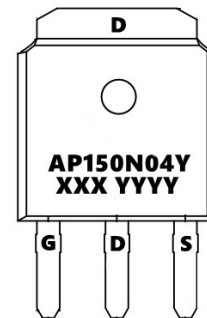
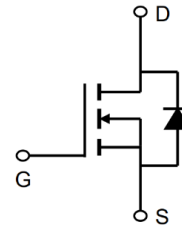


40V N-Channel Enhancement Mode MOSFET

Description

The AP150N04Y uses advanced **SGT V** technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = 40V$ $I_D = 150A$

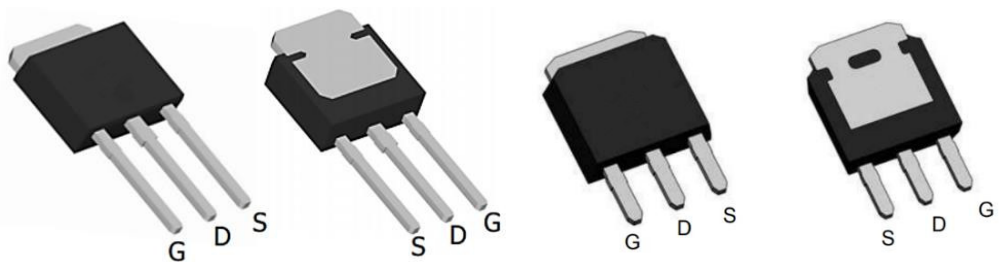
$R_{DS(ON)} < 2.5m\Omega$ @ $V_{GS}=10V$ (Type: **1.9mΩ**)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|------------|------------|---------------------|----------|
| AP150N04Y | TO-251L-3L | AP150N04Y XXXX YYYY | 4000 |
| AP150N04Y | TO-251S-3L | AP150N04Y XXXX YYYY | 4000 |

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|-------------------------|--|------------|-------|
| V_{DS} | Drain-Source Voltage | 40 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_C=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | 150 | A |
| $I_D @ T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | 90 | A |
| IDM | Pulsed Drain Current ² | 450 | A |
| EAS | Single Pulse Avalanche Energy ³ | 400 | mJ |
| IAS | Avalanche Current | 40 | A |
| $P_D @ T_C=25^\circ C$ | Total Power Dissipation ⁴ | 125 | W |
| TSTG | Storage Temperature Range | -55 to 150 | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | °C |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | 50 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | 1 | °C/W |

40V N-Channel Enhancement Mode MOSFET

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

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|--|---|------|------|------|------|
| BVDSS | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 40 | 47 | --- | V |
| RDS(ON) | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =20A | --- | 1.9 | 2.5 | mΩ |
| RDS(ON) | Static Drain-Source On-Resistance ² | V _{GS} =4.5V, I _D =20A | --- | 3.3 | 5.0 | mΩ |
| VGS(th) | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.2 | 1.6 | 2.2 | V |
| IDSS | Drain-Source Leakage Current | V _{DS} =32V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =32V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | |
| IGSS | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | V _{DS} =5V, I _D =20A | --- | 53 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 1.0 | --- | Ω |
| Q _g | Total Gate Charge (4.5V) | V _{DS} =15V, V _{GS} =10V, I _D =20A | --- | 45 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 12 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 18.5 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω, I _D =20A | --- | 18.5 | --- | ns |
| T _r | Rise Time | | --- | 9 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 58.5 | --- | |
| T _f | Fall Time | | --- | 32 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =20V, V _{GS} =0V, f=1MHz | --- | 3972 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 1119 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 82 | --- | |
| I _S | Continuous Source Current ^{1,6} | V _G =V _D =0V, Force Current | --- | --- | 100 | A |
| VSD | Diode Forward Voltage ² | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.2 | V |

Note :

- 1、 The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
- 3、 The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.5mH,I_{AS}=40A
- 4、 The power dissipation is limited by 150°C junction temperature
- 5、 The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation

40V N-Channel Enhancement Mode MOSFET

Typical Characteristics

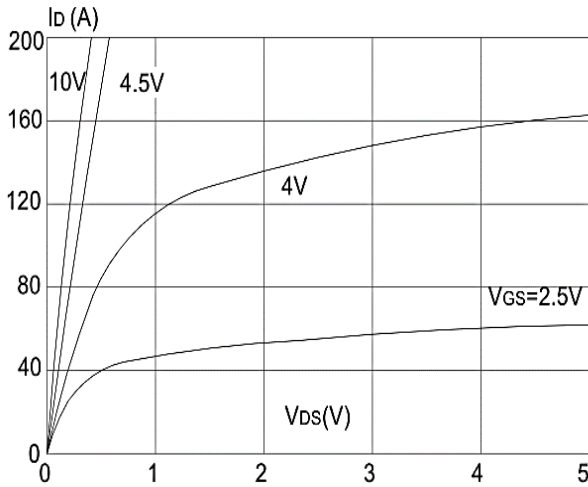


Figure 1: Output Characteristics

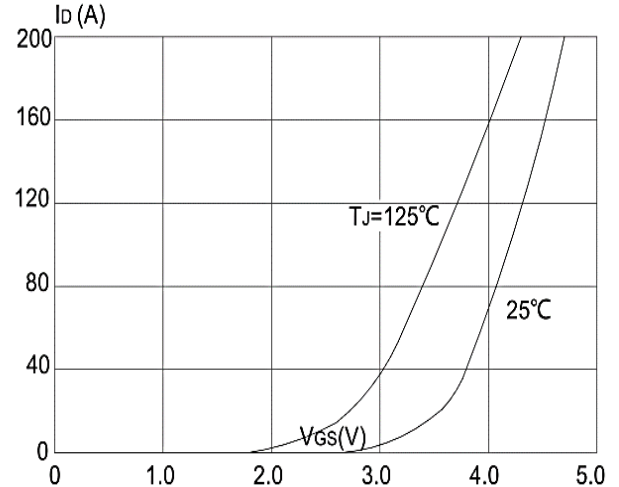


Figure 2: Typical Transfer Characteristics

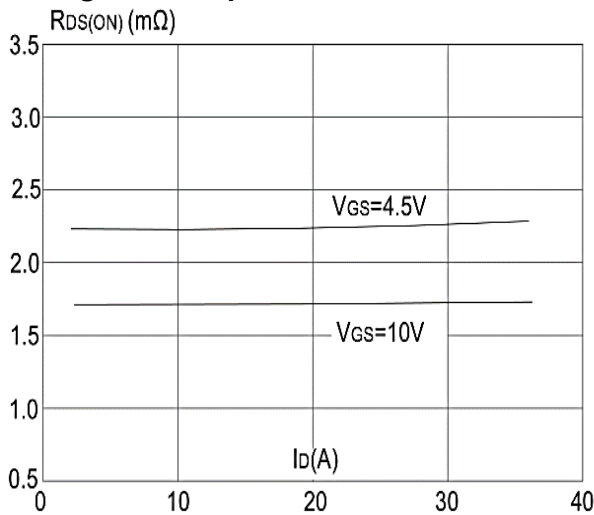


Figure 3: On-resistance vs. Drain Current

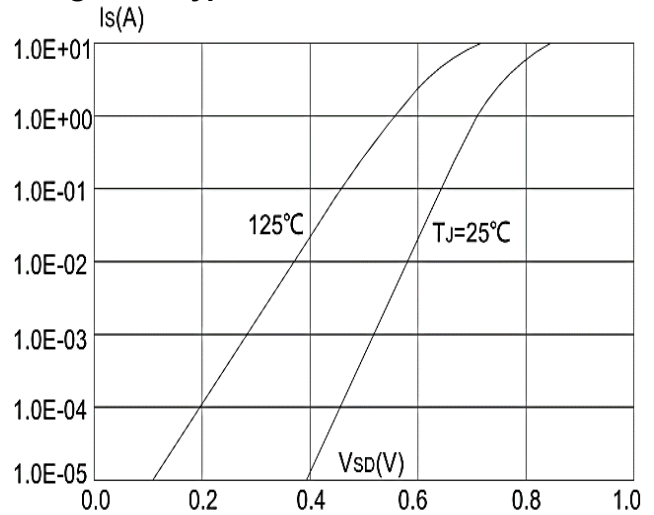


Figure 4: Body Diode Characteristics

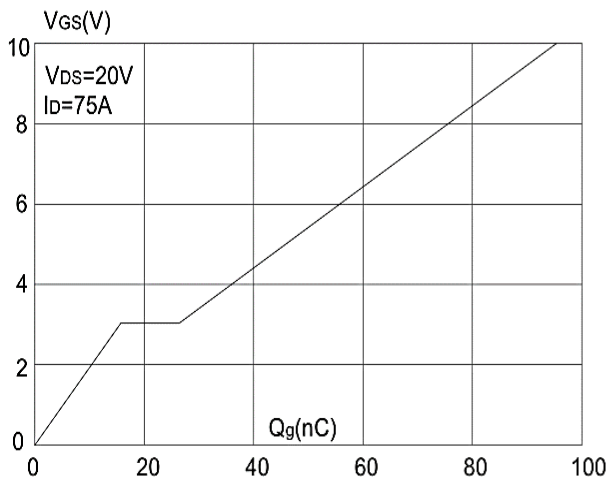


Figure 5: Gate Charge Characteristics

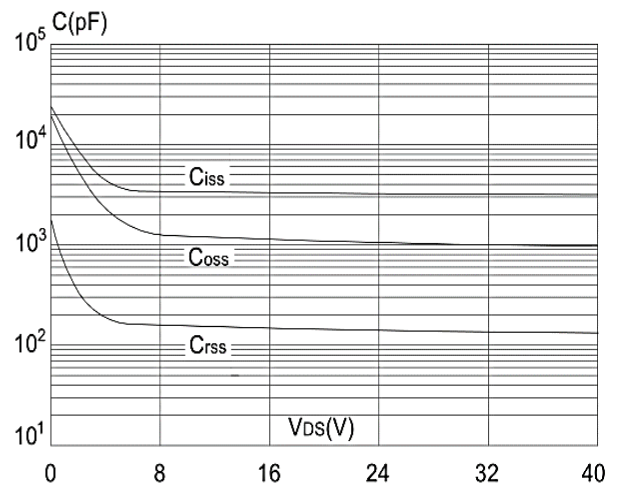


Figure 6: Capacitance Characteristics



40V N-Channel Enhancement Mode MOSFET

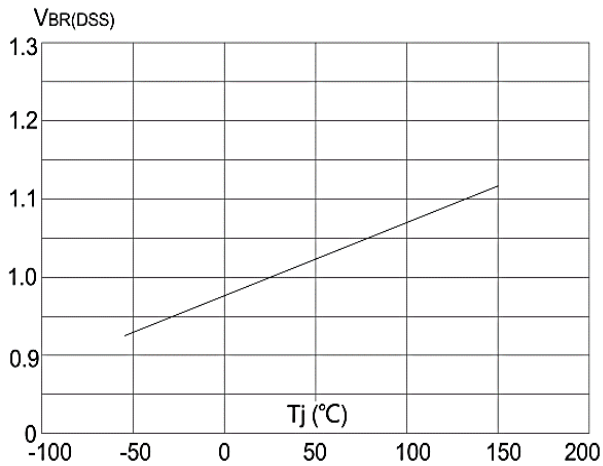


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

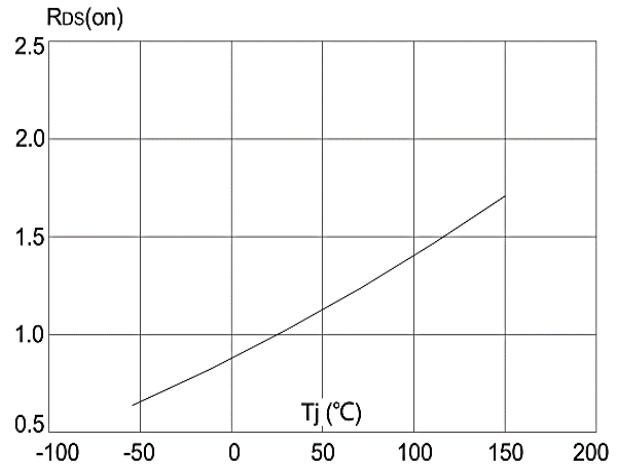


Figure 8: Normalized on Resistance vs. Junction Temperature

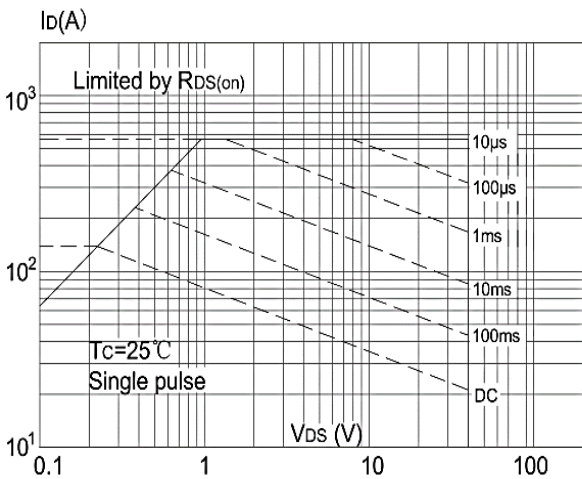


Figure 9: Maximum Safe Operating Area

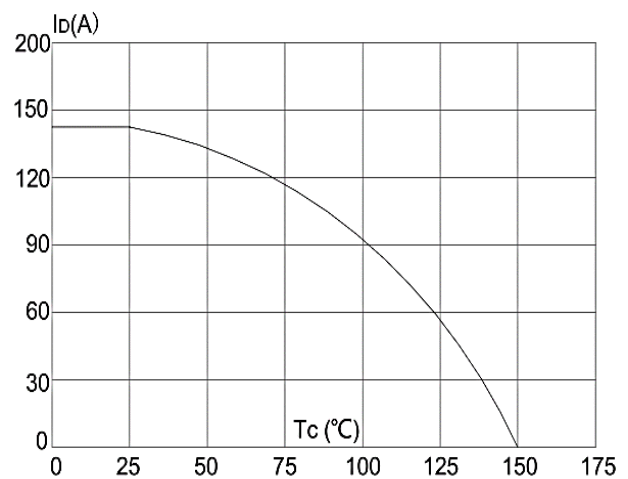


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

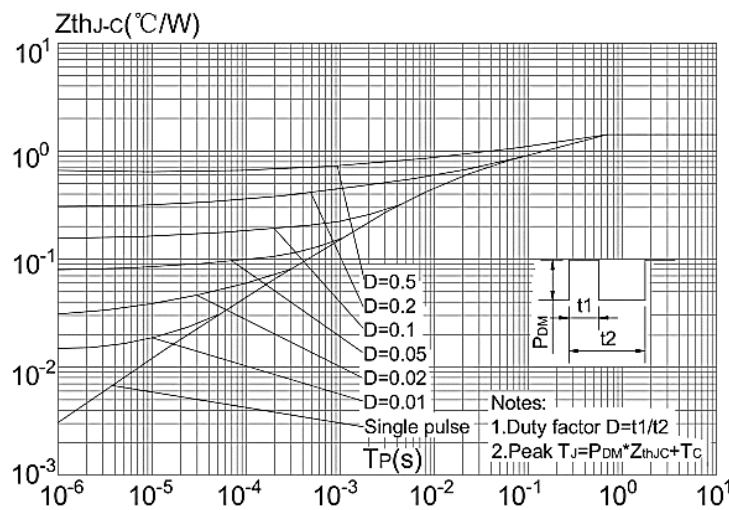
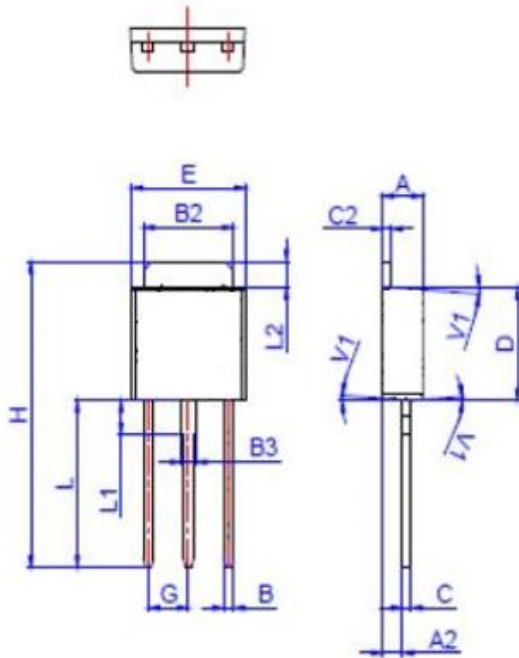


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Cas

40V N-Channel Enhancement Mode MOSFET

Package Mechanical Data-TO-251L-3L



TO-251

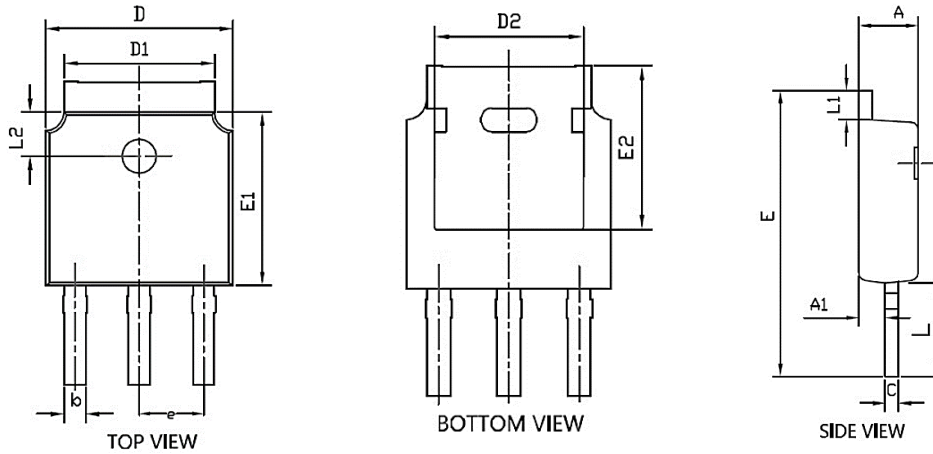
| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.20 | | 2.40 | 0.088 | | 0.095 |
| A2 | 0.90 | | 1.20 | 0.035 | | 0.047 |
| B | 0.55 | | 0.65 | 0.022 | | 0.026 |
| B2 | 5.10 | | 5.40 | 0.200 | | 0.213 |
| B3 | 0.76 | | 0.85 | 0.030 | | 0.033 |
| C | 0.45 | | 0.62 | 0.018 | | 0.024 |
| C2 | 0.48 | | 0.62 | 0.019 | | 0.024 |
| D | 6.00 | | 6.20 | 0.236 | | 0.244 |
| E | 6.40 | | 6.70 | 0.252 | | 0.264 |
| G | | 2.30 | | | 0.091 | |
| H | 16.0 | | 17.0 | 0.630 | | 0.669 |
| L | 8.90 | | 9.40 | 0.350 | | 0.370 |
| L1 | 1.80 | | 1.90 | 0.071 | | 0.075 |
| L2 | 1.37 | | 1.50 | 0.054 | | 0.059 |
| V1 | | 4° | | | 4° | |

Package Information -TO-251

| OUTLINE | TUBE (PCS) | INNER BOX (PCS) | PER CARTON (PCS) |
|---------|------------|-----------------|------------------|
| TUBE | 80 | 4,000 | 32,000 |

40V N-Channel Enhancement Mode MOSFET

Package Mechanical Data-TO-251S-3L



| Symbol | Common | | |
|--------|----------|------|------|
| | mm | | |
| | Min | Nom | Max |
| A | 2.2 | 2.3 | 2.4 |
| A1 | 0.9 | 1.0 | 1.1 |
| b | 0.66 | 0.76 | 0.86 |
| C | 0.46 | 0.52 | 0.58 |
| D | 6.50 | 6.6 | 6.7 |
| D1 | 5.15 | 5.3 | 5.45 |
| D2 | 4.6 | 4.8 | 4.95 |
| E | 10.4 | --- | 11.5 |
| E1 | 6.0 | 6.1 | 6.2 |
| E2 | 5.400REF | | |
| e | 2.286BSC | | |
| L | 3.5 | 4.0 | 4.3 |
| L1 | 0.9 | --- | 1.27 |
| L2 | 1.4 | --- | 1.9 |