## Features

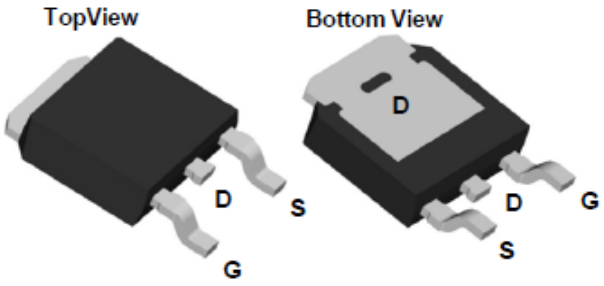
The TW15P06D is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The TW15P06D meet the RoHS and GreeProduct requirement 100% EAS guaranteed with full function reliability approved.

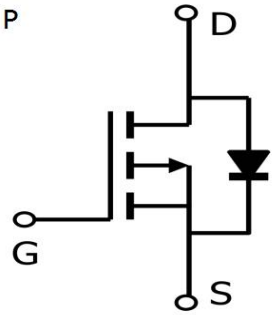
## Product Summary

| BVDSS | RDSON | ID |
|---|---|---|
| -60V | 68mΩ | -15A |

## Pin Configurations




TO-252




## Maximum Ratings(Ta=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | VDS | -60 | V |
| Gate-Source Voltage | VGS | ±20 | |
| Continuous Drain Current, VGS@ -10V[1] | ID@TC=25℃ | -15 | A |
| Continuous Drain Current, VGS@ -10V[1] | ID@TC =100℃ | -8.3 | |
| Continuous Drain Current, VGS@ -10V[1] | ID@TA=25℃ | -3.3 | |
| Continuous Drain Current, VGS@ -10V[1] | ID@TA=70℃ | -2.7 | |
| Pulsed Drain Current [2] | IDM | -26 | |
| Single Pulse Avalanche Energy | EAS | 29.8 | |
| Avalanche Current | IAS | 24.4 | |
| Total Power Dissipation | PD@TC=25℃ | 31.3 | W |
| Total Power Dissipation | PD@TA=25℃ | 2 | |
| Storage Temperature Range | TSTG | -55 to 150 | ℃ |
| Operating Junction Temperature Range | TJ | -55 to 150 | |

**Thermal Data**

| Parameter | Symbol | Max. | Unit |
|---|---|---|---|
| Thermal Resistance Junction-ambient | RθJA | 62 | ℃/W |
| Thermal Resistance Junction-Case | RθJC | 4 | |

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

| | | | | | | |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | VGS = 0V, ID = -250μA | -60 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | VDS =VGS, ID = -250μA | -1.0 | | -2.5 | V |
| Gate-Body leakage Current | $I_{GSS}$ | VDS =0V, VGS = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | VDS=-48V , VGS=0V , TJ=25℃ | | | -1 | μA |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | VGS = -10V, ID = -10A | | 68 | 90 | mΩ |
| | | VGS = -4.5V, ID = -5A | | 85 | 115 | mΩ |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | VDS=-15V , VGS=0V , f=1MHz | | 1080 | | pF |
| Output Capacitance | $C_{oss}$ | | | 73 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 50 | | pF |
| Total Gate Charge | $Q_g$ | VDS=-12V , VGS=-4.5V , ID=-6A | | 11.8 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 1.9 | | nC |
| Gate Drain Charge | $Q_{gd}$ | | | 6.5 | | nC |
| **Switching Parameters** | | | | | | |
| Turn-On DelayTime | $t_{d(on)}$ | VDD=-15V , VGS=-10V , RG=3.3Ω, ID=-1A | | 8.8 | | ns |
| Turn-On Rise Time | tr | | | 19.6 | | ns |
| Turn-Off DelayTime | $t_{d(off)}$ | | | 47.2 | | ns |
| Turn-Off Fall Time | tf | | | 9.6 | | ns |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| Continuous Source Current[1,4] | IS | VG=VD=0V , Force Current | | | -15 | A |
| Pulsed Source Current[2,4] | ISM | | | | -26 | |
| Diode Forward Voltage[2] | VSD | VGS=0V , IS=-1A , TJ=25℃ | | | -1 | V |

## Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 5 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

## Typical Electrical and Thermal Characteristics

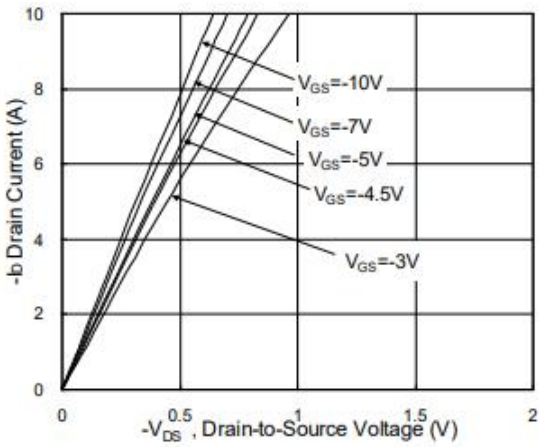



Fig.1 Typical Output Characteristics

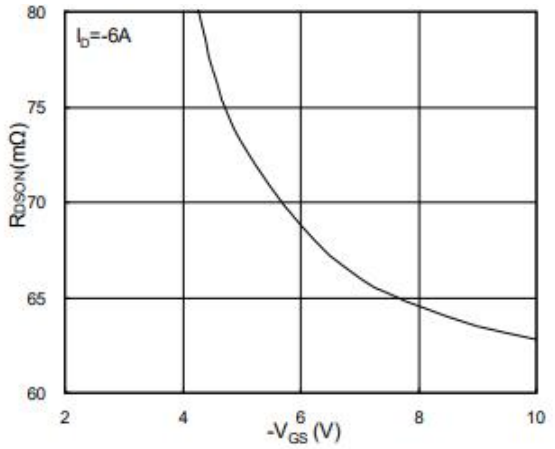



Fig.2 On-Resistance v.s Gate-Source

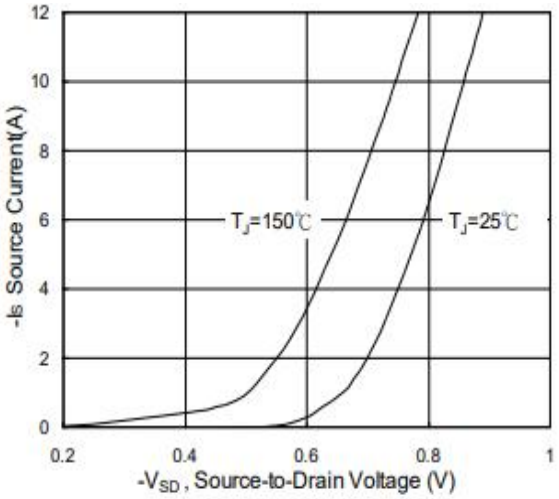



Fig.3 Forward Characteristics of Reverse

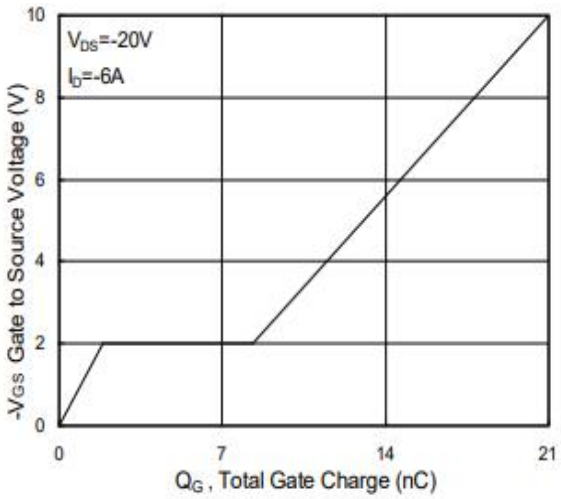



Fig.4 Gate-Charge Characteristics

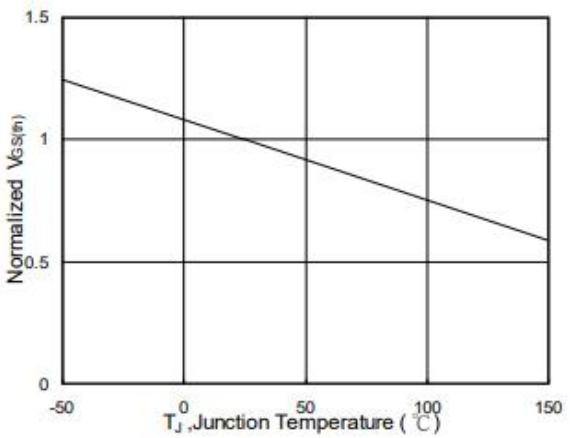



Fig.5 Normalized $V_{GS(th)}$ v.s $T_J$

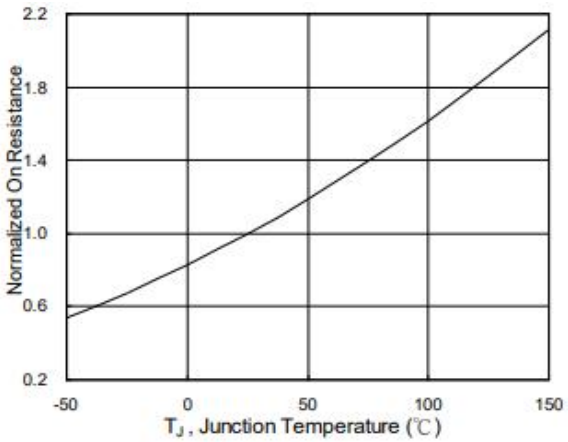



Fig.6 Normalized $R_{DSON}$ v.s $T_J$

## Typical Electrical and Thermal Characteristics

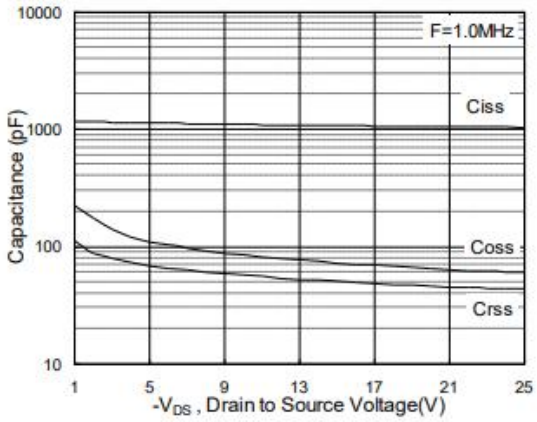



Fig.7 Capacitance

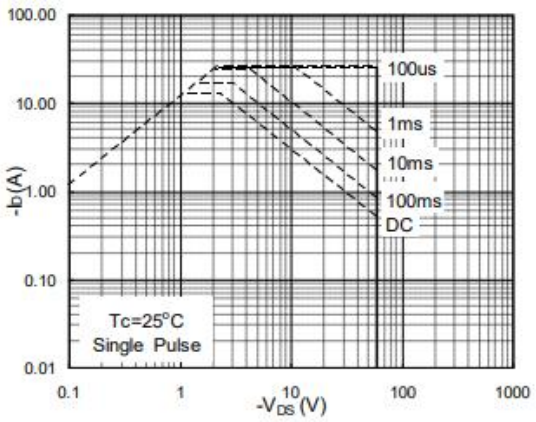



Fig.8 Safe Operating Area

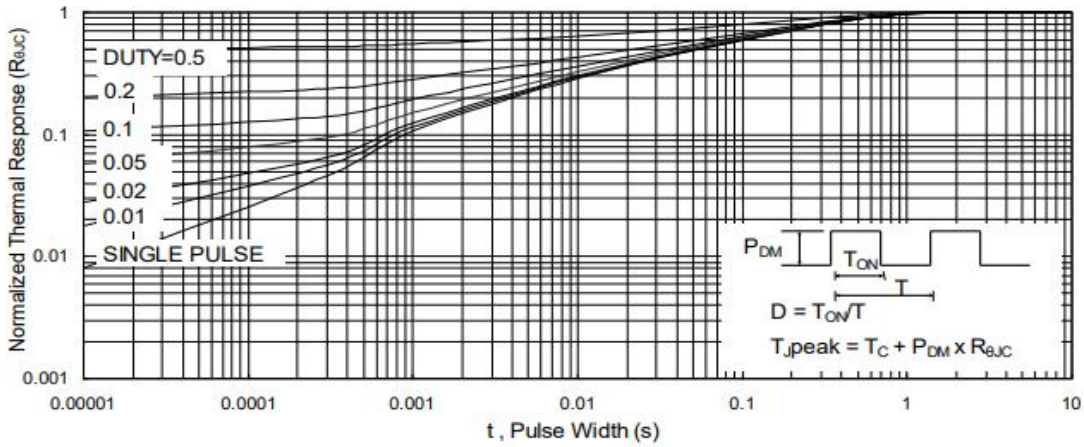



Fig.9 Normalized Maximum Transient Thermal Impedance

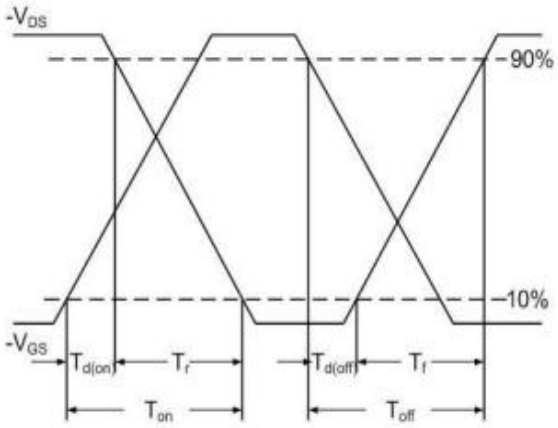



Fig.10 Switching Time Waveform

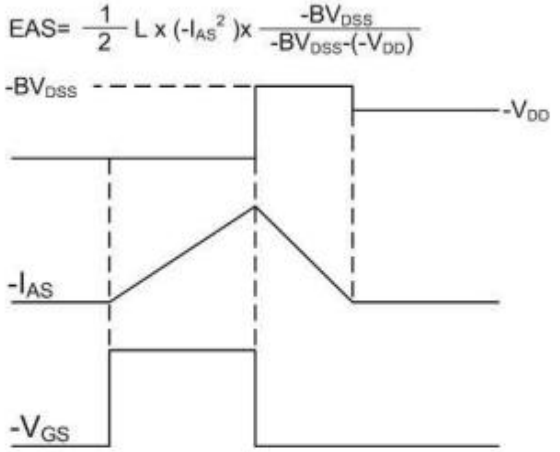
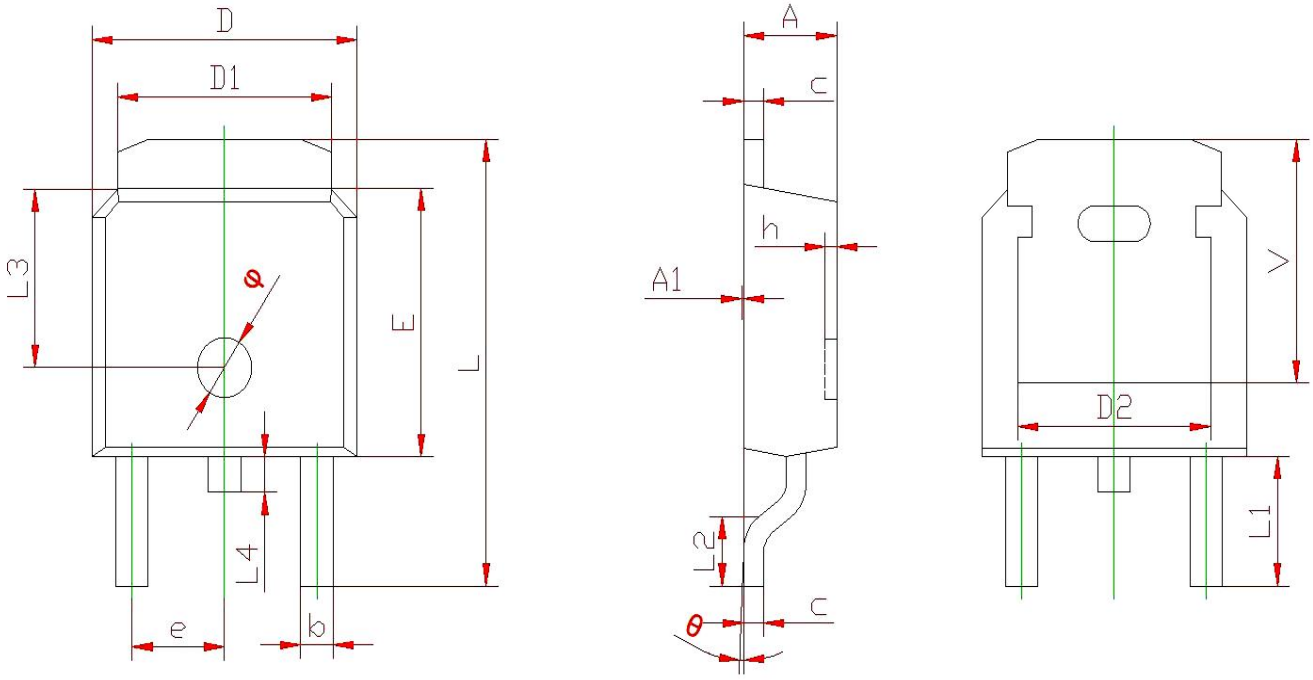



Fig.11 Unclamped Inductive Switching Waveform

## TO-252 Package Outline Dimesions




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 4.800 REF | | 0.189 REF | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.900 REF | | 0.114 REF | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 4.000REF | | 0.157 REF | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| Φ | 1.100 | 1.300 | 0.0.43 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.5000REF | | 0.217 REF | |