

100V N-Channel Enhancement Mode MOSFET

Description

The AP60N10Y uses advanced **SGT II** 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

$V_{DS} = 100V$ $I_D = 60A$

$R_{DS(ON)} < 18m\Omega$ @ $V_{GS}=10V$ (Type: **12.5mΩ**)

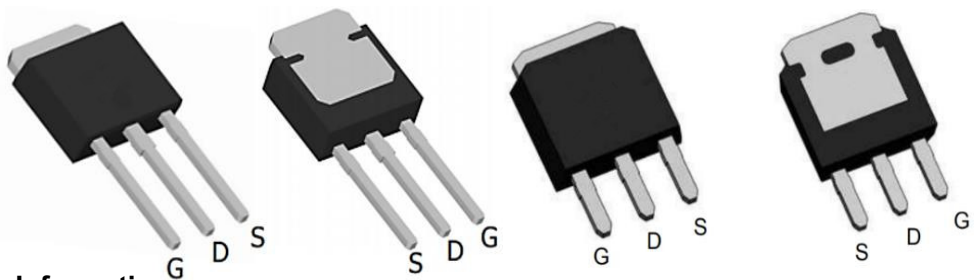
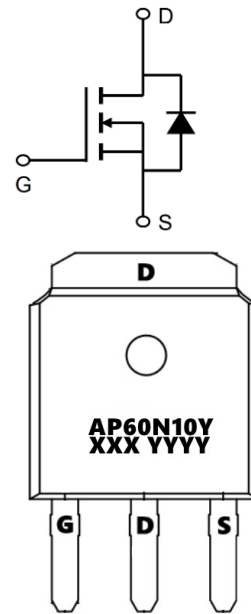
Application

Consumer electronic power supply

Motor control

Synchronous-rectification

Isolated DC



Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|------------|------------|-------------------|----------|
| AP60N10Y | TO-251L-3L | AP60N10Y XXX YYYY | 4000 |
| AP60N10Y | TO-251S-3L | AP60N10Y XXX YYYY | 4000 |

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

| Symbol | Parameter | Rating | Units |
|-------------------------|---|------------|--------------|
| V_{DS} | Drain source voltage | 100 | V |
| V_{GS} | Gate source voltage | ± 20 | V |
| $I_D @ T_C=25^\circ C$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | 60 | A |
| $I_D @ T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | 40 | A |
| IDM | Pulsed drain current ²⁾ , $T_C=25^\circ C$ | 120 | A |
| P_D | Power dissipation ³⁾ , $T_C=25^\circ C$ | 71 | W |
| EAS | Single pulsed avalanche energy ⁵⁾ | 57 | mJ |
| Tstg, Tj | Operation and storage temperature | -55 to 150 | $^\circ C$ |
| RθJC | Thermal resistance, junction-case | 1.76 | $^\circ C/W$ |
| RθJA | Thermal resistance, junction-ambient ⁴⁾ | 62 | $^\circ C/W$ |



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

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|-----------------|----------------------------------|--|------|--------|------|------|
| BVDSS | Drain-source breakdown voltage | V _{GS} =0 V, I _D =250 μA | 100 | 107 | | V |
| VGS(th) | Gate threshold voltage | V _{DS} =V _{GS} , I _D =250 μA | 1.2 | 1.5 | 2.5 | V |
| RDS(ON) | Drain-source on-state resistance | V _{GS} =10 V, I _D =10 A | | 12.5 | 20 | mΩ |
| RDS(ON) | Drain-source on-state resistance | V _{GS} =4.5 V, I _D =7 A | | 18 | 25 | mΩ |
| IGSS | Gate-source leakage current | V _{GS} =±20 V | | | ±100 | nA |
| IDSS | Drain-source leakage current | V _{DS} =100 V, V _{GS} =0 V | | | 1 | uA |
| Ciss | Input capacitance | V _{GS} =0 V, V _{DS} =50 V, f=100 kHz | | 1003.9 | | pF |
| Coss | Output capacitance | | | 185.4 | | pF |
| Crss | Reverse transfer capacitance | | | 9.8 | | pF |
| td(on) | Turn-on delay time | V _{GS} =10 V, V _{DS} =50 V, R _G =10 Ω, I _D =5 A | | 16.6 | | ns |
| t _r | Rise time | | | 3.8 | | ns |
| td(off) | Turn-off delay time | | | 75.5 | | ns |
| t _f | Fall time | | | 46 | | ns |
| Q _g | Total gate charge | I _D =5 A, V _{DS} =50V, V _{GS} =10V | | 16.2 | | nc |
| Q _{gs} | Gate-source charge | | | 2.8 | | nc |
| Q _{gd} | Gate-drain charge | | | 4.1 | | nc |
| Vplateau | Gate plateau voltage | | | 3 | | V |
| I _s | Diode forward current | V _{GS} <V _{th} | | 30 | | A |
| ISP | Pulsed source current | | | 90 | | A |
| trr | Reverse recovery time | I _S =1A, di/dt=100 A/μs | 49 | | | ns |
| Q _{rr} | Reverse recovery charge | | 61.8 | | | nc |
| Irrm | Peak reverse recovery current | | 2.4 | | | A |

Note :

- 1、 Calculated continuous current based on maximum allowable junction temperature.
- 2、 Repetitive rating; pulse width limited by max. junction temperature.
- 3、 Pd is based on max. junction temperature, using junction-case thermal resistance.
- 4、 The value of R_{Θja} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.
- 5、 V_{DD}=50 V, R_G=25 Ω, L=0.3 mH, starting T_J=25 °C.

Typical Characteristics

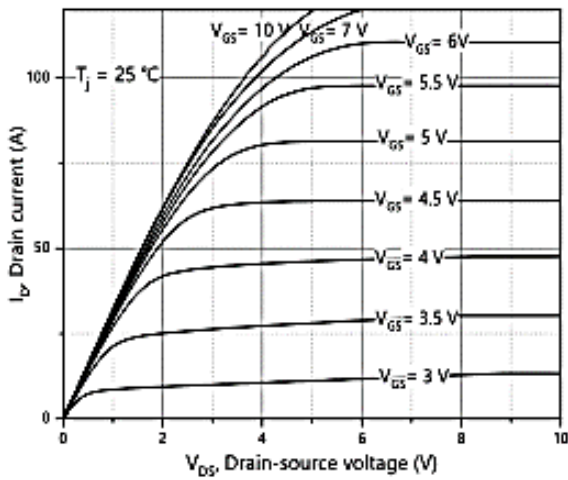


Figure 1, Typ. output characteristics

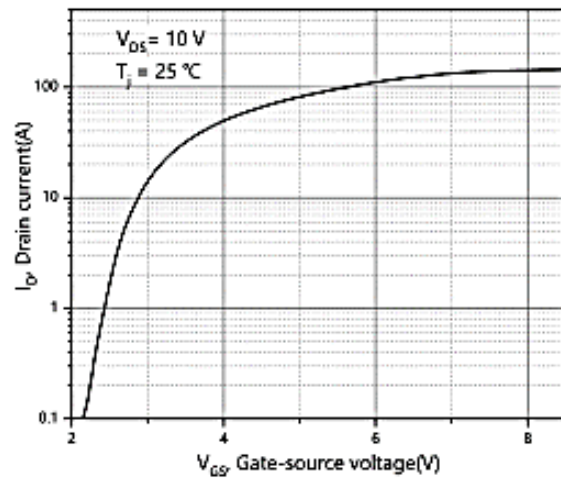


Figure 2, Typ. transfer characteristics

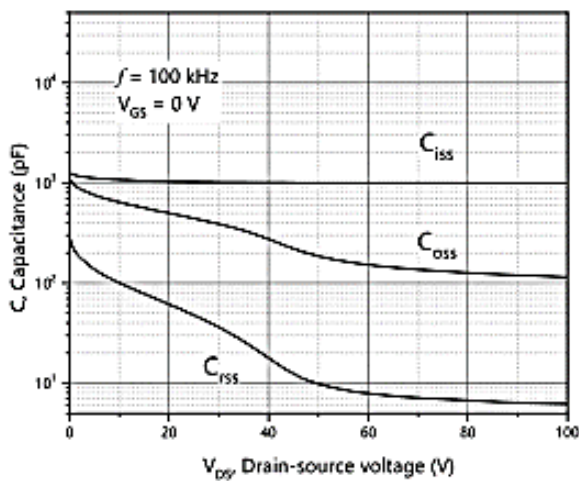


Figure 3, Typ. capacitances

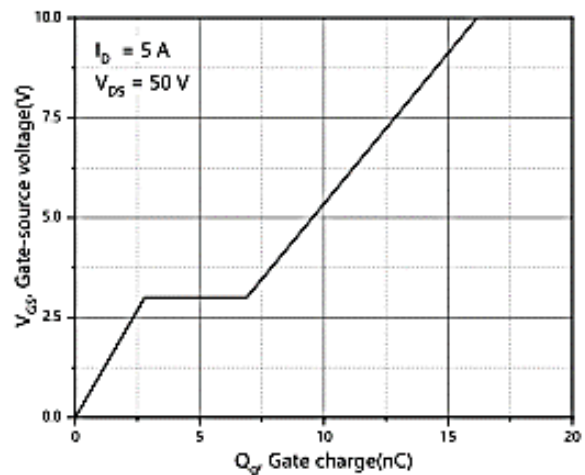


Figure 4, Typ. gate charge

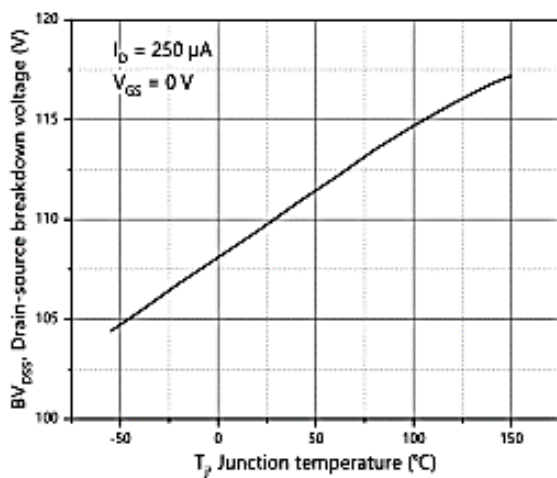


Figure 5, Drain-source breakdown voltage

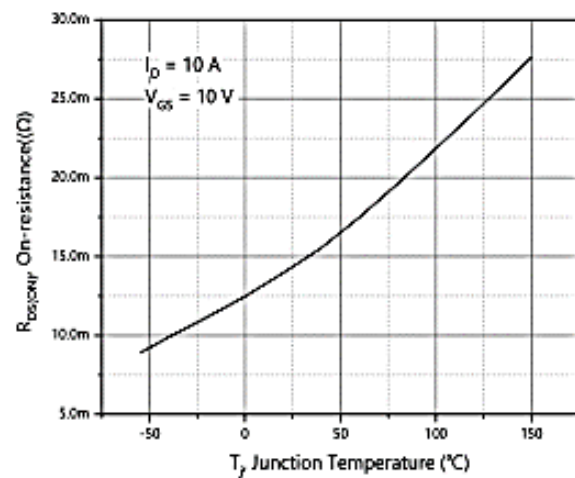


Figure 6, Drain-source on-state resistance

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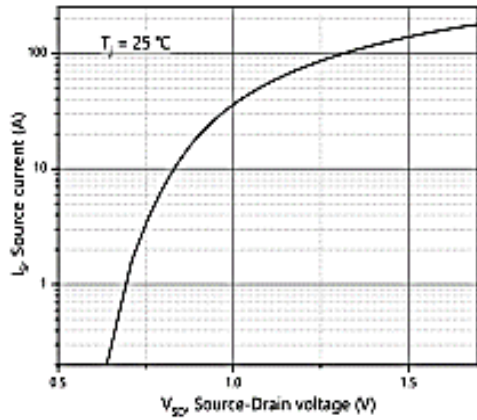


Figure 7, Forward characteristic of body diode

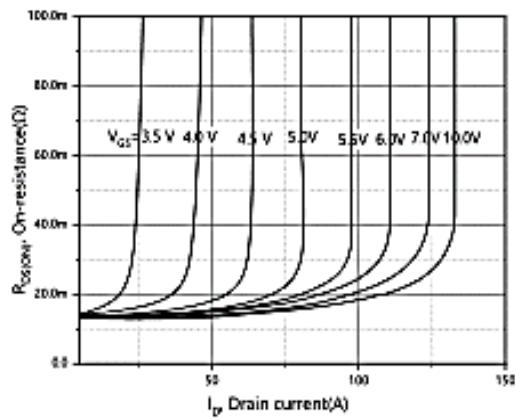


Figure 8, Drain-source on-state resistance

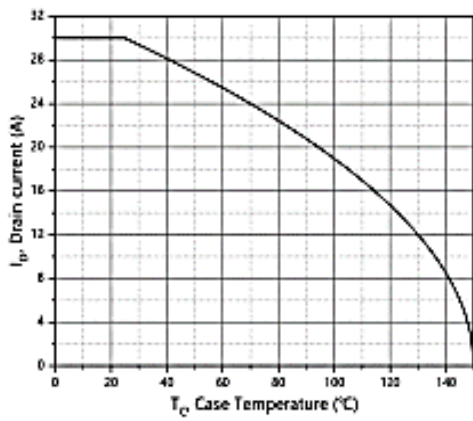


Figure 9, Drain current

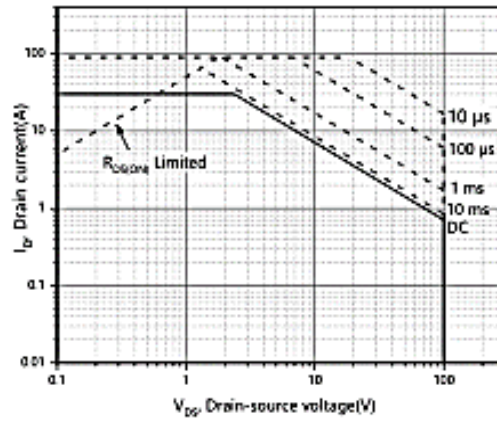


Figure 10, Safe operation area $T_C=25\text{ }^\circ\text{C}$

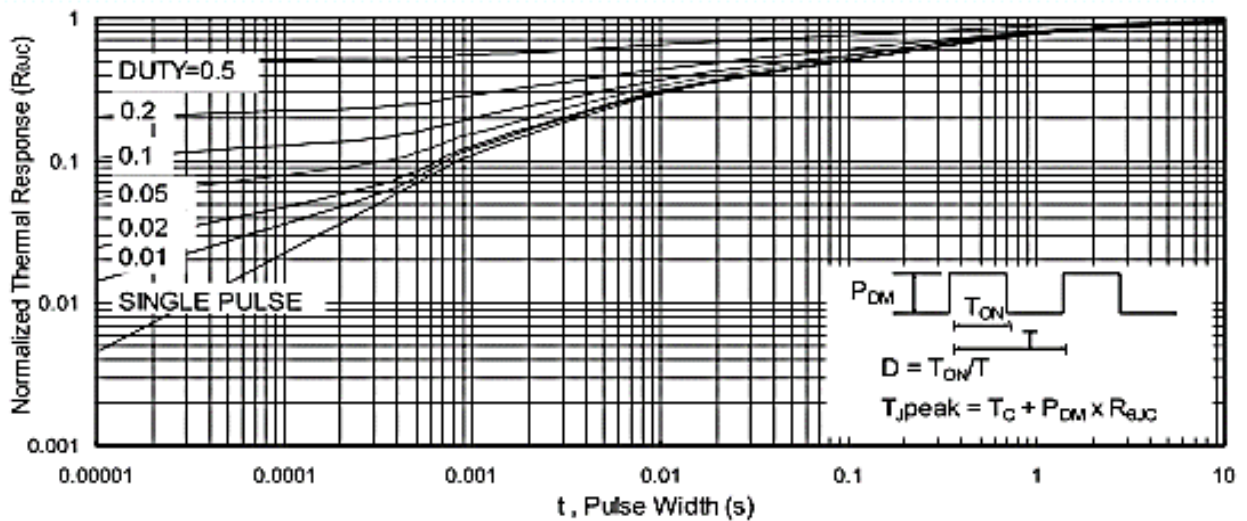
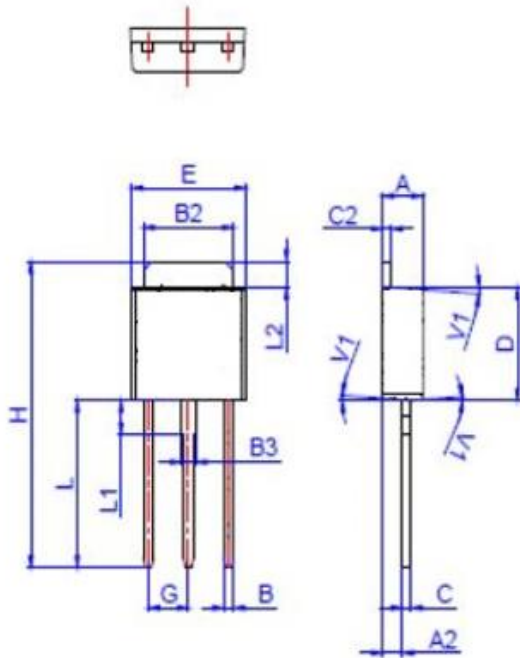


Fig11. Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-TO-251L-3L



TO-251

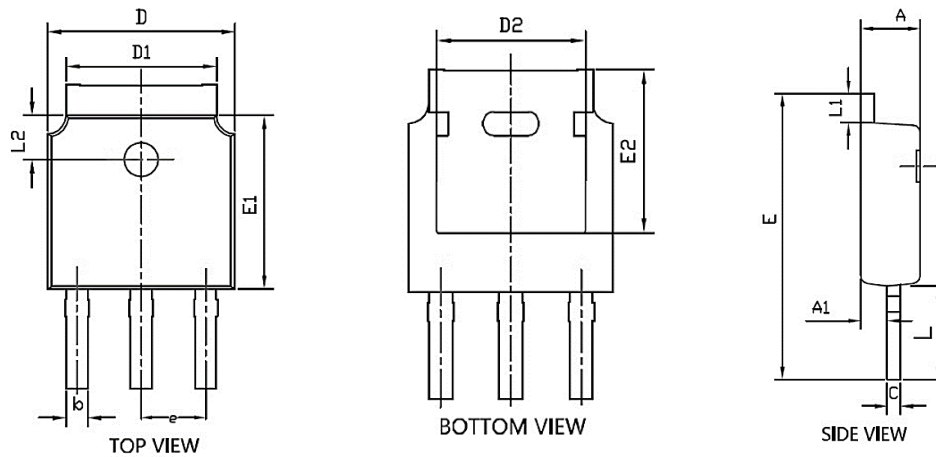
| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.20 | | 2.40 | 0.086 | | 0.095 |
| A2 | 0.90 | | 1.20 | 0.035 | | 0.047 |
| B | 0.55 | | 0.65 | 0.022 | | 0.026 |
| B2 | 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 |

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Package Mechanical Data-TO-251S-3L



| Symbol | Common | | |
|--------|----------|------|------|
| | mm | | |
| | Mim | 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 |