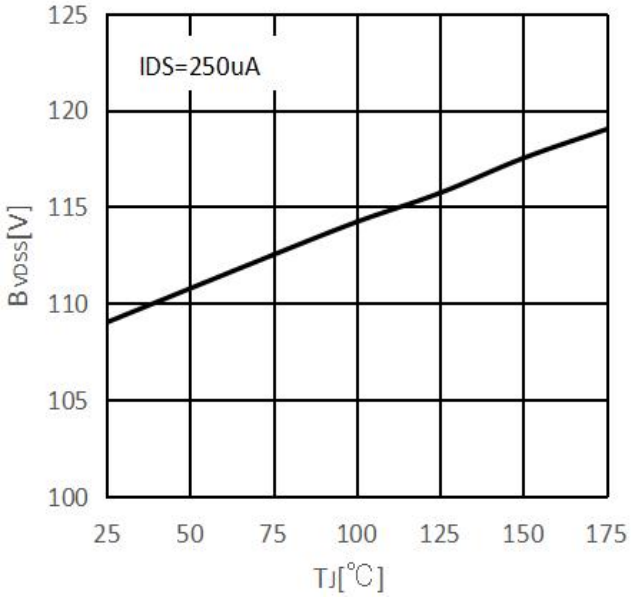
**$R_{DS(on)}$ -- $V_{GS}$**



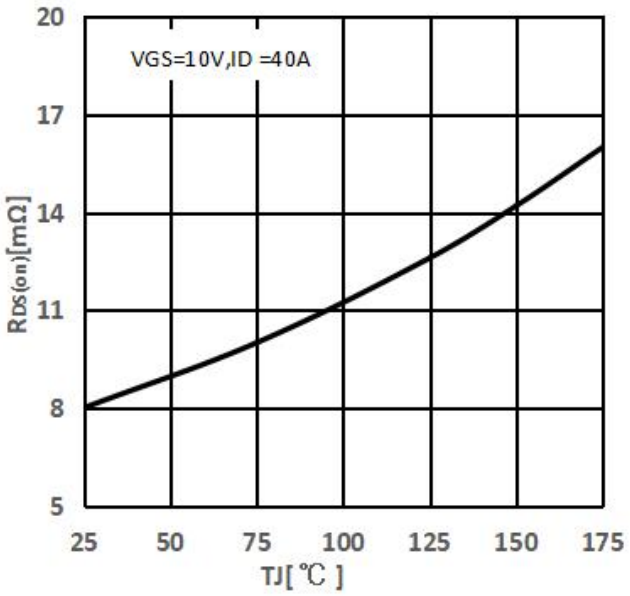

**Threshold Voltage**



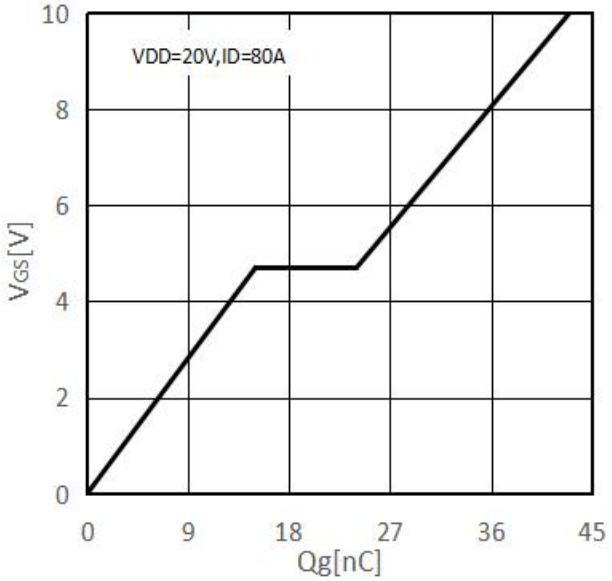

**Drain-source breakdown voltage**



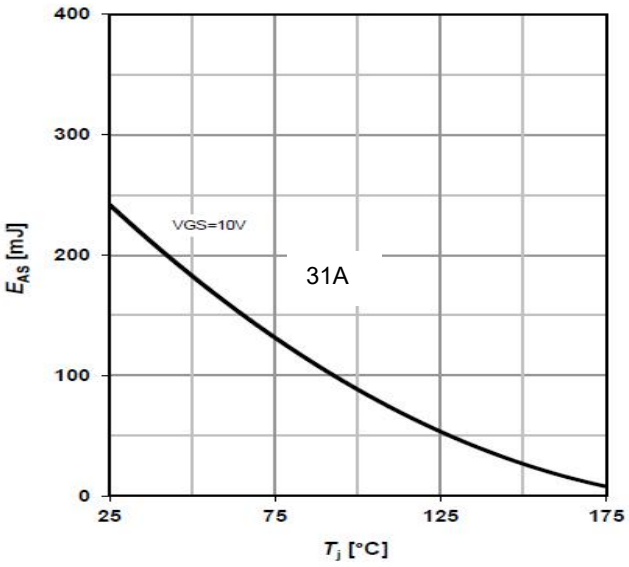

**$R_{DS(on)}$ -- TJ**



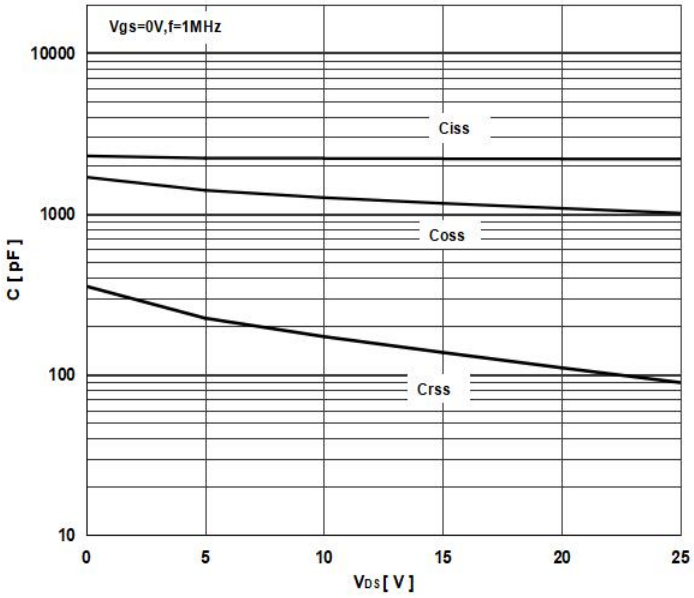

**Typ.gate charge**



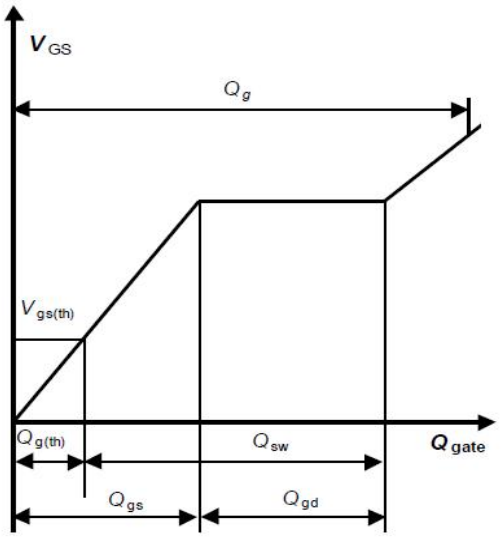

**Avalanche energy**



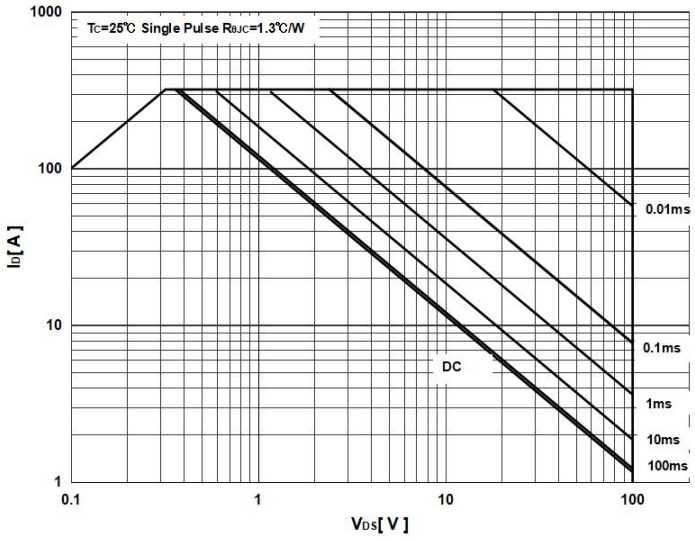
**Typ. capacitances**



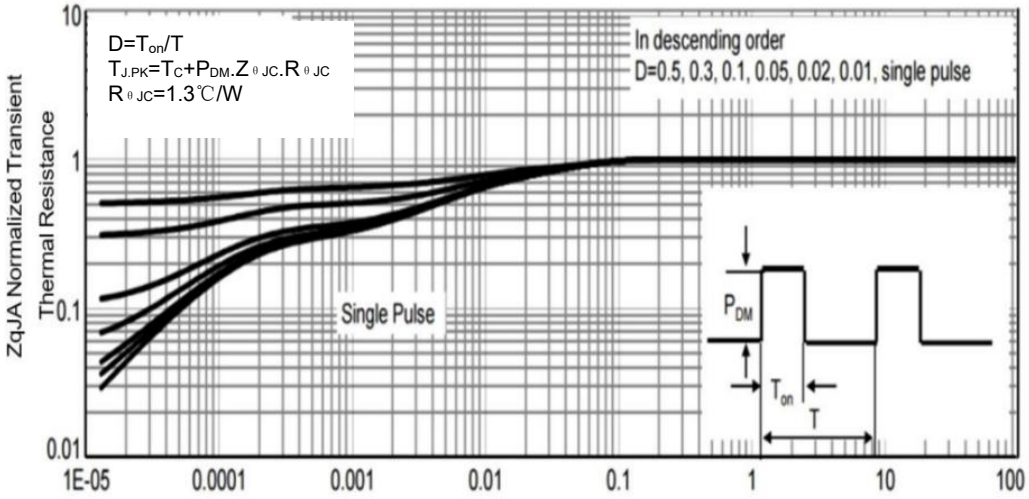

**Gate charge waveforms**



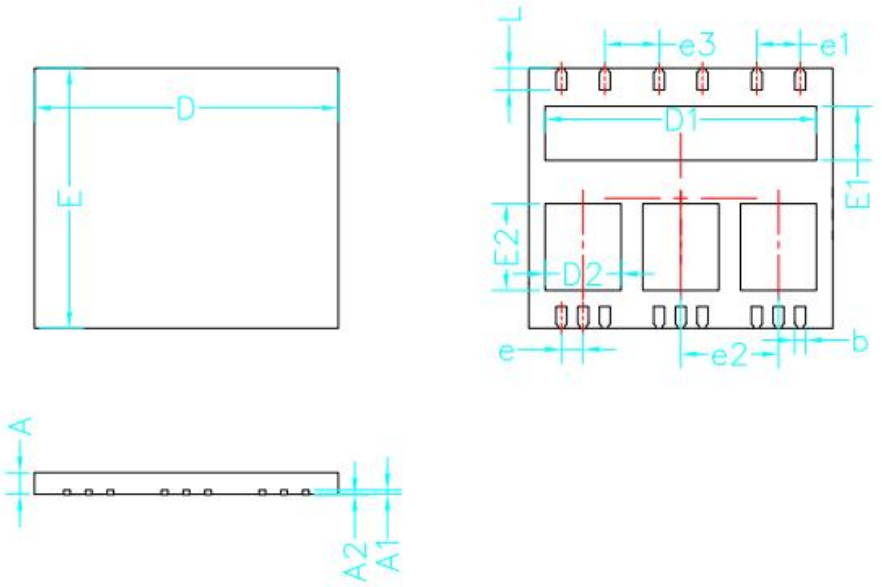

**Maximum Forward Biased Safe Operating Area**




**Normalized Thermal Transient Impedance**



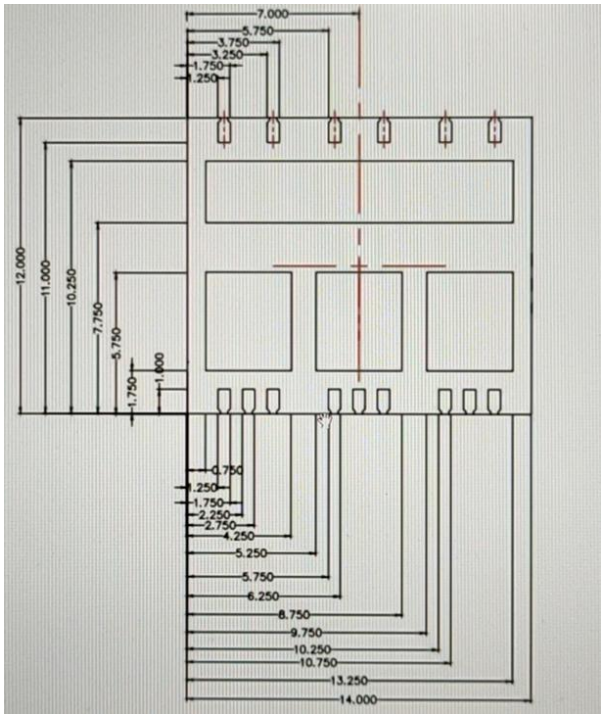
## DFN14*12 Package Outline Dimensions




unit: mm

| | MIN | NOM | MAX |
|---|---|---|---|
| D | 13.90 | 14.00 | 14.10 |
| E | 11.90 | 12.00 | 12.10 |
| D1 | 12.45 | 12.50 | 12.55 |
| E1 | 2.45 | 2.50 | 2.55 |
| D2 | 3.45 | 3.50 | 3.55 |
| E2 | 3.95 | 4.00 | 4.05 |
| L | 0.95 | 1.00 | 1.05 |
| b | 0.45 | 0.50 | 0.55 |
| e | | 1.00BSC | |
| e1 | | 2.00BSC | |
| e2 | | 4.50BSC | |
| e3 | | 2.50BSC | |
| A | 0.95 | 1.00 | 1.05 |
| A1 | | 0.203REF | |
| A2 | 0.00 | 0.02 | 0.05 |

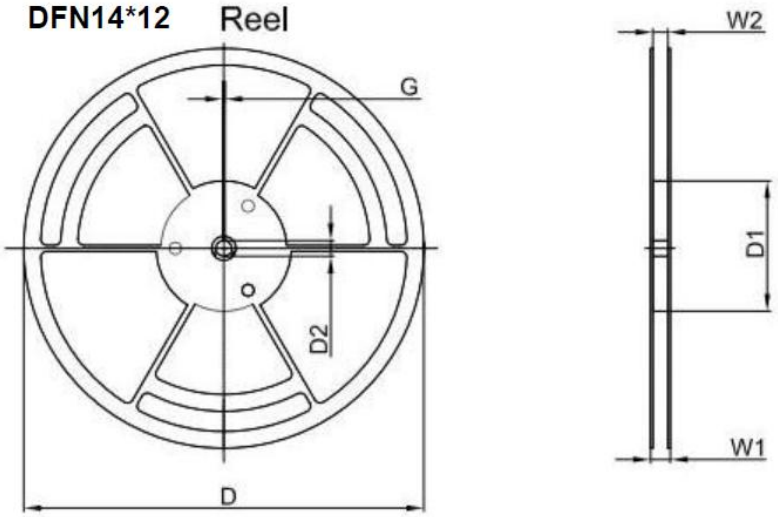
## DFN14*12 Suggested Pad Layout




Note:
1. Controlling dimension：in millimeters.
2. General tolerance:0.5mm.
3. The pad layout is for reference purposes only.

## DFN14*12 Tape and Reel

**DFN14*12 Reel**




| Dimensions are in millimeter | | | | | | |
|---|---|---|---|---|---|---|
| Reel Option | D | D1 | D2 | G | W1 | W2 |
| 13"Dia | Ø330.00 | 100.00 | 13.00 | 1.90 | 28.40 | 24.00 |

| REEL | Reel Size | Box | Box Size(mm) | Carton | Carton Size(mm) |
|---|---|---|---|---|---|
| 2,000 pcs | 13 inch | 4,000 pcs | 340×336×29 | 20,000 pcs | 353×346×365 |

| Date of change | Rev # | revise content |
|---|---|---|
| 2024/02/25 | A/0 | / |
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