

## / Revised record

| A | 2022.5.24 | All | AOS-AOND32324                                                    |  |  |
|---|-----------|-----|------------------------------------------------------------------|--|--|
| A | 2022-7-27 | all | Q<br>AEC-Q101<br>, Q 245±<br>5°C 5±0.5sec<br>255±5°C<br>5±0.5sec |  |  |
|   |           |     |                                                                  |  |  |
|   |           |     |                                                                  |  |  |
|   |           |     |                                                                  |  |  |
|   |           |     |                                                                  |  |  |
|   |           |     |                                                                  |  |  |
|   |           |     |                                                                  |  |  |
|   |           |     |                                                                  |  |  |
|   |           |     |                                                                  |  |  |
|   |           |     |                                                                  |  |  |

## / Descriptions

PDFN5×6A                      N

Dual N-CHANNEL MOSFET in a PDFN5×6A Plastic Package.

## / Features

Dual N-Ch

$V_{DS}(V)=60V$

$I_D=24.5A$

$R_{DS(ON)}<13m\Omega(V_{GS}=10V)$

$R_{DS(ON)}<18m\Omega(V_{GS}=4.5V)$

AEC-Q101

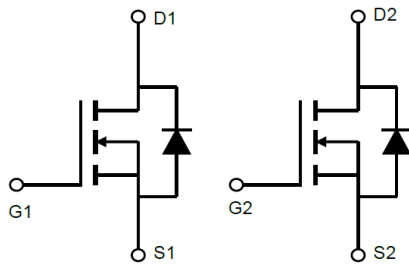
Qualified to AEC-Q101 Standards for High Reliability; HF Product.

## / Applications

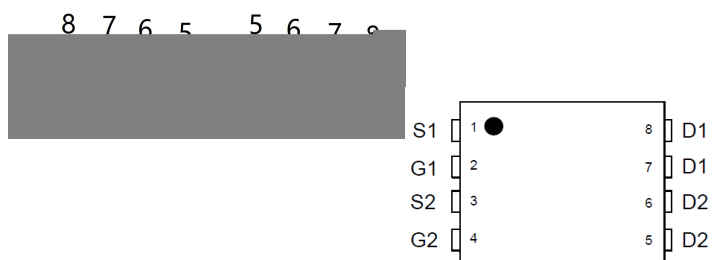
PWM                                      LED

PWM Application, Load Switch, Power Management, Dimming LED, Meet the stringent requirements of automotive applications.

## / Equivalent Circuit



## / Pinning



## / Marking

- See Marking Instructions.

/ Absolute Maximum Ratings( $T_a=25^\circ\text{C}$ )

| Parameter                               |              | Symbol                      | Rating     | Unit               |
|-----------------------------------------|--------------|-----------------------------|------------|--------------------|
| Drain-Source Voltage                    |              | $V_{DSS}$                   | 60         | V                  |
| Drain Current                           |              | $I_D(T_c=25^\circ\text{C})$ | 24.5       | A                  |
| Drain Current - Pulsed                  |              | $I_{DM}$                    | 95         | A                  |
| Gate-Source Voltage                     |              | $V_{GSS}$                   | $\pm 20$   | V                  |
| Single Pulsed Avalanche Energy          |              | $E_{AS}$                    | 70         | mJ                 |
| Avalanche Current                       |              | $I_{AS}$                    | 20         | A                  |
| Power Dissipation                       |              | $P_D(T_c=25^\circ\text{C})$ | 12.5       | W                  |
| Operating and Storage Temperature Range |              | $T_J, T_{stg}$              | -55 to 150 | $^\circ\text{C}$   |
| Junction-to-Ambient                     | $t \leq 10$  | $R_{\theta JA}$             | 35         | $^\circ\text{C/W}$ |
| Junction-to-Ambient                     | Steady-State |                             | 70         |                    |
| Junction-to-Case                        | Steady-State | $R_{\theta JC}$             | 10         |                    |

/ Electrical Characteristics( $T_a=25^\circ\text{C}$ )

| Parameter                          | Symbol        | Test Conditions                           |                | Min | Typ  | Max       | Unit       |
|------------------------------------|---------------|-------------------------------------------|----------------|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage     | $BV_{DSS}$    | $V_{GS}=0V$                               | $I_D=250\mu A$ | 60  | 64   |           | V          |
| Zero Gate Voltage Drain Current    | $I_{DSS}$     | $V_{DS}=60V$                              | $V_{GS}=0V$    |     |      | 1         | $\mu A$    |
| Gate-Body Leakage Current Forward  | $I_{GSS}$     | $V_{GS}=\pm 20V$                          | $V_{DS}=0V$    |     |      | $\pm 0.1$ | $\mu A$    |
| Gate Threshold Voltage             | $V_{GS(th)}$  | $V_{DS}=V_{GS}$                           | $I_D=250\mu A$ | 1.0 | 1.6  | 2.5       | V          |
| Static Drain-Source On-Resistance  | $R_{DS(on)}$  | $V_{GS}=10V$                              | $I_D=20A$      |     | 11.5 | 13        | m $\Omega$ |
|                                    |               | $V_{GS}=4.5V$                             | $I_D=10A$      |     | 15.5 | 18        | m $\Omega$ |
| Drain-Source Diode Forward Voltage | $V_{SD}$      | $V_{GS}=0V$                               | $I_S=1A$       |     |      | 1.2       | V          |
| Input Capacitance                  | $C_{iss}$     | $V_{DS}=25V$<br>$f=1.0MHz$<br>$V_{GS}=0V$ |                |     | 1010 |           | pF         |
| Output Capacitance                 | $C_{oss}$     |                                           |                |     | 250  |           |            |
| Reverse Transfer Capacitance       | $C_{rss}$     |                                           |                |     | 280  |           |            |
| Gate resistance                    | $R_g$         | $V_{GS}=0V$<br>$f=1MHz$                   | $V_{DS}=0V$    |     | 2.3  |           | $\Omega$   |
| Total Gate Charge                  | $Q_{g(10V)}$  | $V_{GS}=10V$<br>$I_D=13A$<br>$V_{DS}=30V$ |                |     | 13.5 |           | nC         |
| Total Gate Charge                  | $Q_{g(4.5V)}$ |                                           |                |     | 6.5  |           |            |
| Gate Source Charge                 | $Q_{gs}$      |                                           |                |     | 2.5  |           |            |
| Gate Drain Charge                  | $Q_{gd}$      |                                           |                |     | 3.0  |           |            |

## / Electrical Characteristics(Ta=25 )

| Parameter           | Symbol       | Test Conditions                                                | Min | Typ | Max | Unit |
|---------------------|--------------|----------------------------------------------------------------|-----|-----|-----|------|
| Turn-On Delay Time  | $t_{d(on)}$  | $V_{GS}=10V$ $V_{DS}=30V$<br>$R_L=2.3\Omega$ $R_{GEN}=3\Omega$ |     | 5   |     | ns   |
| Turn-On Rise Time   | $t_r$        |                                                                |     | 3   |     |      |
| Turn-Off Delay Time | $t_{d(off)}$ |                                                                |     | 19  |     |      |
| Turn-Off Fall Time  | $t_f$        |                                                                |     | 3   |     |      |

/ Electrical Characteristic Curve

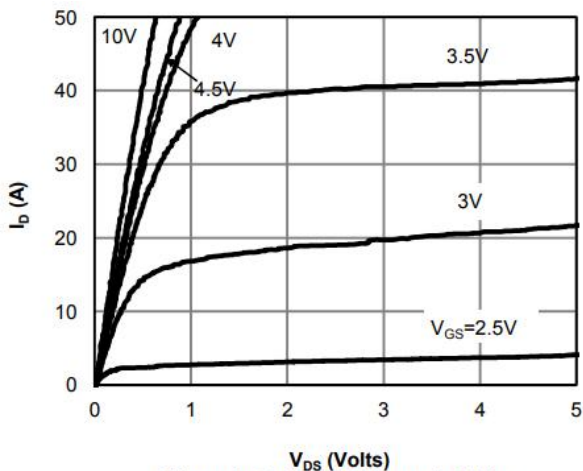


Figure 1: On-Region Characteristics

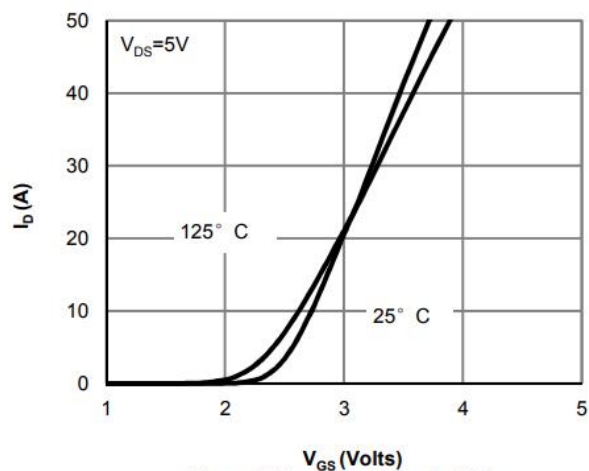
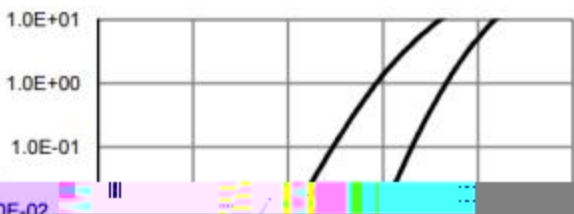
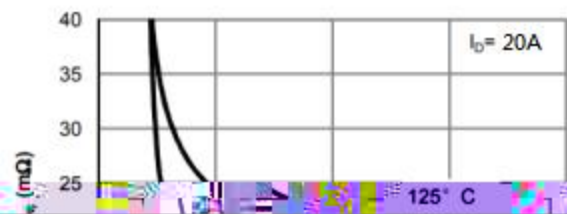
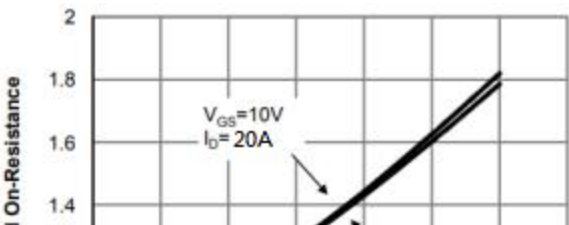
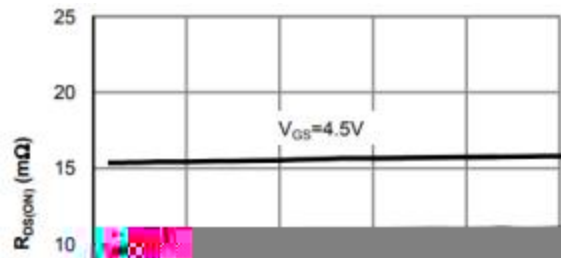
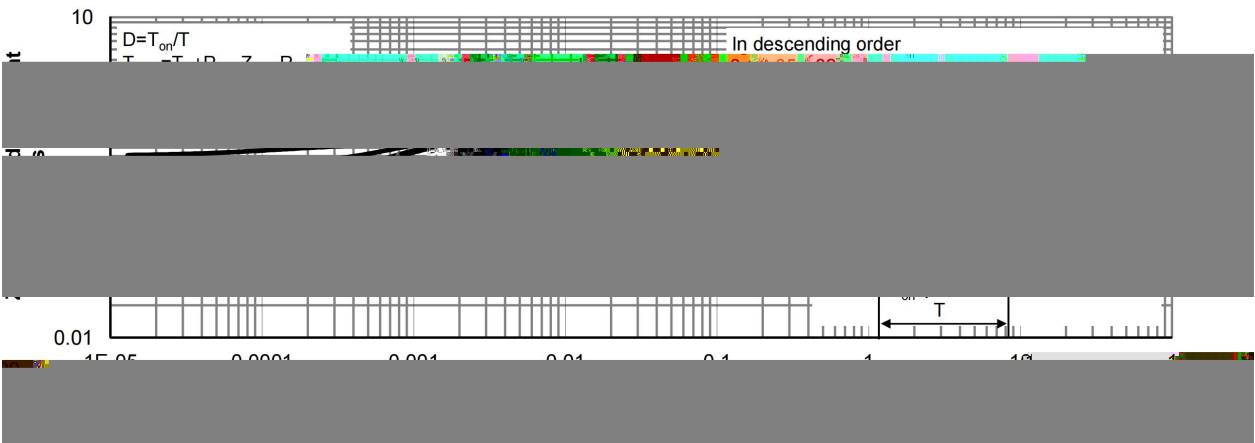
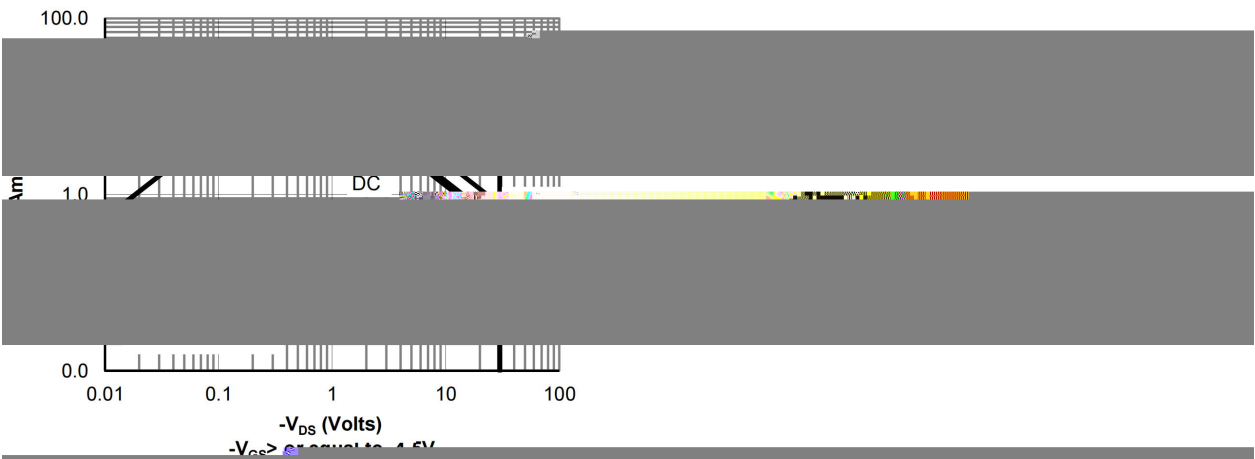
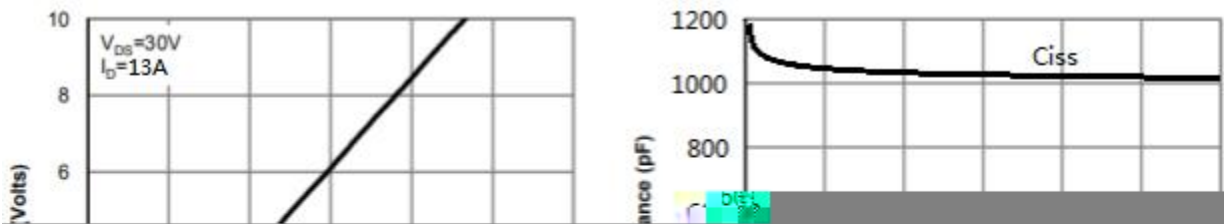


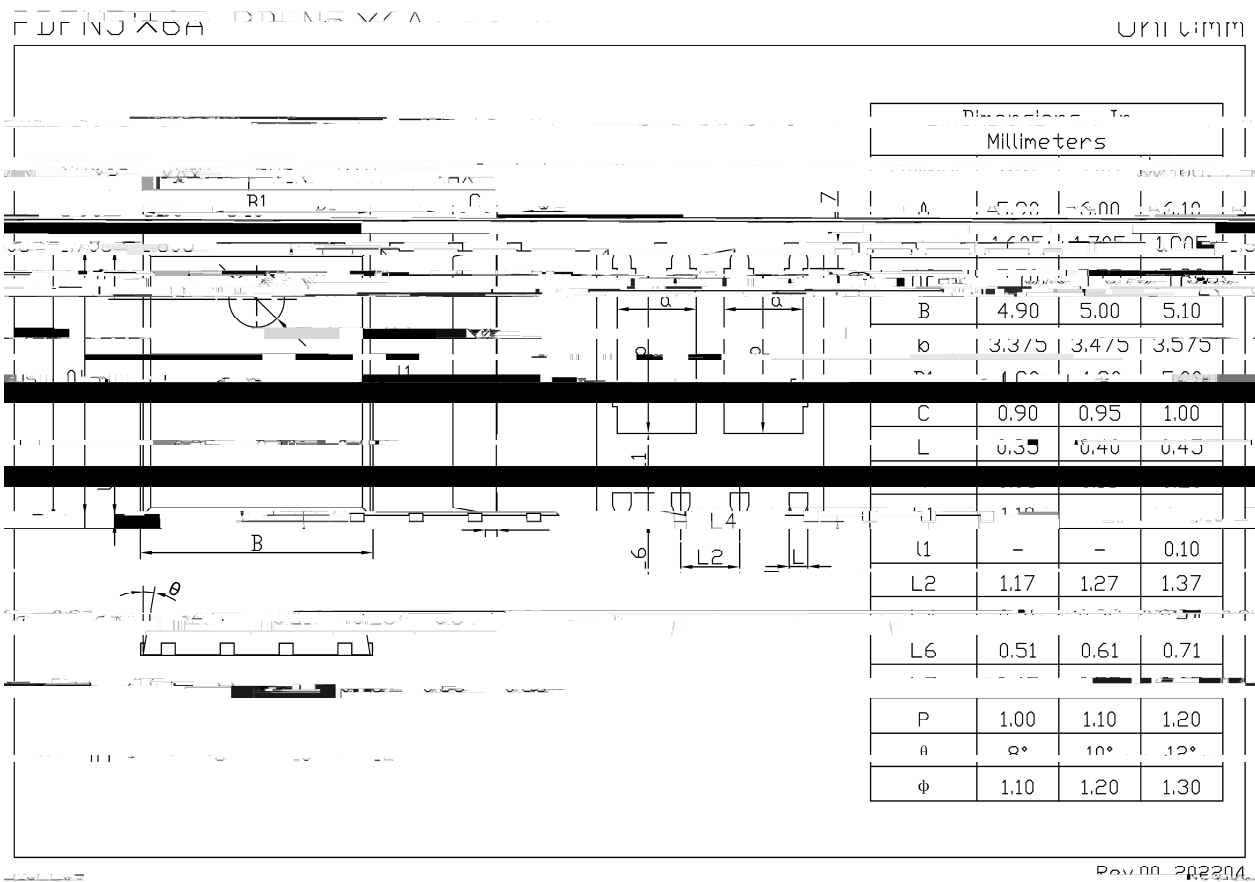
Figure 2: Transfer Characteristics



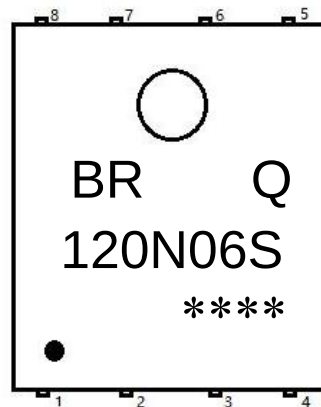
/ Electrical Characteristic Curve



## / Package Dimensions



## / Marking Instructions



BR

Q

120N06S

\*\*\*\*

Note

BR

Company Code

Q:

Automobile halogen-free product Code

120N06S

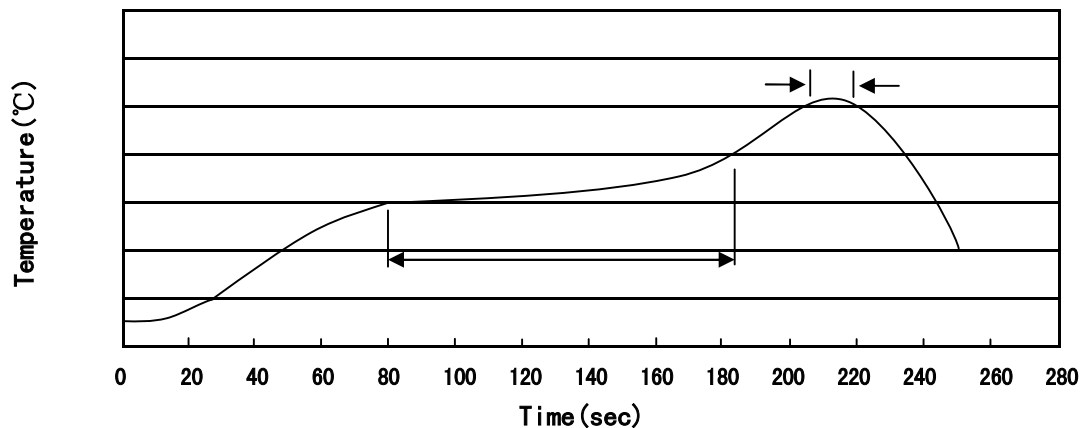
Product Type

\*\*\*\*:

Lot No. Code, code change with Lot No



## ( ) / Temperature Profile for IR Reflow Soldering(Pb-Free)



Note:

- |   |       |     |           |         |                                          |
|---|-------|-----|-----------|---------|------------------------------------------|
| 1 | 150   | 200 | 60        | 120sec; | 1.Preheating:150~200°C, Time:60~120sec.  |
| 2 | 255±5 |     | 5±0.5sec; |         | 2.Peak Temp.:255±5°C, Duration:5±0.5sec. |
| 3 |       | 2   | 10°C/sec. |         | 3. Cooling Speed: 2~10°C/sec.            |

## / Resistance to Soldering Heat Test Conditions

260±5°C

10±1 sec.

Temp.:260±5°C

Time:10±1 sec

## / Packaging SPEC.

## / REEL

| Package Type<br>封装形式 | Units 包装数量         |                         |                        |                              |                        | Dimension 包装尺寸 (unit: mm <sup>3</sup> ) |                |                 |
|----------------------|--------------------|-------------------------|------------------------|------------------------------|------------------------|-----------------------------------------|----------------|-----------------|
|                      | Units/Reel<br>只/卷盘 | Reels/Inner Box<br>卷盘/盒 | Units/Inner Box<br>只/盒 | Inner Boxes/Outer Box<br>盒/箱 | Units/Outer Box<br>只/箱 | Reel                                    | Inner Box 盒    | Outer Box 箱     |
| PDFN5 × 6A           | 5000               | 2                       | 10000                  | 6                            | 60000                  | 13" × 12                                | 360 × 360 × 50 | 380 × 335 × 366 |

## / Notices