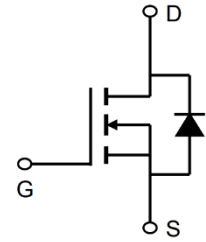


30V N-Channel Enhancement Mode MOSFET

Description

The AP85N03NF uses advanced trench 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

$V_{DS} = 30V$ $I_D = 85A$

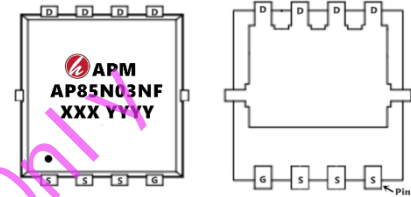
$R_{DS(ON)} < 4m\Omega$ @ $V_{GS} = 10V$

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|------------|------------|--------------------|----------|
| AP85N03NF | PDFN5*6-8L | AP85N03NF XXX YYYY | 5000 |

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

| Symbol | Parameter | Rating | Units |
|---------------------------------------|--|------------|-------|
| V _{DS} | Drain-Source Voltage | 30 | V |
| V _{GS} | Gate-Source Voltage | ±20 | V |
| I _D @T _C =25°C | Continuous Drain Current, V _{GS} @ 10V ^{1,6} | 85 | A |
| I _D @T _C =100°C | Continuous Drain Current, V _{GS} @ 10V ^{1,6} | 68 | A |
| I _{DM} | Pulsed Drain Current ² | 216 | A |
| E _{AS} | Single Pulse Avalanche Energy ³ | 650 | mJ |
| I _{AS} | Avalanche Current | 53.8 | A |
| P _D @T _C =25°C | Total Power Dissipation ⁴ | 45 | W |
| P _D @T _A =25°C | Total Power Dissipation ⁴ | 5 | W |
| T _{STG} | Storage Temperature Range | -55 to 175 | °C |
| T _J | Operating Junction Temperature Range | -55 to 175 | °C |
| R _{θJA} | Thermal Resistance Junction-Ambient ¹ | 62 | °C/W |
| R _{θJA} | Thermal Resistance Junction-Ambient ¹ (t ≤ 10s) | 25 | °C/W |
| R _{θJC} | Thermal Resistance Junction-Case ¹ | 2.8 | °C/W |

30V 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 | 30 | 33 | --- | V |
| ΔBVDSS/ΔT _J | BVDSS Temperature Coefficient | Reference to 25°C, I _D =1mA | --- | 0.0213 | --- | V/°C |
| RDS(ON) | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =30A | --- | 2.3 | 4 | mΩ |
| | | V _{GS} =4.5V, I _D =15A | --- | 4.3 | 6 | |
| VGS(th) | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.2 | 1.6 | 2.5 | V |
| ΔVGS(th) | V _{GS(th)} Temperature Coefficient | | --- | -5.73 | --- | mV/°C |
| IDSS | Drain-Source Leakage Current | V _{DS} =24V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =24V, 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 =30A | 20.08 | 26.5 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 1.4 | --- | Ω |
| Q _g | Total Gate Charge (4.5V) | V _{DS} =15V, V _{GS} =4.5V, I _D =15A | --- | 70 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 12 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 17 | --- | |
| Td(on) | Turn-On Delay Time | V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω, I _D =15A | --- | 11 | --- | ns |
| T _r | Rise Time | | --- | 120 | --- | |
| Td(off) | Turn-Off Delay Time | | --- | 25 | --- | |
| T _f | Fall Time | | --- | 60 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 3500 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 386 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 358 | --- | |
| I _s | Continuous Source Current ^{1,5} | V _G =V _D =0V, Force Current | --- | --- | 90 | A |
| ISM | Pulsed Source Current ^{2,5} | | --- | --- | 360 | A |
| VSD | Diode Forward Voltage ² | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.2 | V |

Note :

- The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width ≅ 300us, duty cycle ≅ 2%
- The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=53.8A
- The power dissipation is limited by 175°C junction temperature
- The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.
- Package limitation current is 85A.

Typical Characteristics

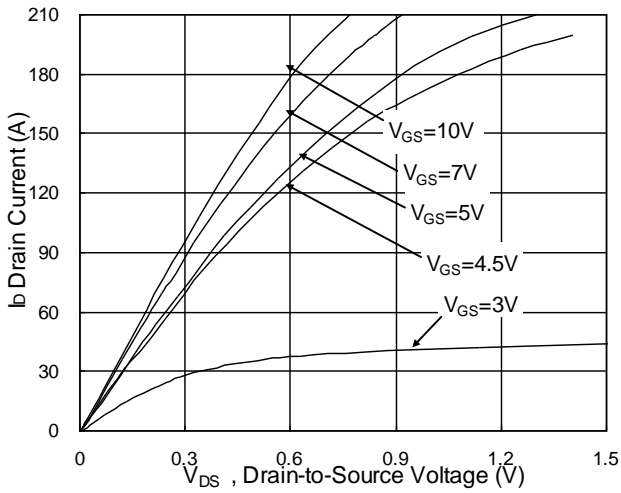


Fig.1 Typical Output Characteristics

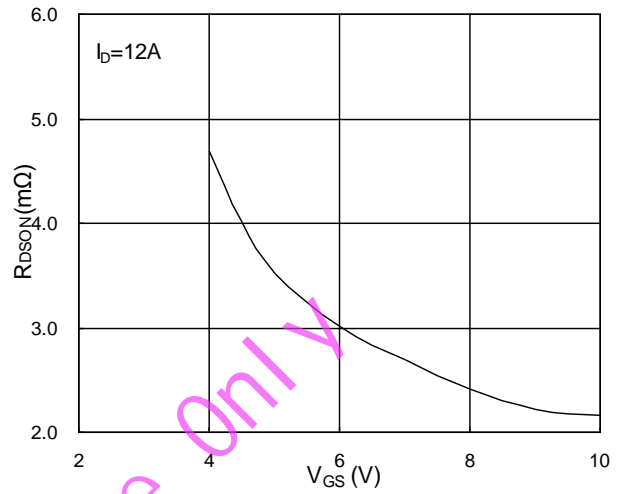


Fig.2 On-Resistance vs. G-S Voltage

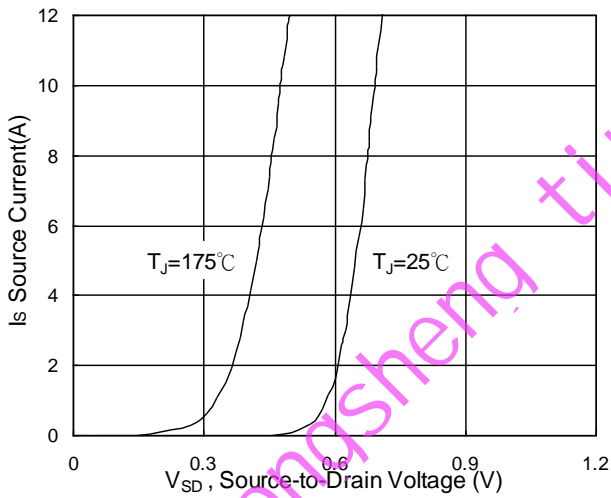


Fig.3 Forward Characteristics of Reverse

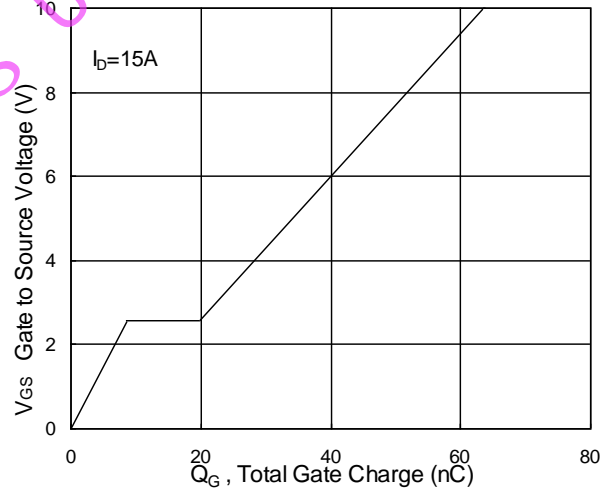


Fig.4 Gate-Charge Characteristics

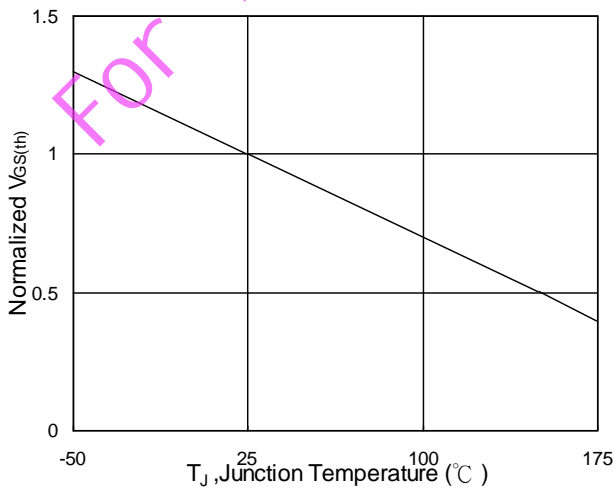


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

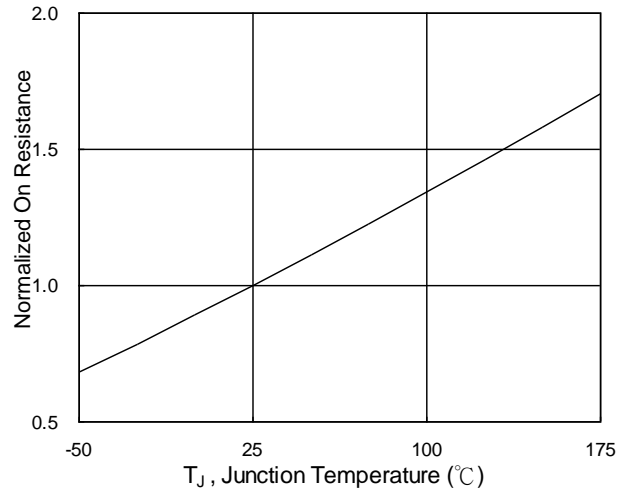


Fig.6 Normalized $R_{DS(on)}$ vs. T_J



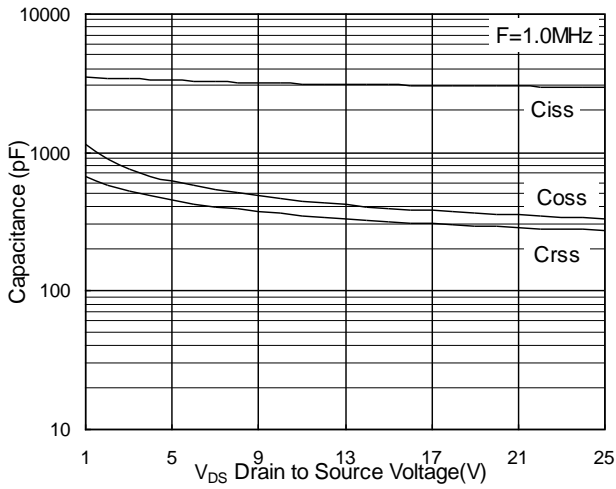


Fig.7 Capacitance

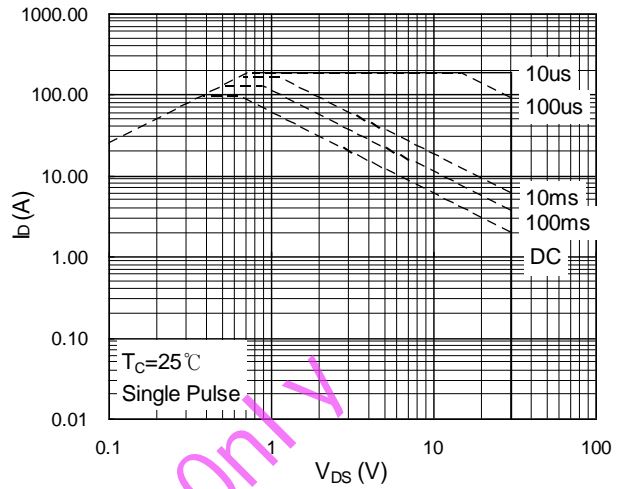


Fig.8 Safe Operating Area

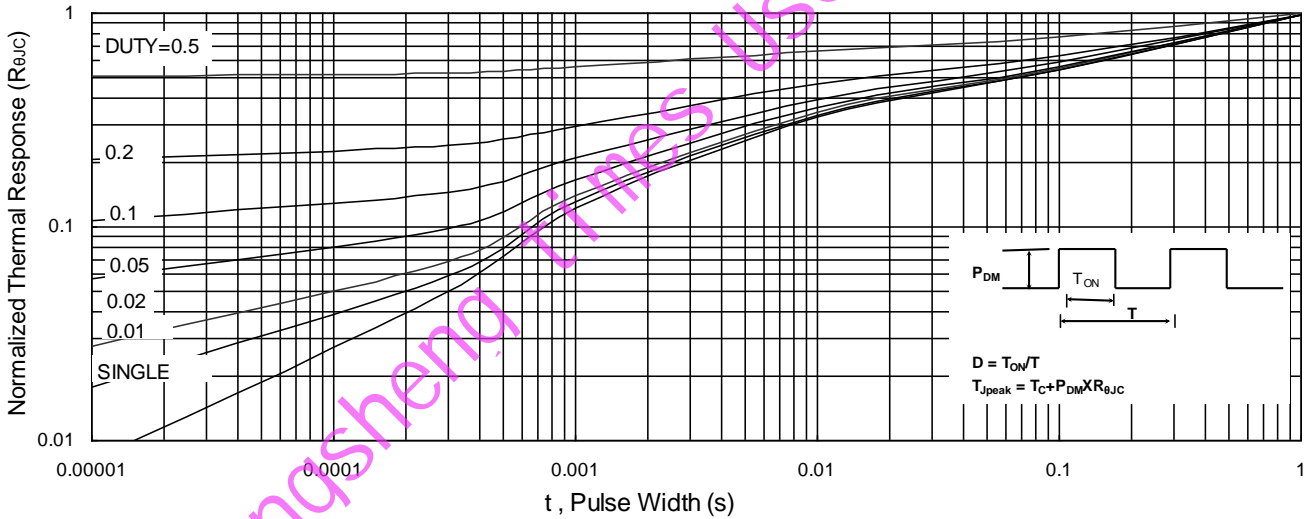


Fig.9 Normalized Maximum Transient Thermal Impedance

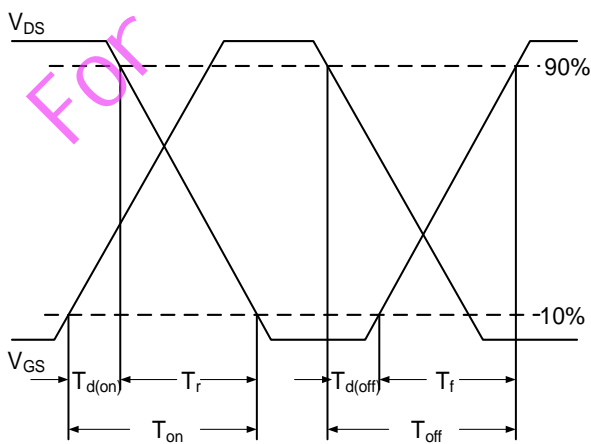


Fig.10 Switching Time Waveform

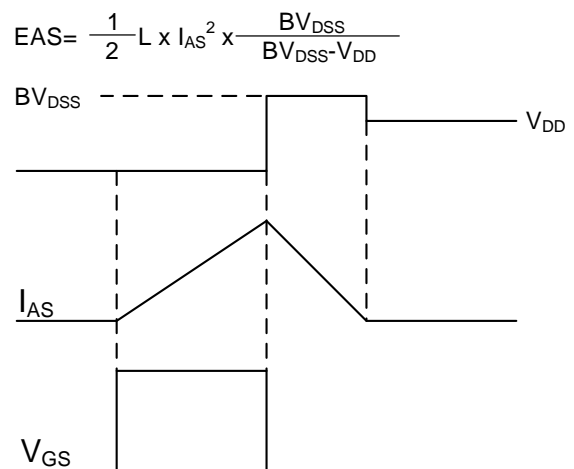
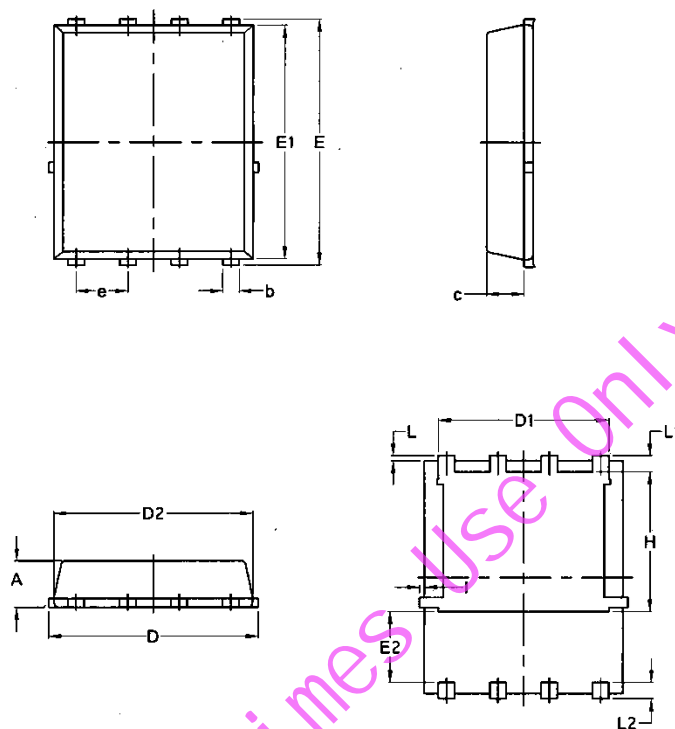


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-DFN5*6-8L-JQ Single



| Symbol | Common | | | |
|--------|----------|--------|----------|--------|
| | mm | | Inch | |
| | Mim | Max | Min | Max |
| A | 1.03 | 1.17 | 0.0406 | 0.0461 |
| b | 0.34 | 0.48 | 0.0134 | 0.0189 |
| c | 0.824 | 0.0970 | 0.0324 | 0.082 |
| D | 4.80 | 5.40 | 0.1890 | 0.2126 |
| D1 | 4.11 | 4.31 | 0.1618 | 0.1697 |
| D2 | 4.80 | 5.00 | 0.1890 | 0.1969 |
| E | 5.95 | 6.15 | 0.2343 | 0.2421 |
| E1 | 5.65 | 5.85 | 0.2224 | 0.2303 |
| E2 | 1.60 | / | 0.0630 | / |
| e | 1.27 BSC | | 0.05 BSC | |
| L | 0.05 | 0.25 | 0.0020 | 0.0098 |
| L1 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| L2 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| H | 3.30 | 3.50 | 0.1299 | 0.1378 |
| I | / | 0.18 | / | 0.0070 |

30V N-Channel Enhancement Mode MOSFET

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AP85N03NF

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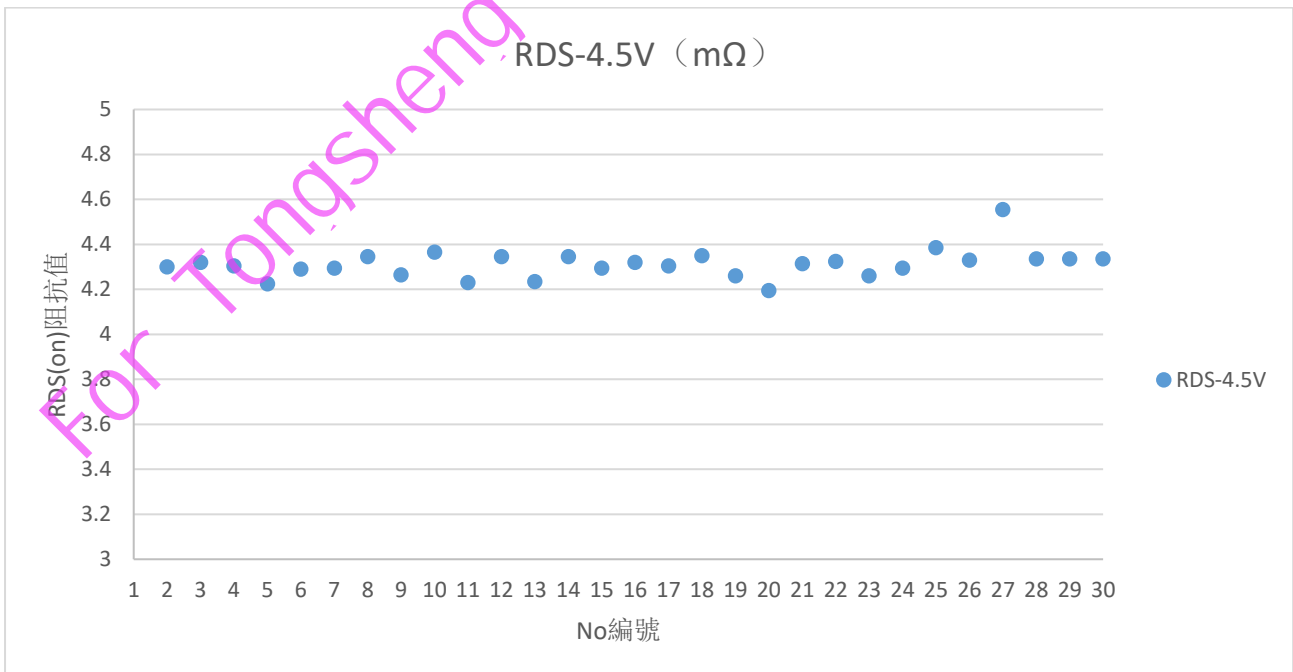
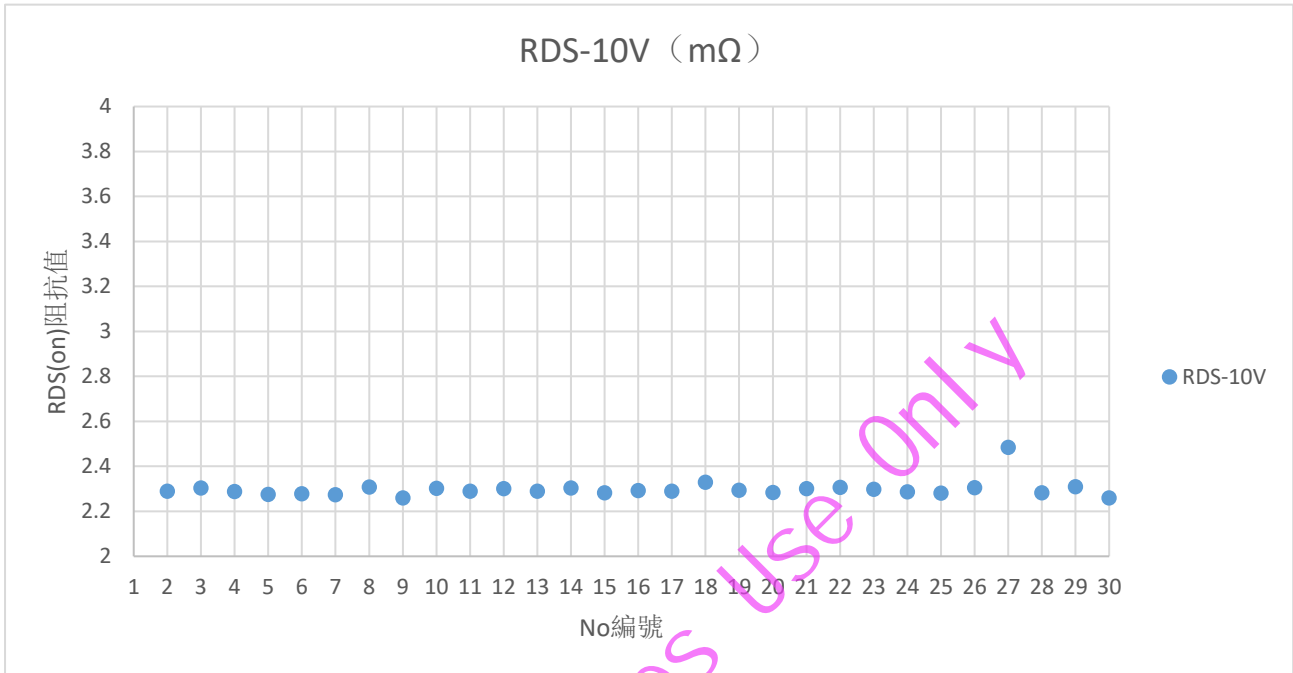
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| Rve1.0 | 2019/8/1 | Initial release |

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Test Report For 30PCS (30pcs 典型測試報告)



30V N-Channel Enhancement Mode MOSFET

