

**/ Descriptions**

SOT23-3      P    MOS      - CHANNEL MOSFET in a SOT23-3 Plastic Package.

**/ Features**

$V_{DS} (V) = -30V$

$I_D = -4.1 A$

$R_{DS(ON)} < 60m\Omega (V_{GS} = -10V)$

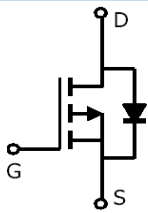
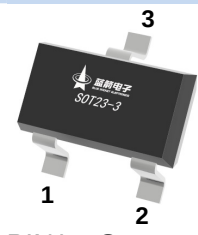
$R_{DS(ON)} < 85m\Omega (V_{GS} = -4.5V)$

Qualified to AEC-Q101 Standards for High Reliability,

HF Product.

**/ Applications**

This device is suitable for use as a load switch or in PWM applications, Meet the stringent requirements of automotive applications.

**/ Equivalent Circuit****/ Pinning**

PIN1   G      PIN 2   S      PIN 3   D

**/ Marking**

Marking

A7Q

## / Absolute Maximum Ratings(Ta=25 )

| Parameter                                        | Symbol                      | Rating     | Unit |
|--------------------------------------------------|-----------------------------|------------|------|
| Drain-Source Voltage                             | $V_{DS}$                    | -30        | V    |
| Drain Current – Continuous                       | $I_D$                       | -4.1       | A    |
| Drain Current- Continuous                        | $I_D(T_a=70^\circ\text{C})$ | -3.5       | A    |
| Pulsed Drain Current                             | $I_{DM}$                    | -20        | A    |
| Gate-Source Voltage                              | $V_{GS}$                    | $\pm 20$   | V    |
| Total Power Dissipation                          | $P_D$                       | 1.4        | W    |
| Operating and Storage Junction Temperature Range | $T_J, T_{STG}$              | -55 to 150 |      |
| Thermal Resistance-Junction to Case              | $R_{\theta JC}$             | 89.3       | /W   |
| Thermal Resistance-Junction to Ambient           | $R_{\theta JA}$             | 79         |      |

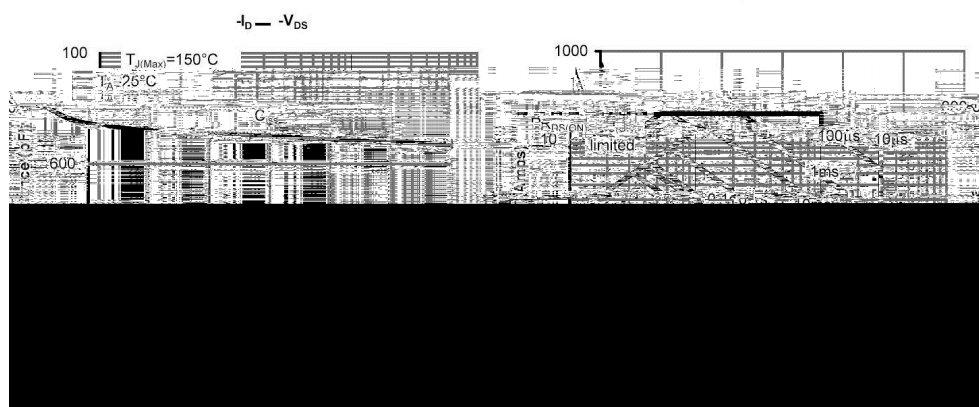
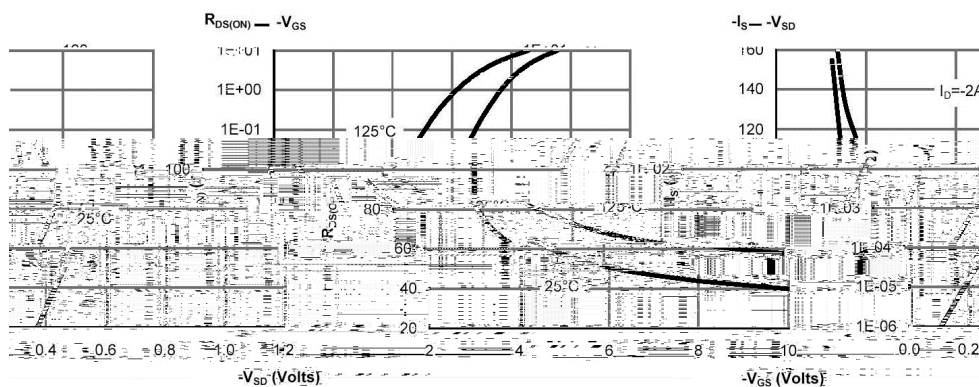
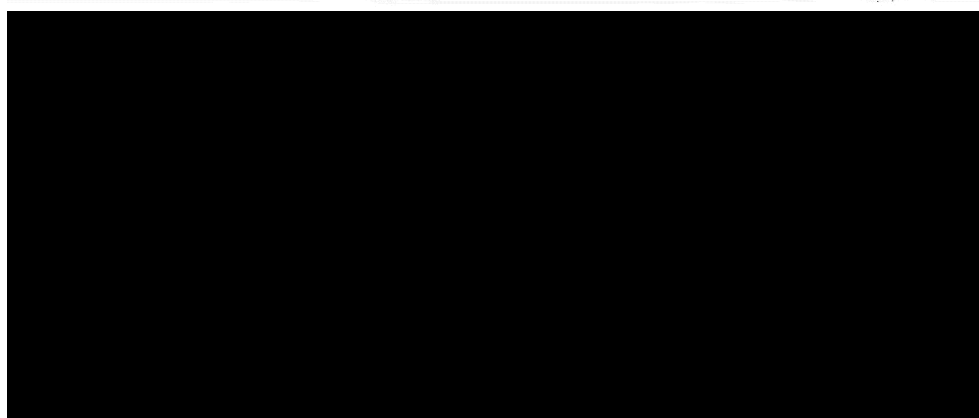
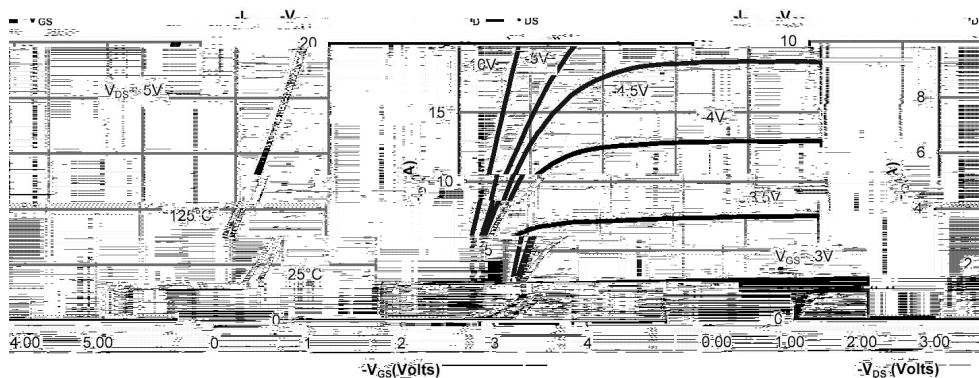
## / Electrical Characteristics(Ta=25 )

| Parameter                          | Symbol        | Test Conditions                                   | Min | Typ   | Max       | Unit |
|------------------------------------|---------------|---------------------------------------------------|-----|-------|-----------|------|
| Drain–Source Breakdown Voltage     | $BV_{DSS}$    | $V_{GS}=0V$ $I_D=-250\text{ }\mu\text{A}$         | -30 |       |           | V    |
| Zero Gate Voltage Drain Current    | $I_{DSS}$     | $V_{DS}=-24V$ $V_{GS}=0V$                         |     |       | -1        | A    |
|                                    |               | $V_{DS}=-24V$ $V_{GS}=0V$ $T_J=55^\circ\text{C}$  |     |       | -5        | A    |
| Gate–Body Leakage.                 | $I_{GSS}$     | $V_{GS}=\pm 20V$ $V_{DS}=0V$                      |     |       | $\pm 0.1$ | A    |
| On–State Drain Current             | $I_{D(on)}$   | $V_{GS}=-4.5V$ $V_{DS}=-5V$                       | -10 |       |           | A    |
| Gate Threshold Voltage             | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ $I_D=-250\text{ }\mu\text{A}$     | -1  | -1.4  | -3        | V    |
| Static Drain–Source On–Resistance  | $R_{DS(on)1}$ | $V_{GS}=-10V$ $I_D=-4.1A$                         |     | 54    | 60        | mΩ   |
|                                    | $R_{DS(on)2}$ | $V_{GS}=-10V$ $I_D=-4.1A$ $T_J=125^\circ\text{C}$ |     | 57    | 73        |      |
|                                    | $R_{DS(on)3}$ | $V_{GS}=-4.5V$ $I_D=-3A$                          |     | 77    | 85        |      |
| Forward Transconductance           | $g_{FS}$      | $V_{DS}=-5V$ $I_D=-4A$                            | 5.5 | 8.2   |           | S    |
| Drain–Source Diode Forward Voltage | $V_{SD}$      | $V_{GS}=0V$ $I_S=-1A$                             |     | -0.77 | -1        | V    |
| Input Capacitance                  | $C_{iss}$     | $V_{DS}=-15V$ $V_{GS}=0V$ $f=1\text{MHz}$         |     | 700   |           | pF   |
| Output Capacitance                 | $C_{oss}$     |                                                   |     | 120   |           |      |
| Reverse Transfer Capacitance       | $C_{rss}$     |                                                   |     | 75    |           |      |

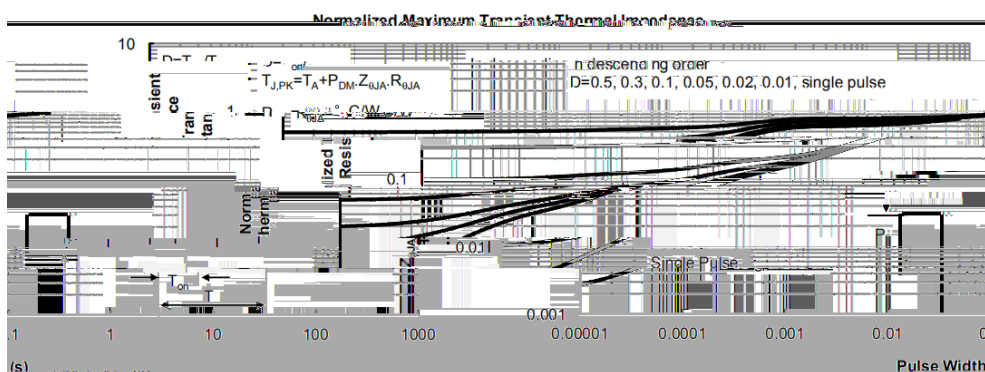
## / Electrical Characteristics(Ta=25 )

| Parameter                          | Symbol       | Test Conditions                                                          | Min | Typ  | Max | Unit |
|------------------------------------|--------------|--------------------------------------------------------------------------|-----|------|-----|------|
| Total Gate Charge                  | $Q_g(10V)$   | $V_{GS}=-10V, \quad V_{DS}=-15V,$<br>$I_D=-4.1A$                         |     | 9    |     | nC   |
| Total Gate Charge                  | $Q_g(4.5V)$  |                                                                          |     | 4.5  |     |      |
| Gate Source Charge                 | $Q_{gs}$     |                                                                          |     | 1.5  |     |      |
| Gate Drain Charge                  | $Q_{gd}$     |                                                                          |     | 2.1  |     |      |
| Turn-On Delay Time                 | $t_{d(on)}$  | $V_{GS}=-10V \quad R_L=3.6\Omega$<br>$V_{DS}=-15V \quad R_{GEN}=3\Omega$ |     | 8.6  |     | ns   |
| Turn-On Rise Time                  | $t_r$        |                                                                          |     | 5    |     |      |
| Turn-Off Delay Time                | $t_{d(off)}$ |                                                                          |     | 28.2 |     |      |
| Turn-Off Fall Time                 | $t_f$        |                                                                          |     | 13.5 |     |      |
| Body Diode Reverse Recovery Time   | $t_{rr}$     | $I_F=-4.1A, \quad dI/dt=100A/\mu s$                                      |     | 13   |     | ns   |
| Body Diode Reverse Recovery Charge | $Q_{rr}$     | $I_F=-4.1A, \quad dI/dt=100A/\mu s$                                      |     | 5.5  |     | nC   |

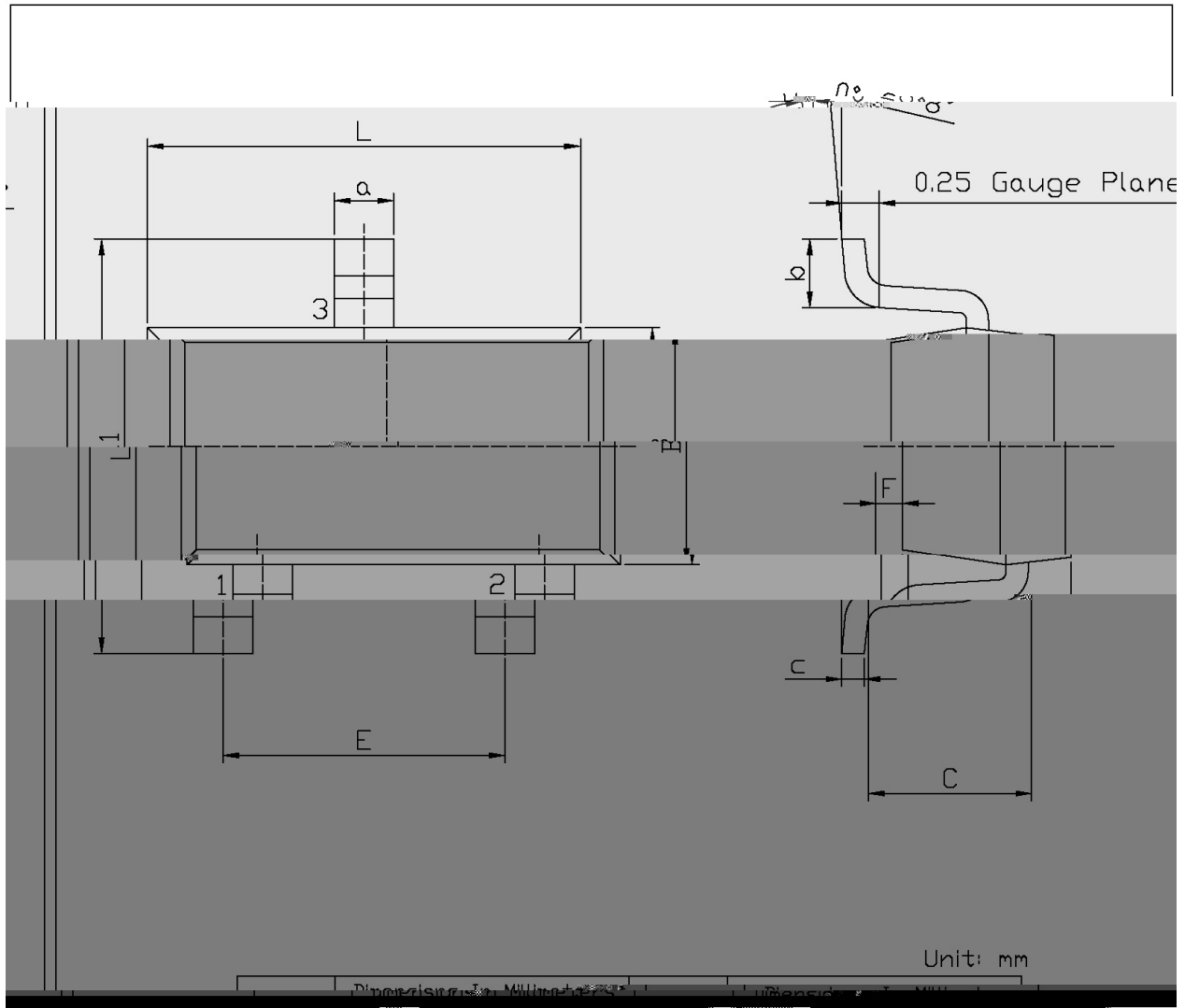
/ Electrical Characteristic Curve



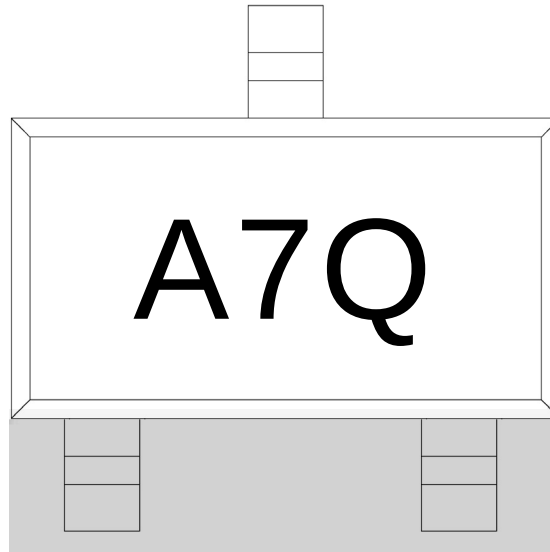
/ Electrical Characteristic Curve



## / Package Dimensions



**/ Marking Instructions**



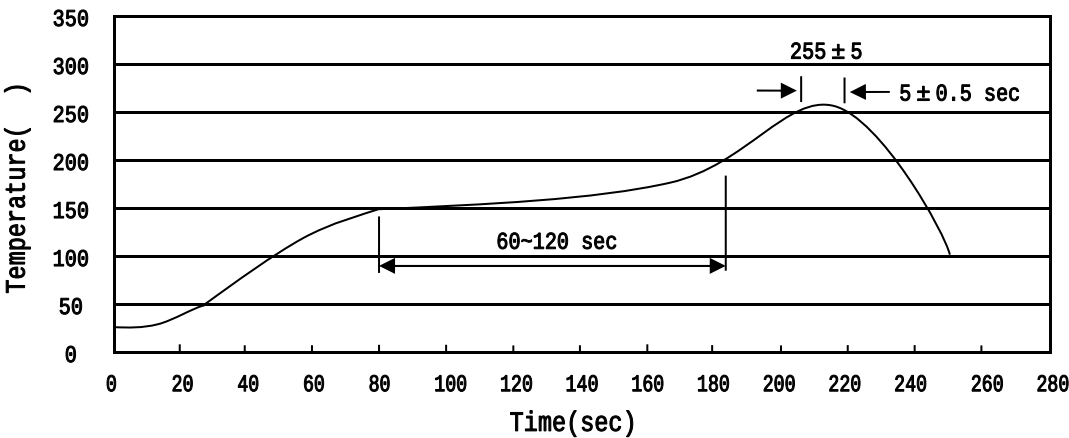
A7

Note:

A7: Product Type

Q: Automobile halogen-free product Code

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



Note:

- 1

150 200

60 120sec;

1.Preheating:150~200 , Time:60~120sec.
- 2

255 5

5 0.5sec;

2.Peak Temp.:255 5 , Duration:5 0.5sec.
- 3

2 10 /sec.

3. Cooling Speed: 2~10 /sec.

/ Resistance to Soldering Heat Test Conditions

260 5                      10 1 sec.                      Temp.:260 5                      Time:10 1 sec

/ Packaging SPEC.

/ REEL

| Package Type | Units           |                      |                      |                            |                      | Dimension (unit mm <sup>3</sup> ) |             |             |
|--------------|-----------------|----------------------|----------------------|----------------------------|----------------------|-----------------------------------|-------------|-------------|
|              | Units/Reel<br>/ | Reels/Inner Box<br>/ | Units/Inner Box<br>/ | Inner Boxes/Outer Box<br>/ | Units/Outer Box<br>/ | Reel                              | Inner Box   | Outer Box   |
| SOT23-3      | 3,000           | 10                   | 30,000               | 4                          | 120,000              | 7 ×8                              | 210×205×205 | 445×230×435 |

/ Notices