# CTx18P03A

## P-Channel MOSFET

**Features:**

- RoHS Compliant
- Low ON Resistance
- Low Input Capacitance
- Low Miller Charge
- Low Input/Output Leakage

**Applications:**

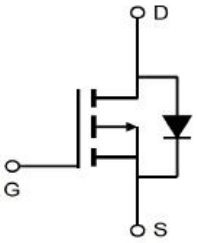
Lithium - Ion Secondary Batteries

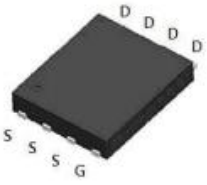
Load Switch

DC-DC converters and Off line UPS

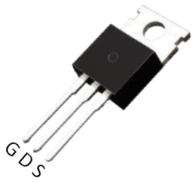
| | |
|---|---|
| $V_{DSS}$(Min.) | -30 V |
| $R_{DS(ON)}$(Typ.) | 16mΩ |
| $I_D$ | -9 A |

**Schematic and Package Information:**




**PDFN5*6**
**CTG18P03A**



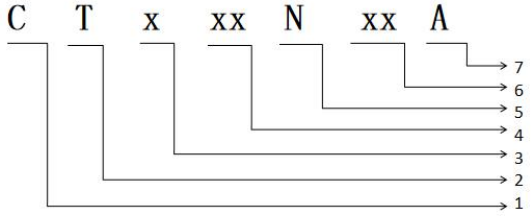

**TO-220CB**
**CTP18P03A**


**TO-252**
**CTD18P03A**


**PDFN3.3*3.3**
**CTK18P03A**

**Marking on the body:**

**MV/LV MOSFET tube naming rules**




1：CYS for short
2：T：Trench S：SGT
3：Package
F：TO-220F P：TO-220 D：TO-252
U：TO-251 W：TO-247S/3P E：SOP-8
G：DFN5*6 K：DFN3.3*3.3
4：RDS(on) Typ
5：N: N channel P: P channel
6：Maximum breakdown voltage (10% of BVdss)
7：Series no.

**Absolute Maximum Ratings** $T_C$=25℃ unless otherwise specified

| Parameter | Symbol | CTx18P03A | | | | Units |
|---|---|---|---|---|---|---|
| | | PDFN 5*6 | TO-220CB | TO-252 | PDFN 3.3*3.3 | |
| Drain-to-Source Voltage | $V_{DSS}$ | -30 | | | | V |
| Gate-to-Source Voltage | $V_{GS}$ | ±20 | | | | V |
| Continuous Drain Current | $I_D$ | -9 | | | | A |
| Pulsed Drain Current, $V_{GS}$@10V (NOTE *1) | $I_{DM}$ | -120 | | | | A |
| Power Dissipation | $P_D$ | 60 | | | | W |
| Derating Factor above 25℃ | | 10 | | | | |
| Single Pulse Avalanche Energy（L=0.5mH） | $E_{AS}$ | 60 | | | | mJ |
| Peak Diode Recovery dv/dt | dv/dt | 5 | | | | V/ns |
| Maximum Temperature for Soldering | $T_L$ | 300 | | | | ℃ |
| Operating Junction and Storage Temperature Range (NOTE *2) | $T_J$ and $T_{STG}$ | 150，-55 to175 | | | | |

## Thermal Resistance

| Parameter | Symbol | Typ. | | | | Units |
|---|---|---|---|---|---|---|
| | | PDFN5*6 | TO-220CB | TO-252 | PDFN3.3*3.3 | |
| Junction to Case | $R_{\theta JC}$ | 2.5 | | | | ℃/W |
| Junction to Ambient | $R_{\theta JA}$ | 60 | | | | ℃/W |

## Electrical Characteristics TJ=25℃ unless otherwise specified

| Parameter | Symbol | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| Drain-to-Source Breakdown Voltage | $BV_{DSS}$ | -30 | -- | -- | V | $V_{GS}$=0V, $I_D$=-250μA |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -1.0 | -1.8 | -2.5 | V | $V_{DS}$=$V_{GS}$,$I_D$=-250μA |
| StaticDrain-to-Source On-Resistance | $R_{DS(ON)}$ | -- | 16 | 18 | mΩ | $V_{GS}$=-10V, $I_D$=-1A |
| Drain-to-Source Leakage Current | $I_{DSS}$ | -- | -- | 1 | uA | $V_{DS}$=-30V,$V_{GS}$=0V $T_J$=25℃ |
| | | -- | -- | 100 | | $V_{DS}$=-30V,$V_{GS}$=0V $T_J$=125℃ |
| Gate-to-Source Forward Leakage | $I_{GSS}$ | -- | -- | +100 | nA | $V_{GS}$=+20V |
| Gate-to-Source Reverse Leakage | | -- | -- | -100 | | $V_{GS}$= -20V |

## Dynamic Characteristics Essentially independent of operating temperature

| Parameter | Symbol | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| Input Capacitance | $C_{iss}$ | -- | 2087 | -- | pF | $V_{GS}$=0V,$V_{DS}$=-15V f =1.0MHz |
| Output Capacitance | $C_{oss}$ | -- | 236 | -- | | |
| Reverse Transfer Capacitance | $C_{rss}$ | -- | 216 | -- | | |
| Total Gate Charge | $Q_g$ | -- | 41 | -- | nC | $I_D$=-9A,$V_D$=-15V VGS = -10V |
| Gate-to-Source Charge | $Q_{gs}$ | -- | 9 | -- | | |
| Gate-to-Drain (“Miller”) Charge | $Q_{gd}$ | -- | 6 | -- | | |
| Turn-on Delay Time | $t_{d(ON)}$ | -- | 10 | -- | ns | $V_D$=-15V, $I_D$=-9A, $V_G$=-10V $R_G$=2.5Ω |
| Rise Time | $t_{rise}$ | -- | 15 | -- | | |
| Turn-Off Delay Time | $t_{d(OFF)}$ | -- | 50 | -- | | |
| Fall Time | $T_{fall}$ | -- | 20 | -- | | |

## Source-Drain Diode Characteristics Tc=25℃ unless otherwise specified

| Parameter | Symbol | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| Continuous Drain-Source Diode Forward Current | $I_S$ | -- | -- | -9 | A | $T_C$=25℃ |
| Pulsed Drain-Source Diode Forward Current | $I_{SM}$ | -- | -- | -36 | | |
| Diode Forward Voltage | $V_{SD}$ | -- | -- | -1.2 | V | $I_{SD}$=-15A, $V_{GS}$=0V |
| Reverse Recovery Time | $t_{rr}$ | -- | 24 | -- | ns | $I_F$= $I_S$ di/dt=100A/us |
| Reverse Recovery Charge | $Q_{rr}$ | -- | 16 | -- | nC | |

Notes:
1. $T_J$ = +25℃ to +150℃.
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. Pulse width < 300μs; duty cycle < 2%.

## Typical Characteristics

Figure 1. Output Characteristics

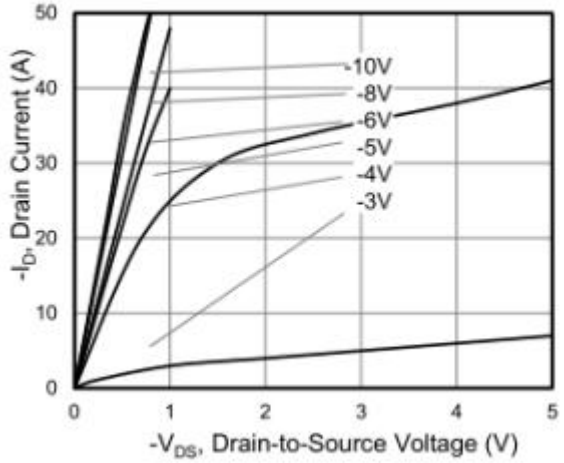



Figure 2. Transfer Characteristics

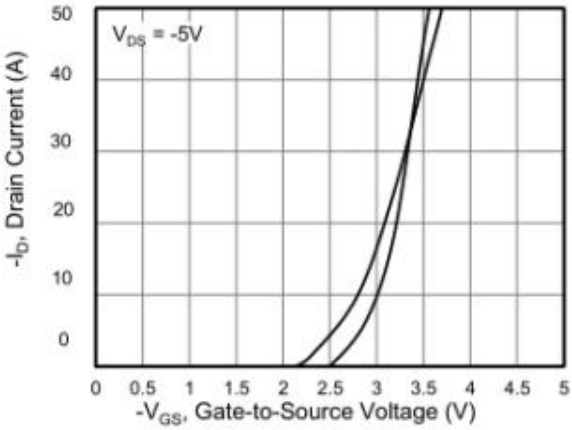



Figure 3. On-Resistance vs. Drain Current

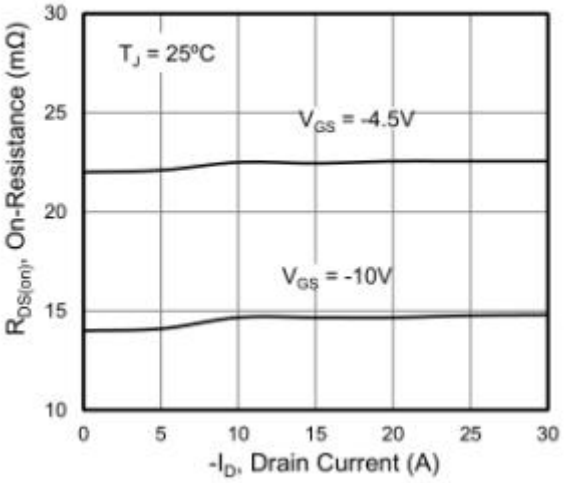



Figure 4. Capacitance

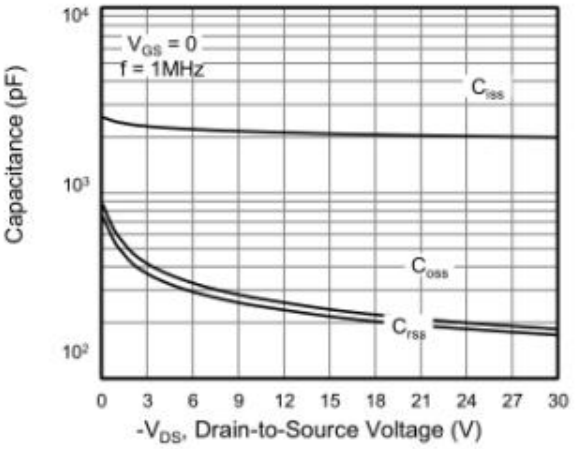



Figure 5. Gate Charge

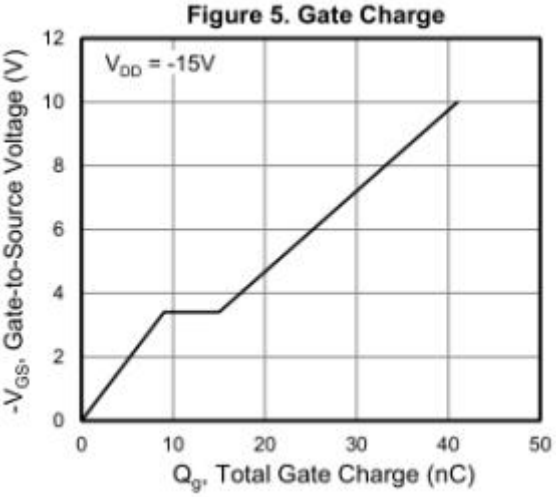



Figure 6. Body Diode Forward Voltage

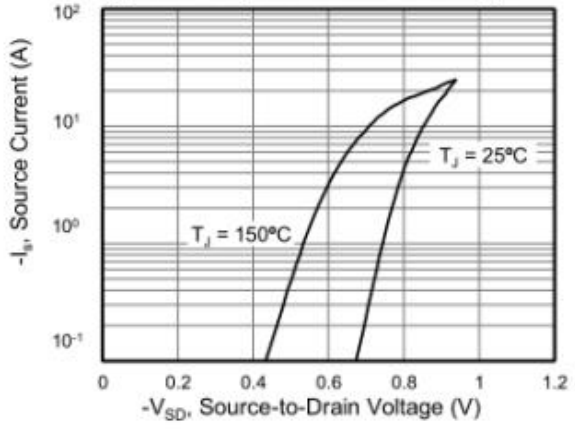


**Figure 7. On-Resistance vs. Junction Temperature**

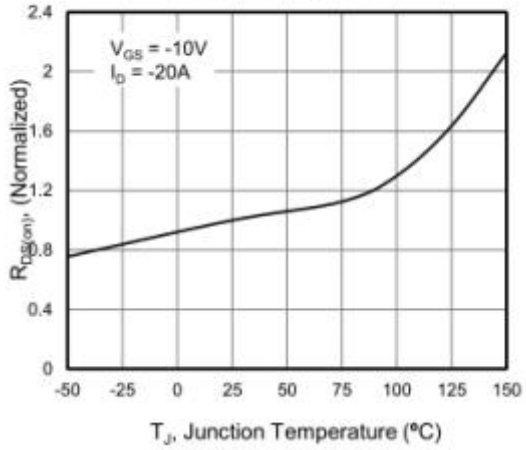



**Figure 8. Threshold Voltage vs. Junction Temperature**

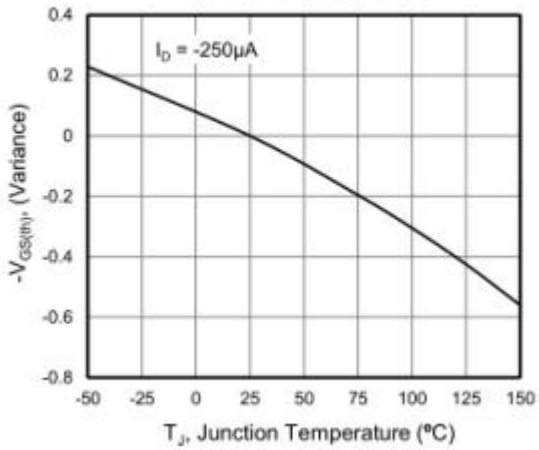



**Figure 9. Transient Thermal Impedance**

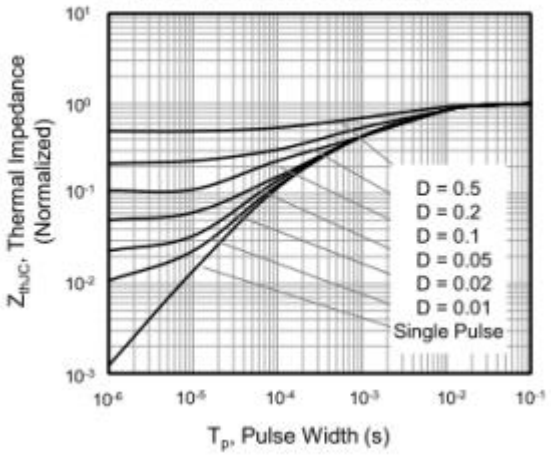
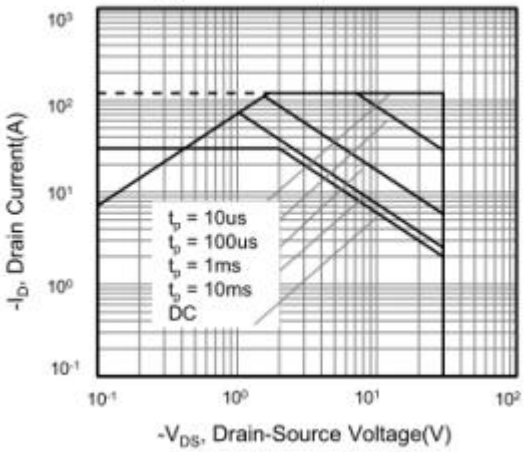
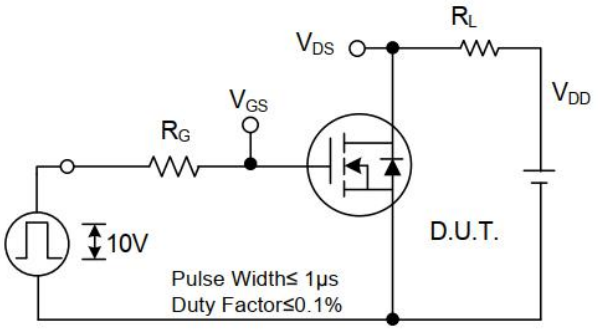


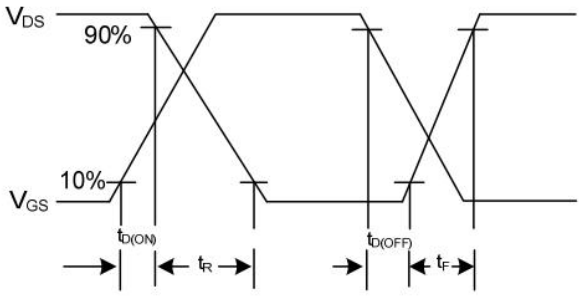

**Figure 10. Safe operation area**



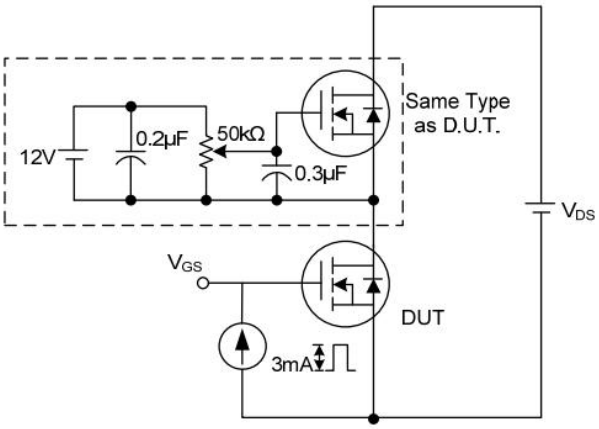
## Test Circuits and Waveform



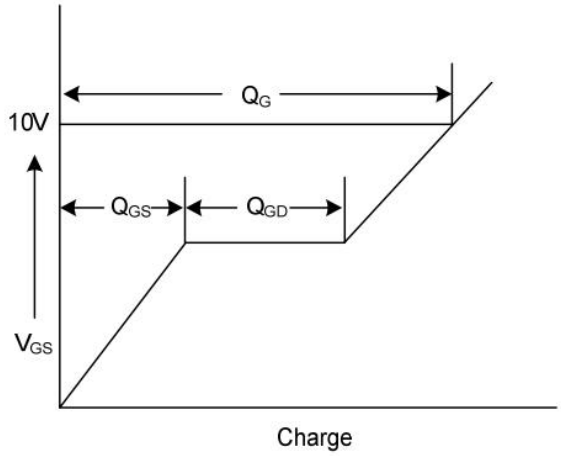

**Switching Test Circuit**



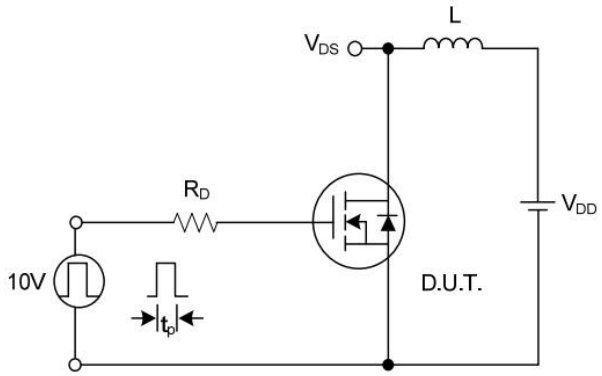

**Switching Waveforms**



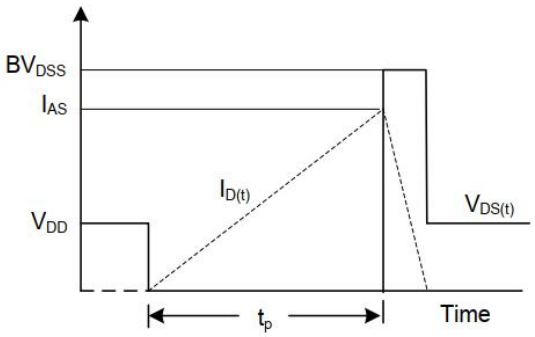

**Gate Charge Test Circuit**




**Gate Charge Waveform**



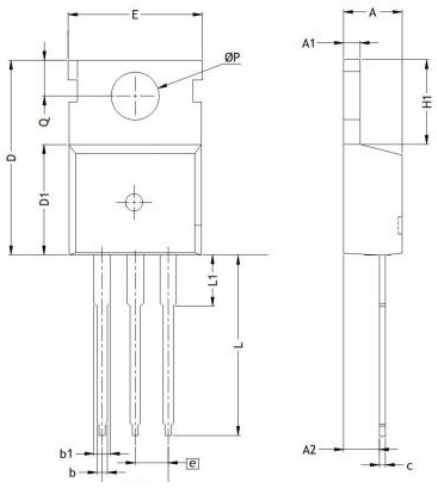

**Unclamped Inductive Switching Test Circuit**




**Unclamped Inductive Switching Waveforms**

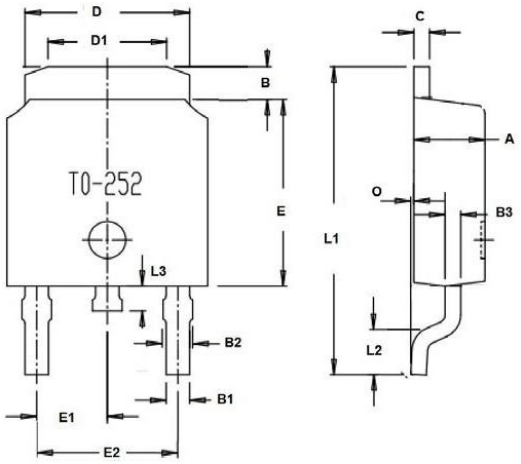
## PACKAGE MECHANICAL DATA（Unit：mm）：

### TO-220CB



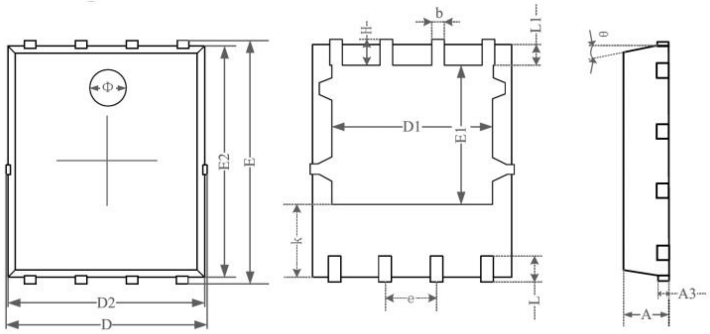

| DIM | Min. | Max. |
|---|---|---|
| A | 4.25 | 4.65 |
| A1 | 1.25 | 1 |
| A2 | 2.35 | 2 |
| b | 0.7 | 0 |
| b1 | 1.15 | 1.75 |
| c | 0.45 | 0.6 |
| D | 14.35 | 15.9 |
| D1 | 8.8 | 9 |
| E | 9.9 | 1 |
| e | Typ 2.54 | |
| e1 | Typ 5.08 | |
| H1 | 6.3 | 6.5 |
| L | 12.85 | 13.5 |
| L1 | 2.85 | 3 |
| Q | 2.7 | 2.9 |
| ΦP | 3.5 | 3.9 |
| All Dimensions in millimeter | | |

### TO-252



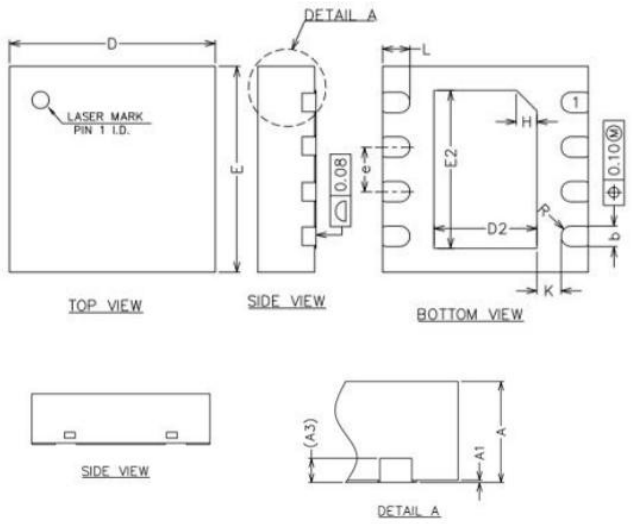

| DIM | Min. | Max. |
|---|---|---|
| A | 2.1 | 2.5 |
| B | 0.95 | 1.55 |
| C | 0.4 | 0.6 |
| D | 6.4 | 6.7 |
| D1 | 5.1 | 5.8 |
| E | 5.8 | 6.4 |
| E1 | Typ 2.3 | |
| E2 | Typ 4.6 | |
| B1 | 0.6 | 0.8 |
| B2 | 0.75 | 0.95 |
| O | -- | 0.15 |
| L1 | 9.0 | 11.0 |
| L2 | 1.3 | 1.7 |
| L3 | 0.7 | 0.95 |
| All Dimensions in millimeter | | |

### DFN5*6




| DIM | Min. | Max. |
|---|---|---|
| A | 0.8 | 1.0 |
| A3 | Typ 0.15 | |
| D | 4.9 | 5.1 |
| E | 6.0 | 6.1 |
| D1 | 3.9 | 4.1 |
| E1 | 3.3 | 3.5 |
| D2 | 4.8 | 5.0 |
| E2 | 5.7 | 5.8 |
| K | 1.2 | 1.4 |
| b | 0.3 | 0.4 |
| e | Typ 1.27 | |
| L | 0.5 | 0.7 |
| L1 | 0.4 | 0.6 |
| H | 0.5 | 0.7 |
| θ | 10° | 12° |
| Φ | 1.1 | 1.3 |
| All Dimensions in millimeter | | |

## DFN3.3*3.3




| DIM | Min. | Max. |
|---|---|---|
| A | 0 | 0.9 |
| A1 | 0 | 0.05 |
| A3 | Typ 0.20 | |
| b | 0 | 0.35 |
| D | 2 | 3.1 |
| E | 2 | 3.1 |
| D2 | 1 | 1.6 |
| E2 | 2 | 2.4 |
| e | 0 | 0.75 |
| H | Typ 0.30 | |
| K | 0 | 0.45 |
| L | 0 | 0.45 |
| R | 0 | --- |
| All Dimensions in millimeter | | |

## Statement:

- We reserve the right to change the manual without prior notice! Customers should obtain the latest version of the information before placing an order, and verify that the relevant information is complete and up-to-date.
- Any semiconductor product has the possibility of failure or failure under specific conditions. The buyer has the responsibility to comply with safety standards and take safety measures when using Silan product for system design and complete machine manufacturing, so as to avoid the occurrence of personal injury or property loss caused by potential failure risk!
- Product promotion will never end, our company will wholeheartedly provide customers with more excellent products!