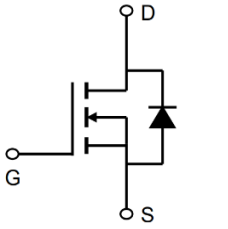
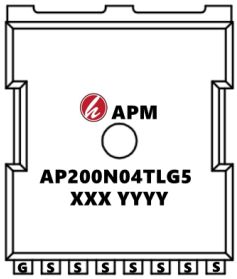
# AP200N04TLG5

## 40V N-Channel Enhancement Mode MOSFET

### Description

The AP200N04TLG5 uses advanced **APM-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.




TOLLA

### General Features

$V_{DS}$ = 40V $I_D$ =200A

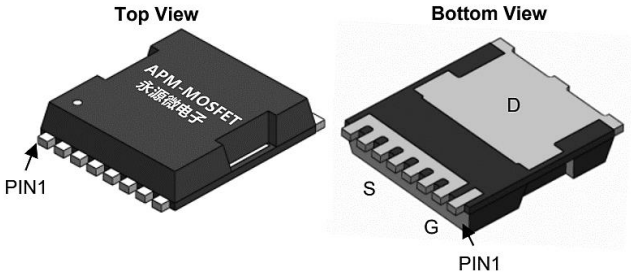
$R_{DS(ON)}$ < 2.5mΩ @ $V_{GS}$=10V **（Type：1.9mΩ）**

### Application

BMS

BLDC

UPS




### Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|---|---|---|---|
| AP200N04TLG5 | TOLLA-8L | AP200N04TLG5 XXX YYYY | 2000 |

### Absolute Maximum Ratings ($T_C$=25℃unless otherwise noted)

| Symbol | Parameter | Max. | Units |
|---|---|---|---|
| VDSS | Drain-Source Voltage | 40 | V |
| VGSS | Gate-Source Voltage | ±20 | V |
| ID@TC=25℃ | Continuous Drain Current, VGS @ 10V1 | 200 | A |
| ID@TC=100℃ | Continuous Drain Current, VGS @ 10V1 | 130 | A |
| IDM | Pulsed Drain Current | 600 | A |
| EAS | Single Pulsed Avalanche Energy | 525 | mJ |
| IAS | Avalanche Current | 35 | A |
| PD@TC=25℃ | Power Dissipation | 130 | W |
| RθJA | Thermal Resistance Junction-Ambient [1] | 35 | °C/W |
| RθJC | Thermal Resistance, Junction to Case | 1.5 | ℃/W |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | °C |
| TSTG | Storage Temperature Range | -55 to 150 | °C |

## N-Channel Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| V(BR)DSS | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | 40 | 47 | - | V |
| IDSS | Zero Gate Voltage Drain Current | $V_{DS}$=40V, $V_{GS}$=0V, | - | - | 1.0 | μA |
| IGSS | Gate to Body Leakage Current | $V_{DS}$=0V, $V_{GS}$= ±20V | - | - | ±100 | nA |
| VGS(th) | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.0 | 1.5 | 2.5 | V |
| RDS(on) | Static Drain-Source on-Resistance | $V_{GS}$=10V, $I_D$=30A | - | 1.9 | 2.5 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=20A | - | 2.7 | 4.0 | |
| Ciss | Input Capacitance | $V_{DS}$=20V, $V_{GS}$=0V, f=1.0MHz | - | 3162 | - | pF |
| Coss | Output Capacitance | | - | 1099 | - | pF |
| Crss | Reverse Transfer Capacitance | | - | 157 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{DS}$=20V, $I_D$=75A, $V_{GS}$=10V | - | 95 | - | nC |
| Qgs | Gate-Source Charge | | - | 15 | - | nC |
| Qgd | Gate-Drain(“Miller”) Charge | | - | 11 | - | nC |
| td(on) | Turn-on Delay Time | $V_{DD}$=20V, $I_D$=75A, $R_G$=1.6Ω, $V_{GS}$=10V | - | 12.5 | - | ns |
| tr | Turn-on Rise Time | | - | 7 | - | ns |
| td(off) | Turn-off Delay Time | | - | 50 | - | ns |
| $t_f$ | Turn-off Fall Time | | - | 8.5 | - | ns |
| IS | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 140 | A |
| ISM | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 560 | A |
| VSD | Drain to Source Diode Forward Voltage | $V_{GS}$=0V, $I_S$=30A | - | - | 1.2 | V |
| trr | Body Diode Reverse Recovery Time | $T_J$=25℃, $I_F$=$I_S$,dI/dt=100A/μs | - | 31 | - | ns |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge | | - | 110 | - | nC |

**Note** :

1、The data tested by surface mounted on a 1 inch 2 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 VDD =32V,VGS =10V,L=0.1mH,IAS =35A

4、The power dissipation is limited by 150℃ 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.

## Typical Characteristics

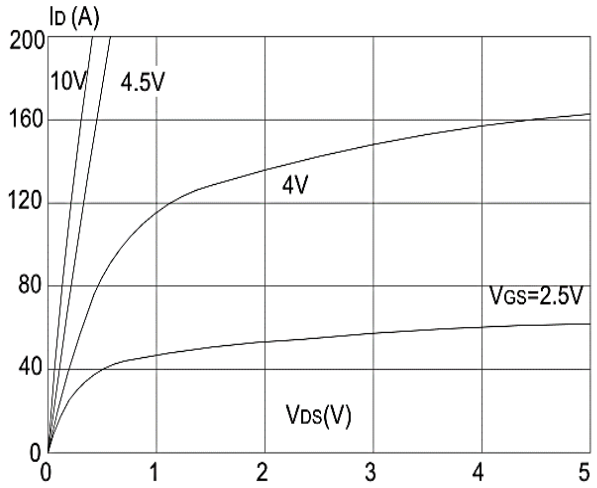



**Figure1: Output Characteristics**

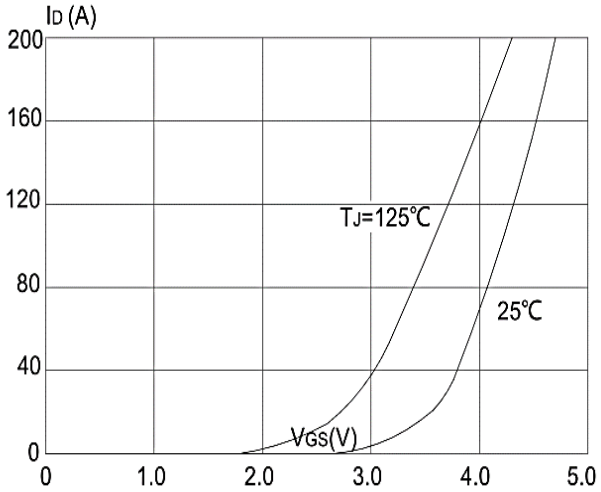



**Figure 2: Typical Transfer Characteristics**

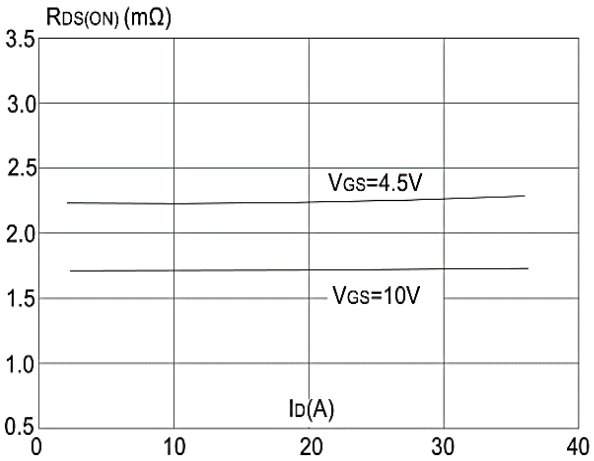



**Figure 3:On-resistance vs. Drain Current**

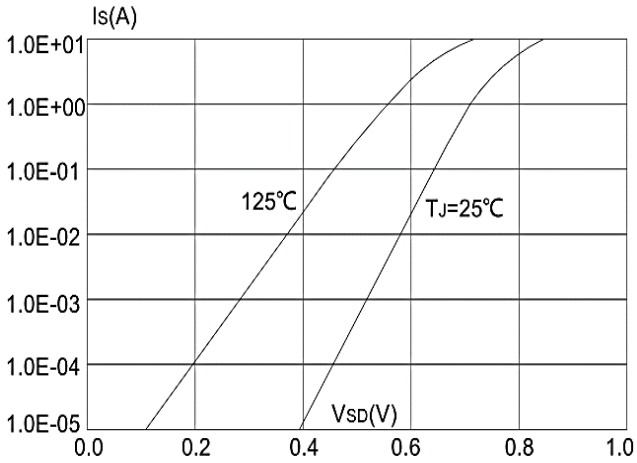



**Figure 4: Body Diode Characteristics**

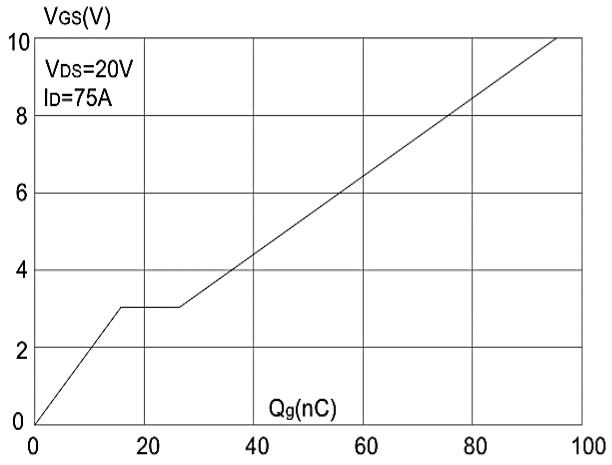



**Figure 5: Gate Charge Characteristics**

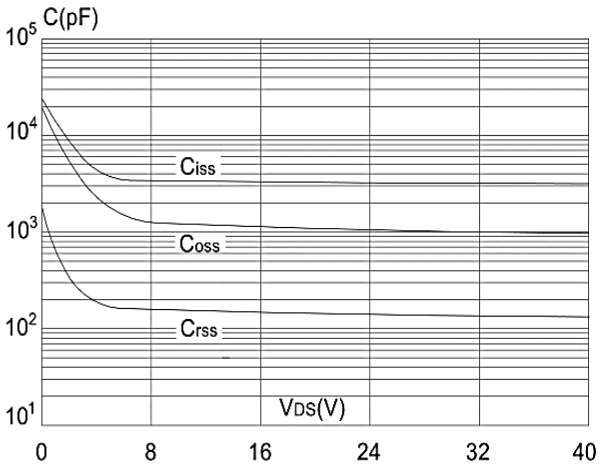



**Figure 6: Capacitance Characteristics**

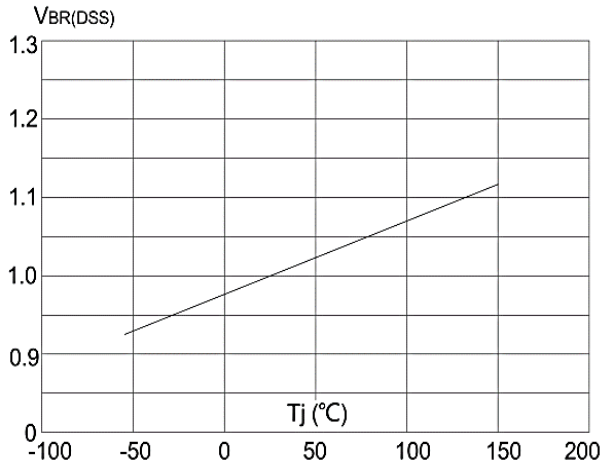



**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**

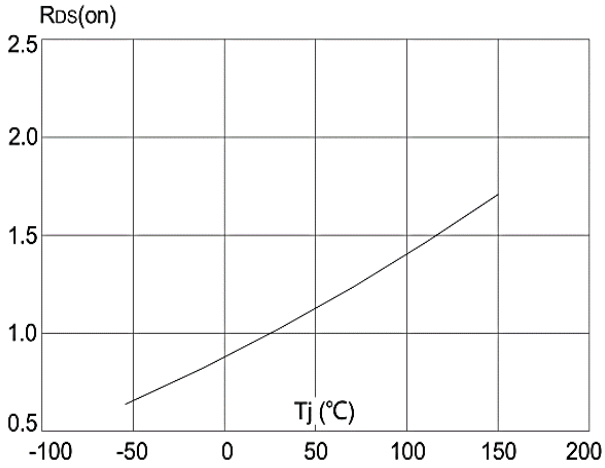



**Figure 8: Normalized on Resistance vs Junction Temperature**

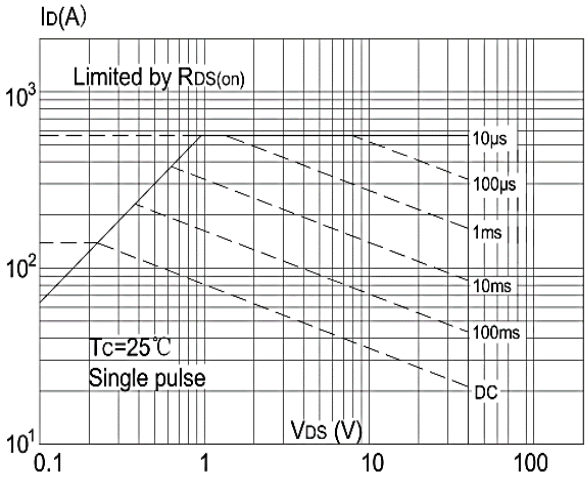



**Figure 9: Maximum Safe Operating Area**

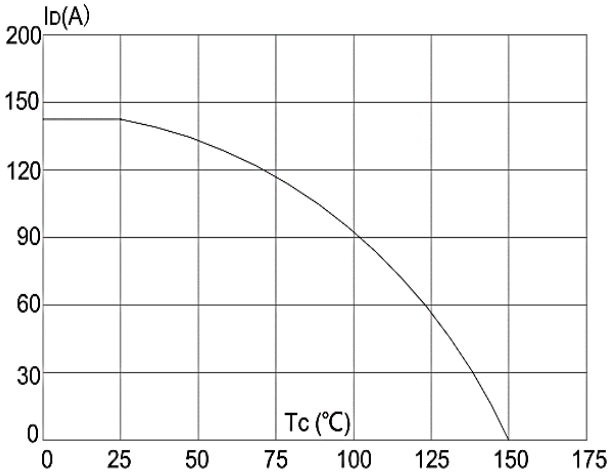



**Figure 10: Maximum Continuous Drain Currentvs. Case Temperature**

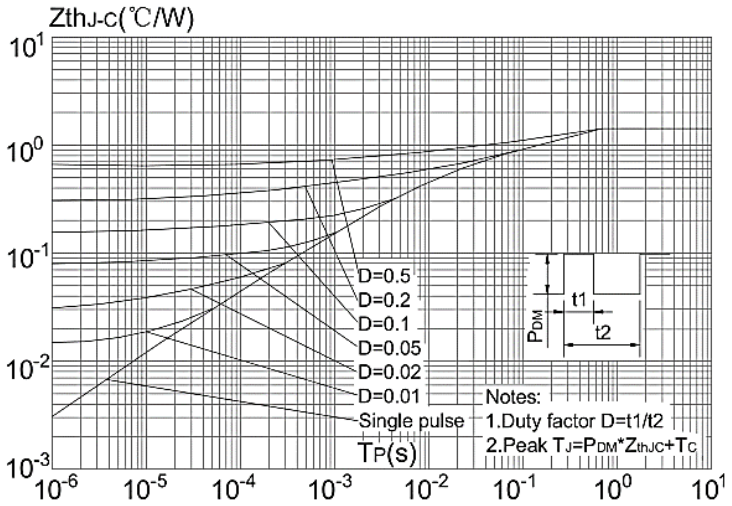
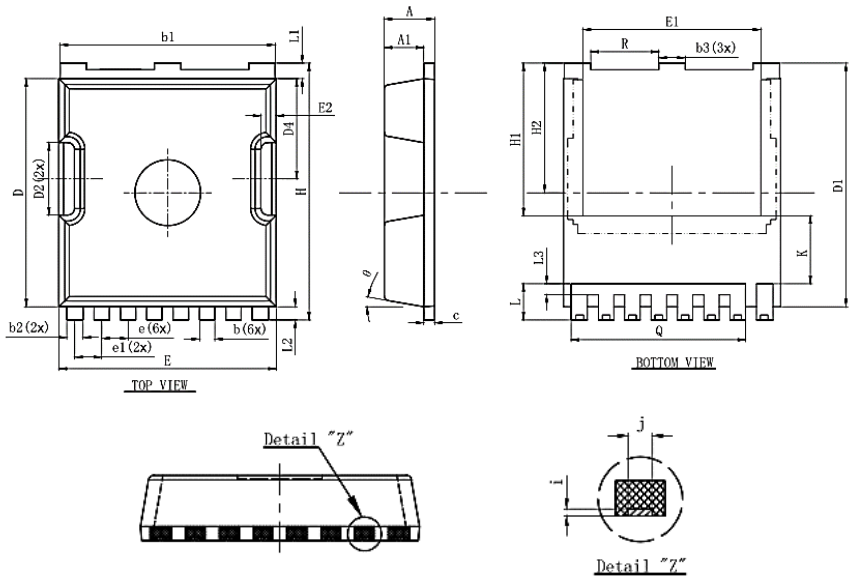



**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Cas**

## Package Mechanical Data-TOLLA-8-XZ Single




| Symbol | Dimensions In Millimeters | | |
|---|---|---|---|
| | Min. | Nom | Max. |
| A | 2.2 | 2.3 | 2.4 |
| A1 | 1.7 | 1.8 | 1.9 |
| b | 0.6 | 0.7 | 0.8 |
| b1 | 9.7 | 9.8 | 9.9 |
| b2 | 0.65 | 0.75 | 0.85 |
| b3 | 1.1 | 1.2 | 1.3 |
| C | 0.4 | 0.5 | 0.6 |
| D | 10.3 | 10.4 | 10.5 |
| D1 | 11.0 | 11.1 | 11.2 |
| D2 | 3.2 | 3.3 | 3.4 |
| D4 | 4.47 | 4.57 | 4.67 |
| E | 9.8 | 9.9 | 10.0 |
| E1 | 8.0 | 8.1 | 8.2 |
| E2 | 0.5 | 0.6 | 0.7 |
| e | 1.200（BSC） | | |
| e1 | 1.225（BSC） | | |
| H | 11.6 | 11.7 | 11.8 |
| H1 | 6.95BSC | | |
| H2 | 5.9BSC | | |
| i | 0.1REF | | |
| j | 0.350REF | | |
| K | 3.100REF | | |
| L | 1.55 | 1.65 | 1.75 |
| L1 | 0.6 | 0.7 | 0.8 |
| L2 | 0.5 | 0.6 | 0.7 |
| L3 | 0.4 | 0.5 | 0.6 |
| Q | 7.95REF | | |
| R | 3.0 | 3.1 | 3.2 |
| θ | 10°REG | | |

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## 40V N-Channel Enhancement Mode MOSFET

| Edition | Date | Change |
|---|---|---|
| RVE1.0 | 2021/12/31 | Initial release |