

TM30P06D

P-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

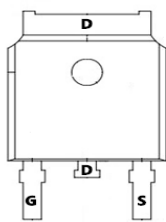
General Features

$V_{DS} = -60V$ $I_D = -30A$

$R_{DS(ON)} = 24m\Omega$ (typ.) @ $V_{GS} = -10V$

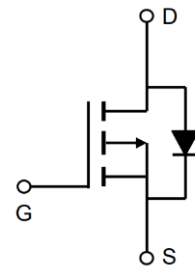
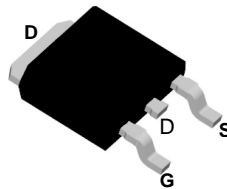
100% UIS Tested

100% R_g Tested



Marking: 30P06

D:TO-252-3L



Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|------------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage ($V_{GS} = 0V$) | -60 | V |
| V_{GS} | Gate-Source Voltage ($V_{DS} = 0V$) | ± 20 | V |
| I_D | Drain Current-Continuous ($T_C = 25^\circ C$) | -30 | A |
| | Drain Current-Continuous ($T_C = 100^\circ C$) | -21 | A |
| I_{DM} (pulse) | Drain Current-Continuous @ Current-Pulsed (Note 1) | -124 | A |
| P_D | Maximum Power Dissipation ($T_C = 25^\circ C$) | 79 | W |
| | Maximum Power Dissipation ($T_C = 100^\circ C$) | 39.5 | W |
| E_{AS} | Avalanche energy (Note 2) | 196 | mJ |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 To 175 | $^\circ C$ |

Thermal Characteristic

| Symbol | Parameter | Typ | Max | Unit |
|-----------------|--------------------------------------|-----|-----|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | | 1.9 | $^\circ C/W$ |

Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|-----------------------------------|---|-----|------|------|------|
| On/Off States | | | | | | |
| B _V DSS | Drain-Source Breakdown Voltage | V _{GS} =0V I _D =-250μA | -60 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =-60V, V _{GS} =0V | | | -1 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =±20V, V _{DS} =0V | | | ±100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =-250μA | -1 | -1.6 | -2.5 | V |
| g _{FS} | Forward Transconductance | V _{DS} =-5V, I _D =-15A | | 35 | | S |
| R _{DS(ON)} | Drain-Source On-State Resistance | V _{GS} =-10V, I _D =-15A | | 24 | 29 | mΩ |
| | | V _{GS} =-4.5V, I _D =-10A | | 30 | 39 | mΩ |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =-25V, V _{GS} =0V, f=1.0MHz | | 2026 | | pF |
| C _{oss} | Output Capacitance | | | 134 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 98 | | pF |
| Switching Parameters | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{GS} =-10V, V _{DS} =-30V, R _L =1.5Ω, R _{GEN} =3Ω | | 12.2 | | nS |
| t _r | Turn-on Rise Time | | | 10 | | nS |
| t _{d(off)} | Turn-Off Delay Time | | | 64 | | nS |
| t _f | Turn-Off Fall Time | | | 14 | | nS |
| Q _g | Total Gate Charge | V _{GS} =-10V, V _{DS} =-30V, I _D =-20A | | 68 | | nC |
| Q _{gs} | Gate-Source Charge | | | 10.5 | | nC |
| Q _{gd} | Gate-Drain Charge | | | 13 | | nC |
| Source-Drain Diode Characteristics | | | | | | |
| I _{SD} | Source-Drain Current (Body Diode) | | | | -30 | A |
| V _{SD} | Forward on Voltage (Note 3) | V _{GS} =0V, I _S =-15A | | | -1.2 | V |
| t _{rr} | Reverse Recovery Time | I _F =-20A, di/dt=100A/μs | | 26 | | ns |
| Q _{rr} | Reverse Recovery Charge | I _F =-20A, di/dt=100A/μs | | 29 | | nC |

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

 Notes 2.E_{AS} Condition: T_J=25°C, V_{DD}=40V, V_G=-10V, R_g=25Ω, L=0.5mH.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)

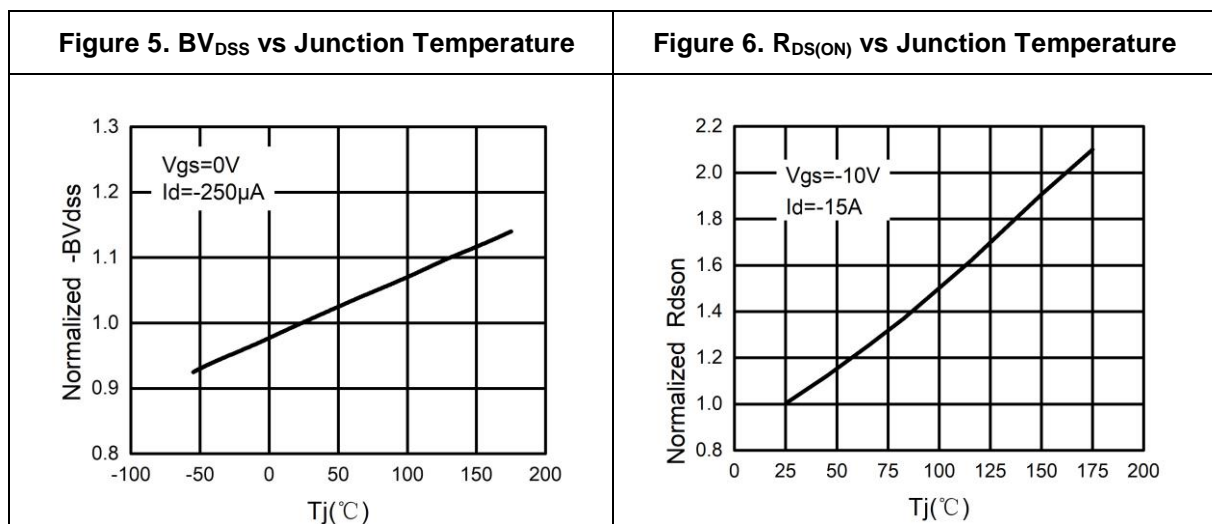
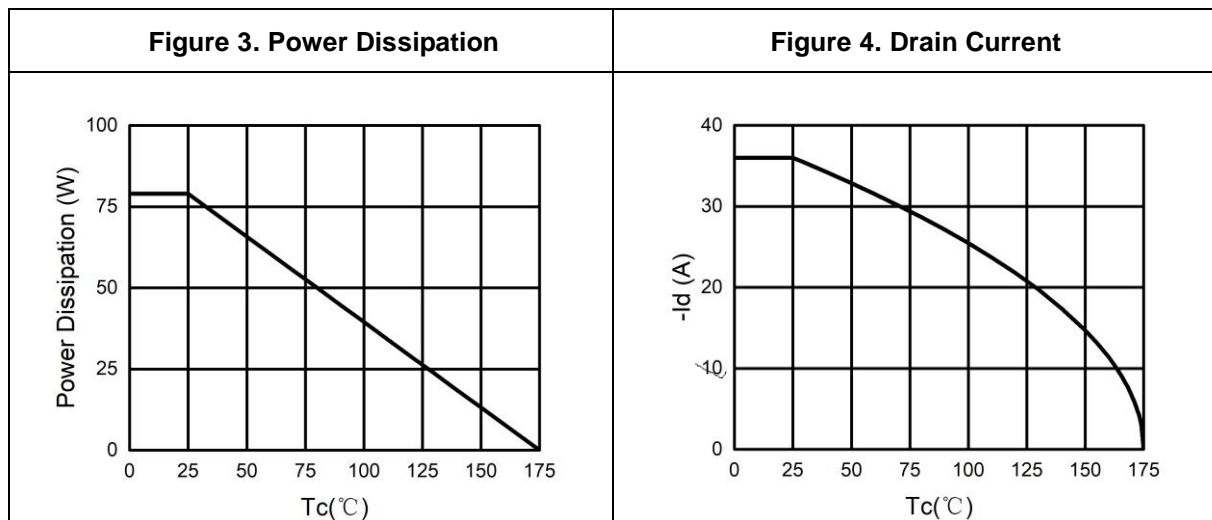
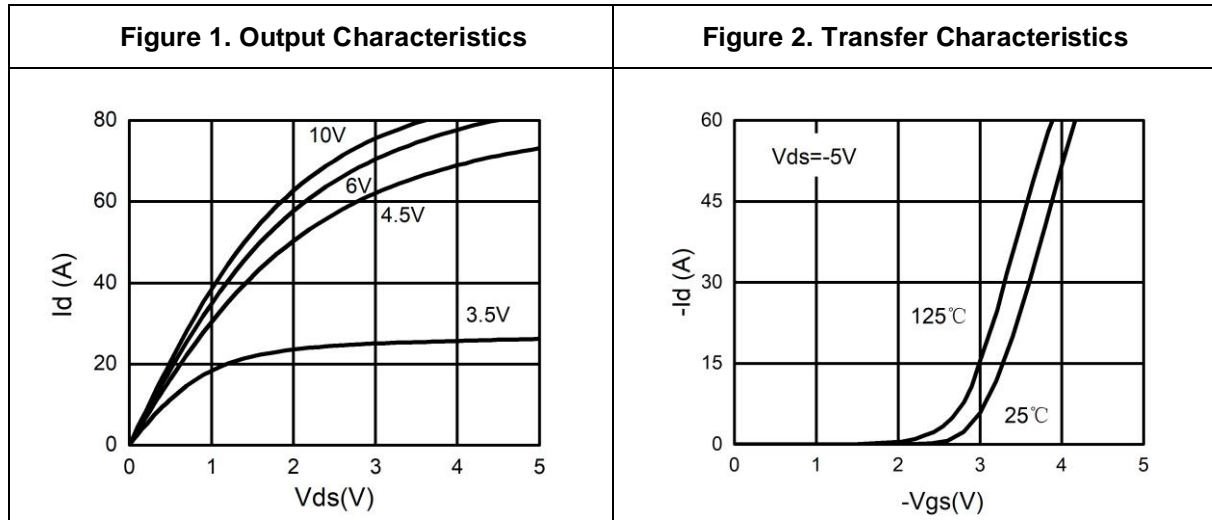


Figure 7. Gate Charge Waveforms

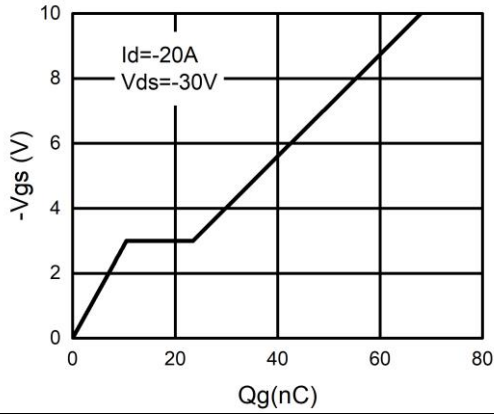


Figure 8. Capacitance

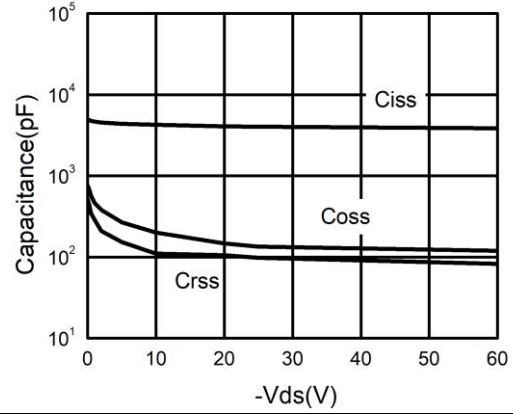


Figure 9. Body-Diode Characteristics

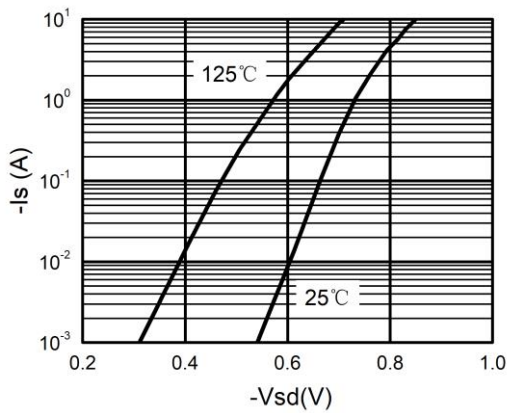
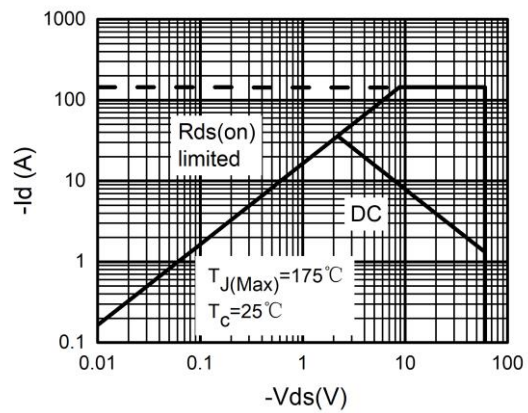
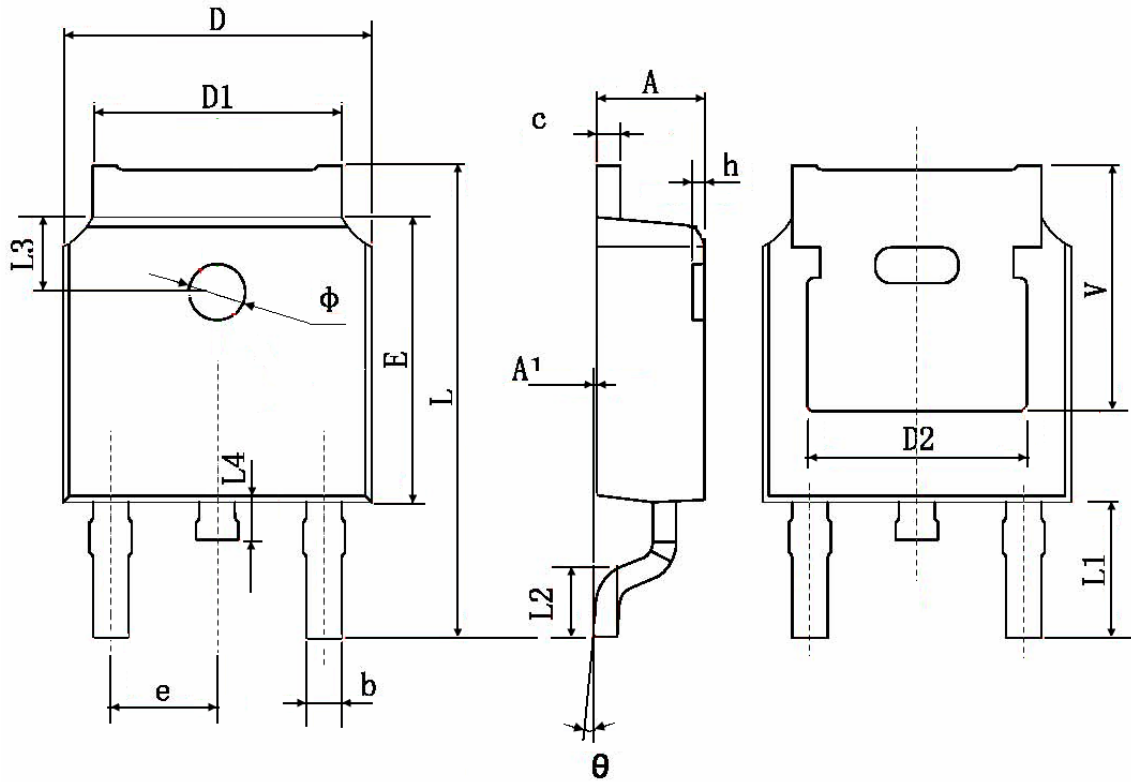


Figure 10. Maximum Safe Operating Area



Package Information: TO-252-3L



| 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 | 4.830 TYP. | | 0.190 TYP. | |
| 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 TYP. | | 0.114 TYP. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 1.600 TYP. | | 0.063 TYP. | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| φ | 1.100 | 1.300 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.350 TYP. | | 0.211 TYP. | |