**P-CHANNEL ENHANCEMENT MODE POWER MOSFET**

# TF160P02L

## ● General Description

The TF160P02L combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

## ● Features

Advance high cell density Trench technology

Low $R_{DS(ON)}$ to minimize conductive loss

Low Gate Charge for fast switching

Low Thermal resistance

## ●Application

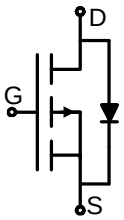
MB/VGA Vcore

SMPS 2nd Synchronous Rectifier

POL application

BLDC Motor driver

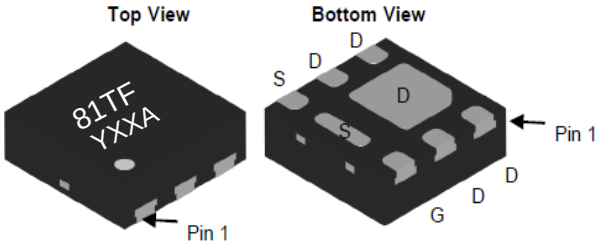
## ● Product Summary




$V_{DS}$=-20V $I_D$=-12A

$R_{DSON(-4.5V\ typ)}$=15.5mΩ

$R_{DSON(-2.5V\ typ)}$=19.0mΩ




DFN2x2-6L

## ●Ordering Information:

| | |
|---|---|
| Part NO. | TF160P02L |
| Marking1 | 81:TF160P02L; TF:tuofeng |
| Marking2 | Y:year code; XX:Week; A:device code; |
| Basic ordering unit (pcs) | 3000 |

## ●Absolute Maximum Ratings ($T_C$ =25℃)

| **Parameter** | **Symbol** | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | V |
| Continuous Drain Current | $I_{D@}T_C$=25℃ | -12 | A |
| | $I_{D@}T_C$=75℃ | -7.5 | A |
| | $I_{D\ @}T_C$=100℃ | -7.0 | A |
| Pulsed Drain Current ① | $I_{DM}$ | 30 | A |
| Total Power Dissipation② | $P_D$@$T_C$=25℃ | 2.5 | W |
| Total Power Dissipation | $P_D$@$T_A$=25℃ | 0.5 | W |
| Operating Junction Temperature | $T_J$ | -55 to 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55 to 150 | ℃ |

## ●Thermal resistance

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Thermal resistance, junction - case② | $R_{thJC}$ | - | - | 7 | °C/W |
| Thermal resistance, junction - ambient | $R_{thJA}$ | - | - | 50 | °C/W |
| Soldering temperature, wavesoldering for 8s | $T_{sold}$ | - | - | 265 | °C |

## ●Electronic Characteristics

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ =0V, $I_D$ =-250uA | -20 | | | V |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}$ =$V_{DS}$, $I_D$ =2-50uA | 0.45 | 0.55 | 0.90 | V |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=-20V, $V_{GS}$ =0V | | | 1.0 | uA |
| Gate- Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V, $V_{DS}$ =0V | | | ±100 | nA |
| Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS}$=-4.5V, $I_D$=-5.5A | | 15.5 | 19.0 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-4.0A | | 19.0 | 23.0 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$ =-10V, $I_D$=-5.5A | | 10 | | S |
| Source-drain voltage | $V_{SD}$ | Is=-5.5A | | 0.83 | 1.00 | V |

## ●Electronic Characteristics

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| Input capacitance | $C_{iss}$ | f = 1MHz | - | 1478 | - | pF |
| Output capacitance | $C_{oss}$ | | - | 127.9 | - | |
| Reverse transfer capacitance | $C_{rss}$ | | - | 136.5 | - | |

## ●Gate Charge characteristics($T_a$ = 25℃)

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| Total gate charge | $Q_g$ | $V_{DD}$ =-10V | - | 18.7 | - | nC |
| Gate - Source charge | $Q_{gs}$ | $I_D$ = -6A | - | 2.64 | - | |
| Gate - Drain charge | $Q_{gd}$ | $V_{GS}$ = - 4.5V | - | 4.40 | - | |

Note:
① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;
② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

Fig.1 Power Dissipation Derating Curve

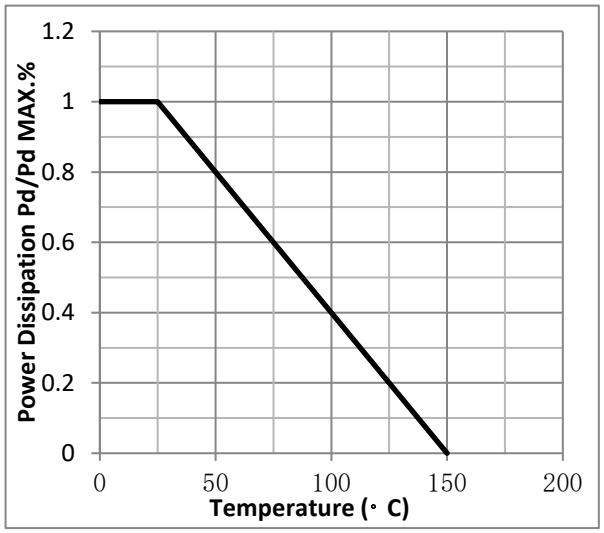



Fig.2 Typical output Characteristics

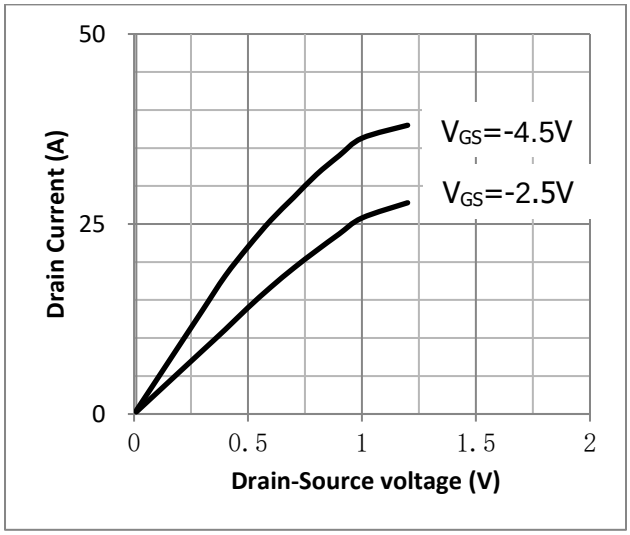



Fig.3 Threshold Voltage V.S Junction Temperature

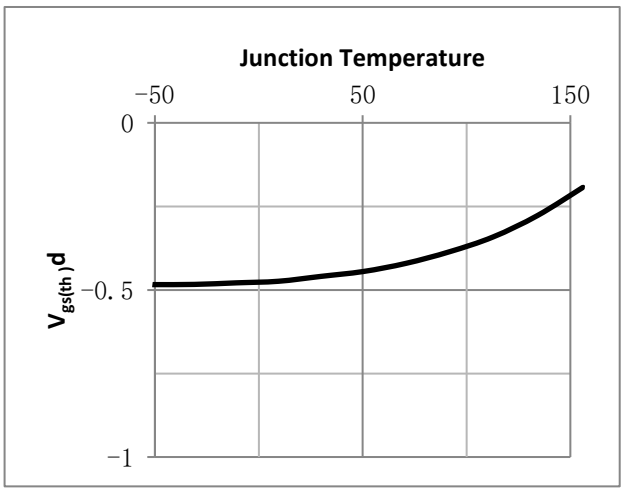



Fig.4 Resistance V.S Drain Current

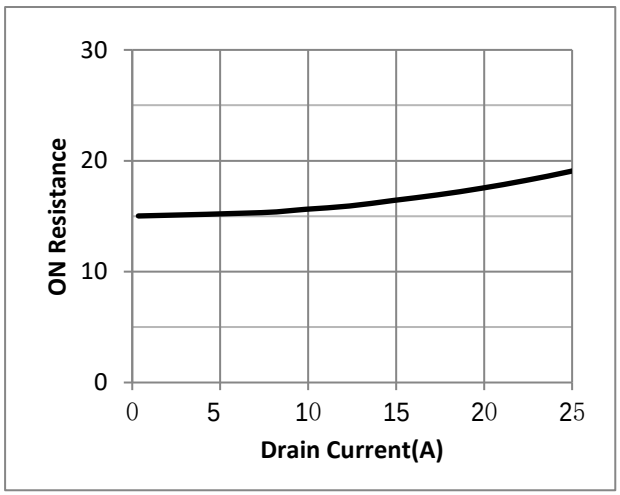



Fig.5 On-Resistance VS Gate Source Voltage

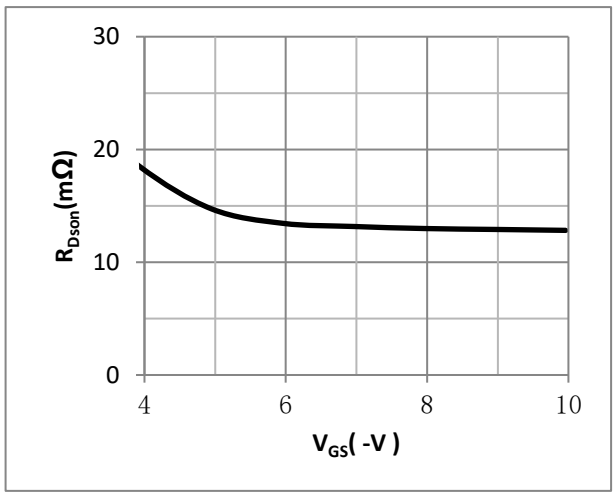



Fig.6 On-Resistance V.S Junction Temperature

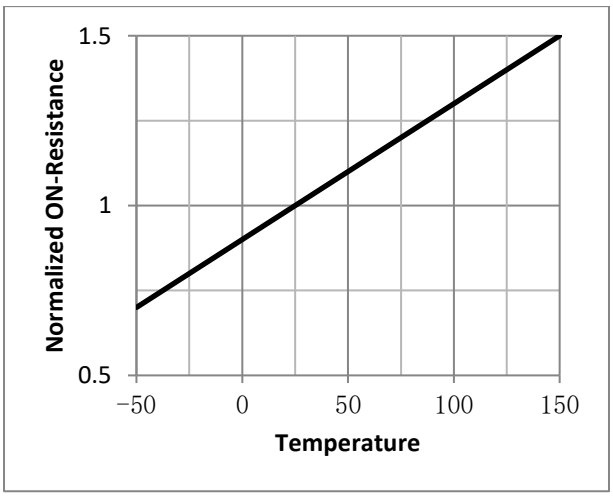


Fig.7 Switching Time Measurement Circuit

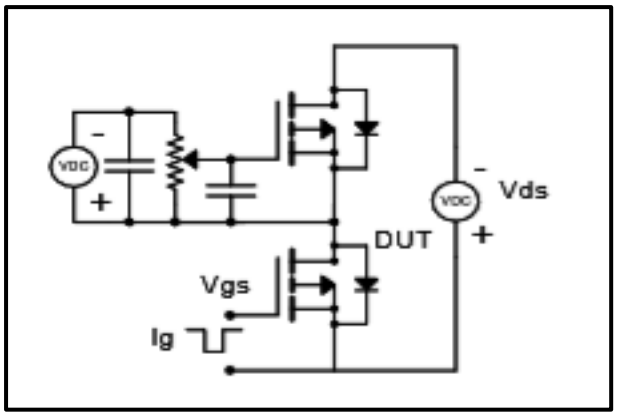



Fig.8 Gate Charge Waveform

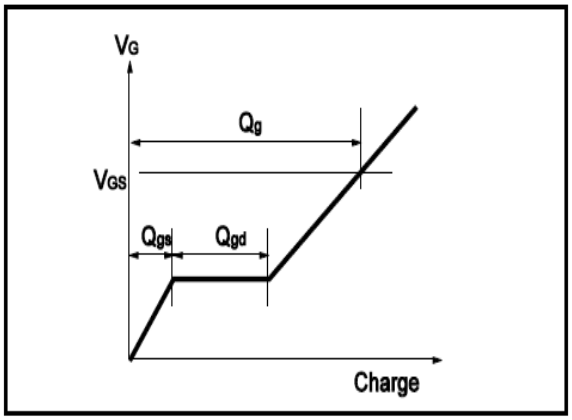



Fig.9 Switching Time Measurement Circuit

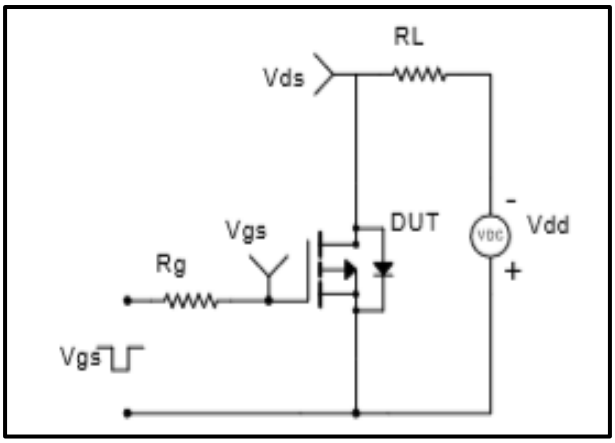



Fig.10 Gate Charge Waveform

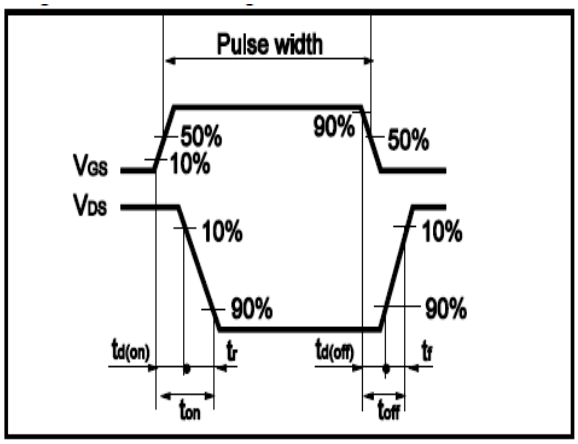



Fig.11 Avalanche Measurement Circuit

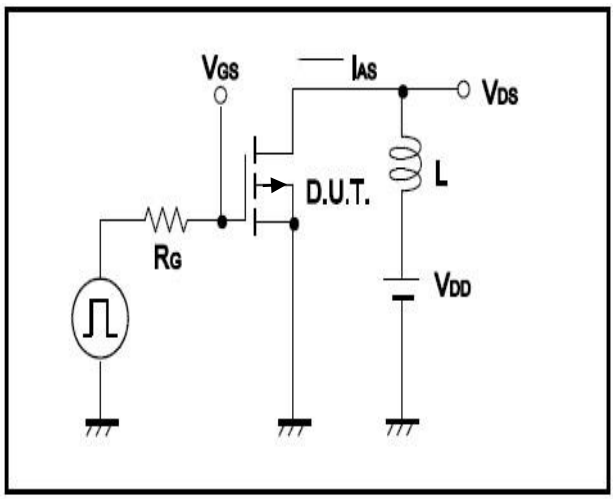
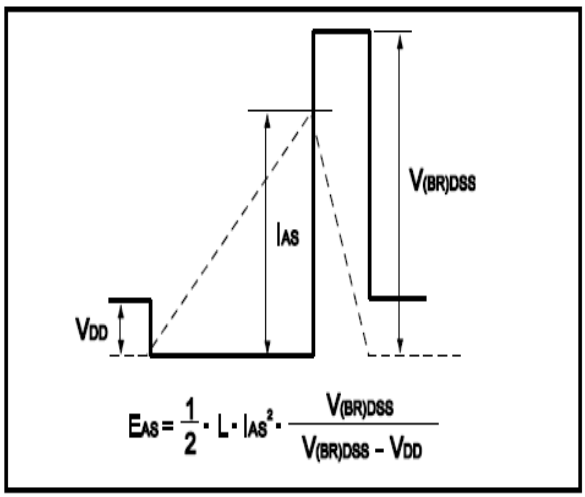
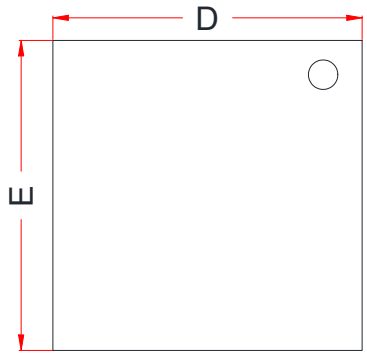


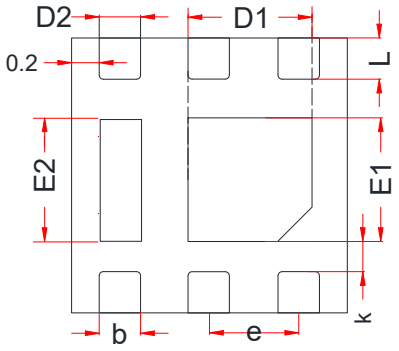

Fig.12 Avalanche Waveform



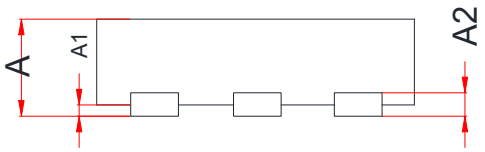
## DFN2X2-6L Package Information




TOP VIEW




BOTTOM VIEW




SIDE VIEW

| Symbol | Dimensions in Millimeters | | |
|---|---|---|---|
| | Min. | Typ. | Max. |
| A | 0.70 | 0.75 | 0.80 |
| A1 | 0.00 | 0.02 | 0.05 |
| A2 | | 0.203Ref. | |
| b | 0.25 | 0.30 | 0.35 |
| D | 1.92 | 2.00 | 2.07 |
| D1 | 0.85 | 0.95 | 1.05 |
| D2 | 0.20 | 0.30 | 0.40 |
| E | 1.92 | 2.00 | 2.07 |
| E1 | 0.70 | 0.80 | 0.90 |
| E2 | 0.70 | 0.80 | 0.90 |
| e | | 0.65 BSC | |
| L | 0.30 | 0.35 | 0.40 |
| K | 0.20 | - | - |