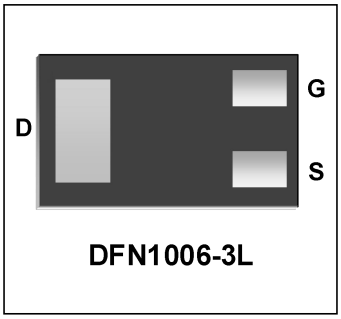
Etek Microelectronics

# EM03N06FX

**N-Channel Trench MOSFET**

## Features

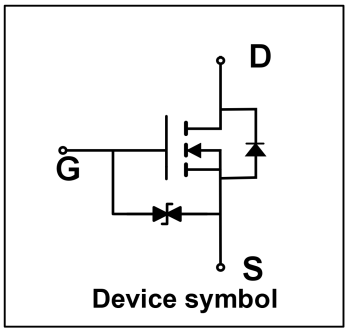


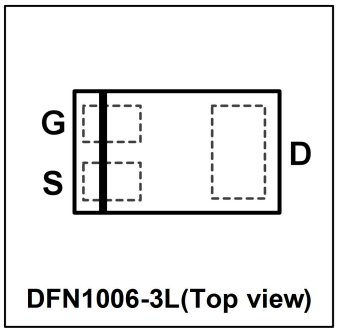

- $V_{DS}$= 60V, $I_D$ = 0.34A
  $R_{DS(on)}$ < 2.1Ω @ $V_{GS}$ = 10V
  $R_{DS(on)}$ < 2.8Ω @ $V_{GS}$ = 4.5V
- Very Fast Switching
- Trench MOSFET Technology
- Low Threshold Voltage
- Pb Free Device
- ESD Protected

## Mechanical Characteristics

- DFN1006-3L Package
- Marking : Making Code
- RoHS Compliant

## Schematic & PIN Configuration




## Absolute Maximum Rating

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $I_D$ | 0.34 | A |
| Power Dissipation | $P_D$ | 360 | mW |
| Junction Temperature | $T_J$ | 150 | °C |
| Storage Temperature | $T_{STG}$ | -55 to +150 | °C |

## Electrical Characteristics (Tamb=25°C unless otherwise noted)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 60 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1 | 1.3 | 2.0 | V |
| Drain Cut-off Current | $I_{DSS}$ | $V_{DS}$ = 60V, $V_{GS}$ = 0V | - | - | 1 | μA |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$= 0V | - | - | ±10 | μA |
| Drain-Source on-State Resistance[1] | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 0.5A | - | 1.3 | 2.1 | Ω |
| | | $V_{GS}$ = 4.5V, $I_D$ = 0.2A | - | 1.4 | 2.8 | |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 10V, $V_{GS}$ = 0V, f = 1 MHz | - | 29 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 7.5 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 3 | - | |
| **Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 10V, $V_{GS}$ = 4.5V, $I_D$ = 0.25A | - | 0.3 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 0.2 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 0.08 | - | |
| Turn-on Delay Time[2] | $t_{d(on)}$ | $V_{DD}$ = 30V, $V_{GEN}$ = 10V, $I_D$ = 0.2A, $R_G$ =25Ω | - | 3.9 | - | ns |
| Rise Time[2] | $t_r$ | | - | 3.4 | - | |
| Turn-off Delay Time[2] | $t_{d(off)}$ | | - | 15.7 | - | |
| Fall Time[2] | $t_f$ | | - | 9.9 | - | |
| **Source-Drain Diode Characteristics** | | | | | | |
| Body Diode Voltage | $V_{SD}$ | $I_S$=0.3A, $V_{GS}$ = 0V | - | - | 1.5 | V |

Notes:

1. Pulse Test : Pulse Width≤300μs, Duty Cycle≤2%.

2. Guaranteed by design, not subject to producting.

# Typical Characteristics

Figure 1. Output Characteristics

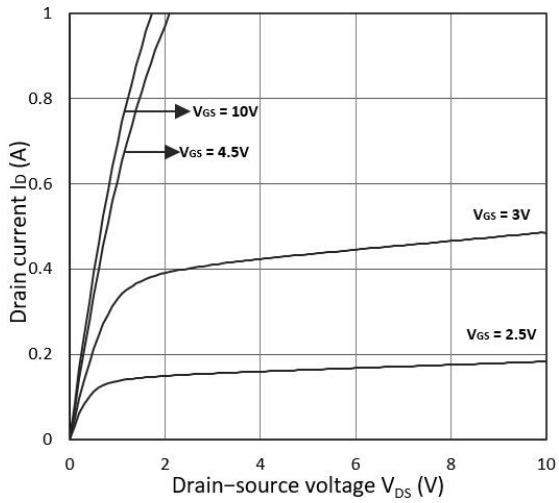



Figure 2. Transfer Characteristics

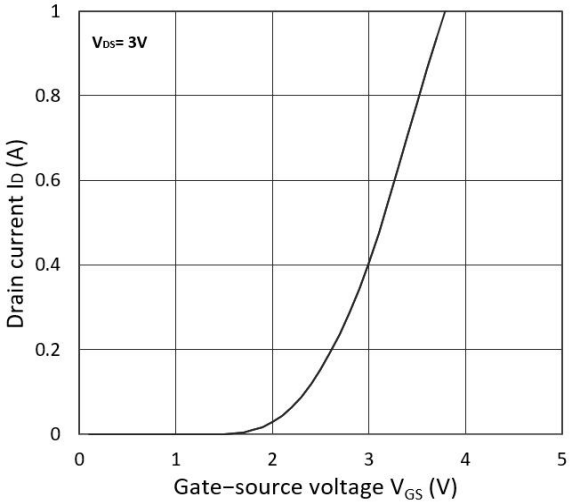



Figure 3. $R_{DS(on)}$ vs. $I_D$

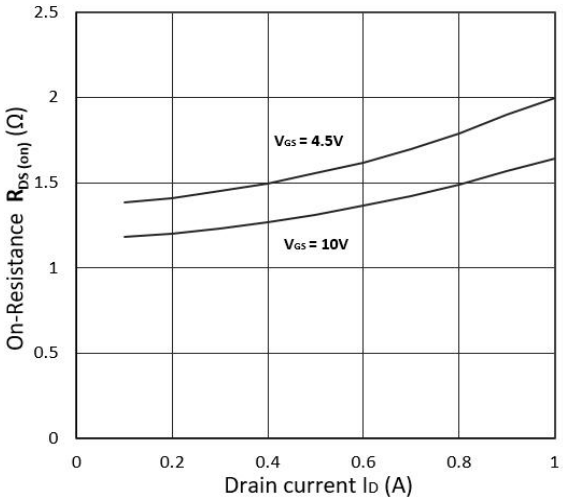



Figure 4. $R_{DS(on)}$ vs. $V_{GS}$

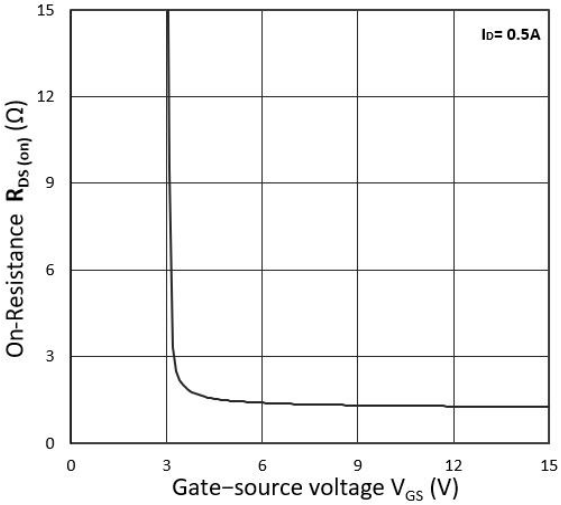



Figure 5. $I_S$ vs. $V_{SD}$

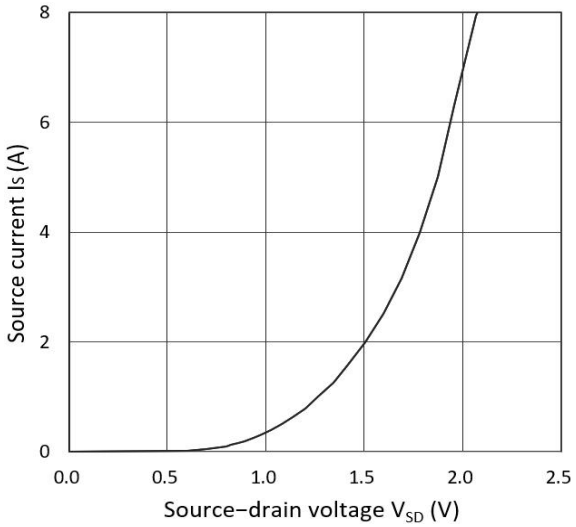
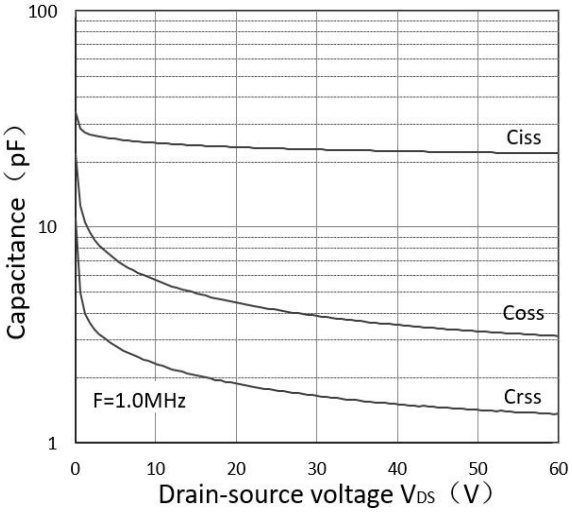
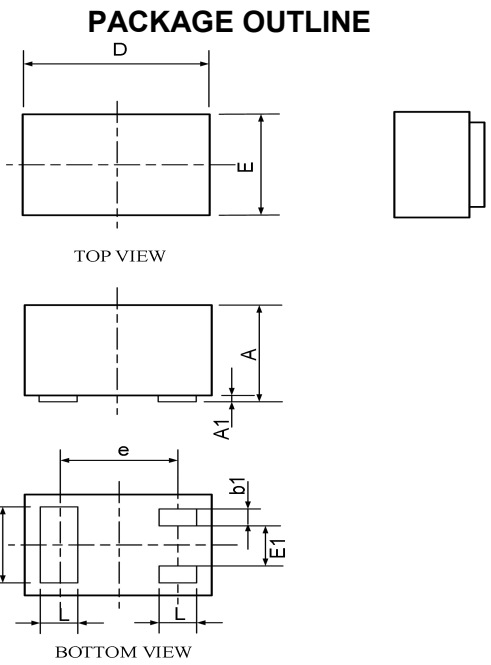



Figure 6. Capacitance Characteristics



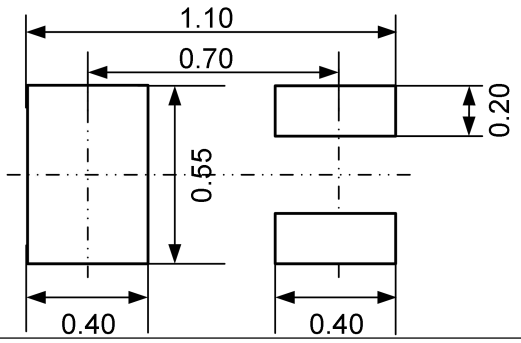
## Outline Drawing – DFN1006-3L



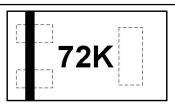

DFN1006-3L

| SYMBOL | MILLIMETERS | | |
|---|---|---|---|
| | MIN. | TYP. | MAX. |
| A | 0.45 | 0.50 | 0.55 |
| A1 | 0.00 | - | 0.05 |
| b | 0.40 | 0.50 | 0.60 |
| b1 | 0.10 | 0.15 | 0.20 |
| D | 0.95 | 1.00 | 1.05 |
| e | 0.65BSC | | |
| E | 0.55 | 0.60 | 0.65 |
| E1 | 0.19BSC | | |
| L | 0.20 | 0.25 | 0.30 |

**Land Pattern**




## Marking Codes

| Part Number | EM03N06FX |
|---|---|
| Marking Code |  |

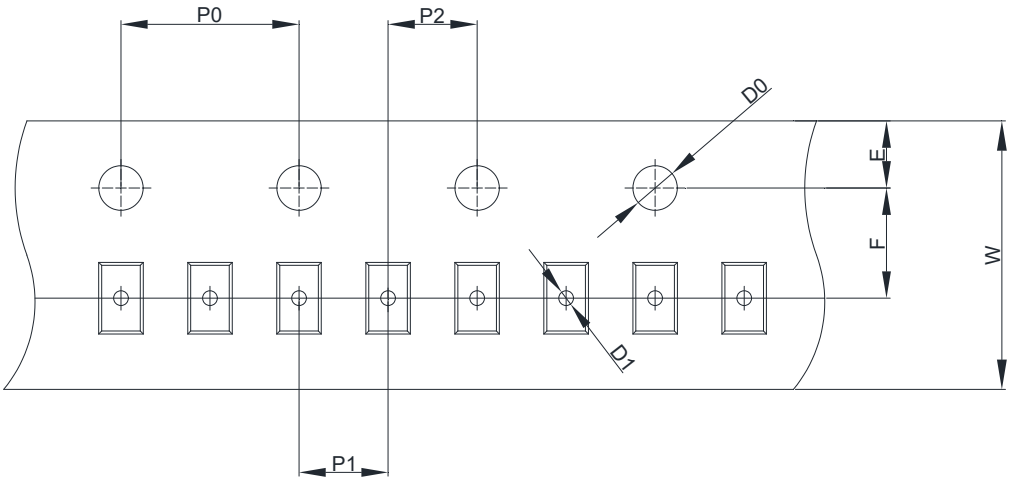


## Package Information

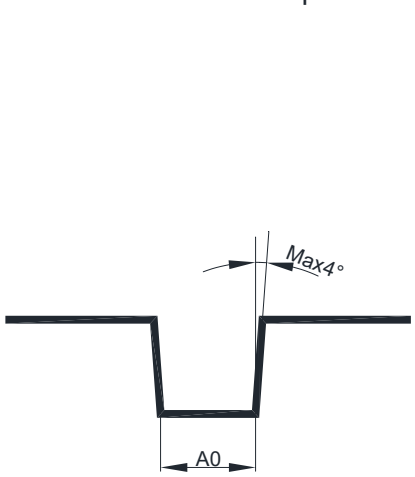
Qty：10k/Reel

# Tape Information

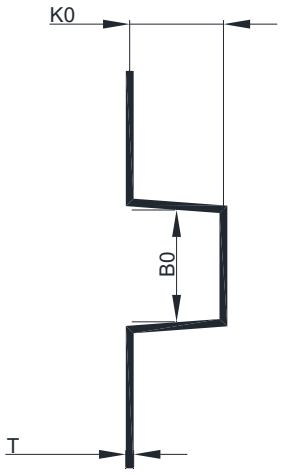
## Tape Dimensions



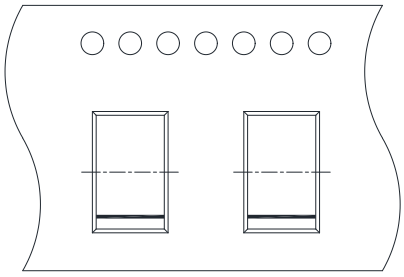

top view




front view




end view



User Direction of Feed

| SYMBOL | A0 | B0 | K0 | P0 | P1 | P2 |
|---|---|---|---|---|---|---|
| SPEC | 0.63~0.75 | 1.07~1.24 | 0.54~0.71 | 3.90~4.10 | 1.90~2.10 | 1.95~2.05 |
| SYMBOL | T | E | F | D0 | D1 | W |
| SPEC | 0.15~0.27 | 1.65~1.85 | 3.40~3.60 | 1.00~2.10 | 0.30~0.60 | 7.80~8.30 |

# Revision History

| No. | Version | Date | Revision Item | Request | Function and characteristic checking | Package dimension checking | Typos checking |
|---|---|---|---|---|---|---|---|
| 1 | 1.0 | 2019-09-19 | Released Version | Qi Shu Kun | Qi Shu Kun | Liu Jia Ying | Liu Jia Ying |
| 2 | 1.1 | 2022-02-18 | Add tape information | Qi Shu Kun | Qi Shu Kun | Liu Jia Ying | Liu Jia Ying |
| | | | | | | | |