



## Description

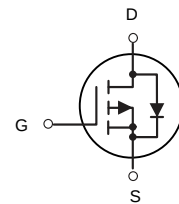
The SQ2319ADS-T1\_GE3 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

## General Features

$V_{DS} = -40V, I_D = -5A$   
 $R_{DS(ON)} < 85m\Omega @ V_{GS} = -10V$   
 $R_{DS(ON)} < 120m\Omega @ V_{GS} = -4.5V$

## Application

Power switching application  
Hard switched and high frequency circuits  
DC-DC converter



P-Channel MOSFET

## Ordering Information

| Product ID       | Pack   | Marking | Qty(PCS) |
|------------------|--------|---------|----------|
| SQ2319ADS-T1_GE3 | SOT-23 | 2319    | 3000     |

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

| Parameter                                                   | Symbol             | Limit      | Unit         |
|-------------------------------------------------------------|--------------------|------------|--------------|
| Drain-Source Voltage                                        | $V_{DS}$           | -40        | V            |
| Gate-Source Voltage                                         | $V_{GS}$           | $\pm 20$   | V            |
| Drain Current-Continuous                                    | $I_D$              | -5         | A            |
| Drain Current-Continuous( $T_C = 100^\circ C$ )             | $I_D(100^\circ C)$ | -2.3       | A            |
| Pulsed Drain Current                                        | $I_{DM}$           | -18        | A            |
| Maximum Power Dissipation                                   | $P_D$              | 1.4        | W            |
| Operating Junction and Storage Temperature Range            | $T_J, T_{STG}$     | -55 To 150 | $^\circ C$   |
| Thermal Resistance ,Junction-to-Ambient <sup>(Note 2)</sup> | $R_{\theta JA}$    | 89         | $^\circ C/W$ |



**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

| Parameter                                     | Symbol              | Condition                                                                                  | Min  | Typ  | Max  | Unit |
|-----------------------------------------------|---------------------|--------------------------------------------------------------------------------------------|------|------|------|------|
| Off Characteristics                           |                     |                                                                                            |      |      |      |      |
| Drain-Source Breakdown Voltage                | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V I <sub>D</sub> =-250μA                                                 | -40  | -    | -    | V    |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>    | V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V                                                 | -    | -    | 1    | μA   |
| Gate-Body Leakage Current                     | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                 | -    | -    | ±100 | nA   |
| On Characteristics <sup>(Note 3)</sup>        |                     |                                                                                            |      |      |      |      |
| Gate Threshold Voltage                        | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                  | -1.0 | -1.9 | -3.0 | V    |
| Drain-Source On-State Resistance              | R <sub>DS(ON)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-3A                                                 | -    | 73   | 85   | mΩ   |
|                                               |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2A                                                | -    | 98   | 120  | mΩ   |
| Forward Transconductance                      | g <sub>FS</sub>     | V <sub>DS</sub> =-5V, I <sub>D</sub> =-3A                                                  | -    | 5    | -    | S    |
| Dynamic Characteristics <sup>(Note4)</sup>    |                     |                                                                                            |      |      |      |      |
| Input Capacitance                             | C <sub>iss</sub>    | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                    | -    | 600  | -    | PF   |
| Output Capacitance                            | C <sub>oss</sub>    |                                                                                            | -    | 90   | -    | PF   |
| Reverse Transfer Capacitance                  | C <sub>rss</sub>    |                                                                                            | -    | 70   | -    | PF   |
| Switching Characteristics <sup>(Note 4)</sup> |                     |                                                                                            |      |      |      |      |
| Turn-on Delay Time                            | t <sub>d(on)</sub>  | V <sub>DD</sub> =-20V, , R <sub>L</sub> =2Ω<br>V <sub>GS</sub> =-10V, R <sub>GEN</sub> =3Ω | -    | 9    | -    | nS   |
| Turn-on Rise Time                             | t <sub>r</sub>      |                                                                                            | -    | 8    | -    | nS   |
| Turn-Off Delay Time                           | t <sub>d(off)</sub> |                                                                                            | -    | 28   | -    | nS   |
| Turn-Off Fall Time                            | t <sub>f</sub>      |                                                                                            | -    | 10   | -    | nS   |
| Total Gate Charge                             | Q <sub>g</sub>      | V <sub>DS</sub> =-20V, I <sub>D</sub> =-3A,<br>V <sub>GS</sub> =-10V                       | -    | 14   | -    | nC   |
| Gate-Source Charge                            | Q <sub>gs</sub>     |                                                                                            | -    | 2.9  | -    | nC   |
| Gate-Drain Charge                             | Q <sub>gd</sub>     |                                                                                            | -    | 3.8  | -    | nC   |
| Drain-Source Diode Characteristics            |                     |                                                                                            |      |      |      |      |
| Diode Forward Voltage <sup>(Note 3)</sup>     | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =-3.3A                                                 | -    | -    | 1.2  | V    |
| Diode Forward Current <sup>(Note 2)</sup>     | I <sub>S</sub>      |                                                                                            | -    | -    | -3.3 | A    |

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production



## Typical Electrical and Thermal Characteristics

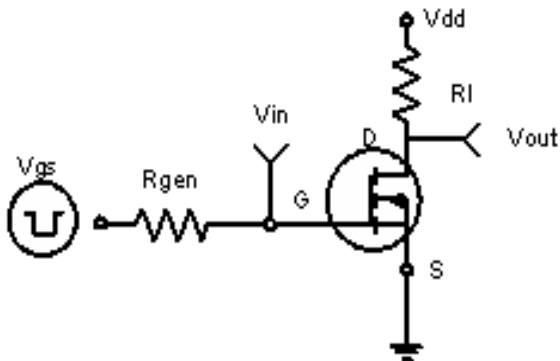


Figure 1: Switching Test Circuit

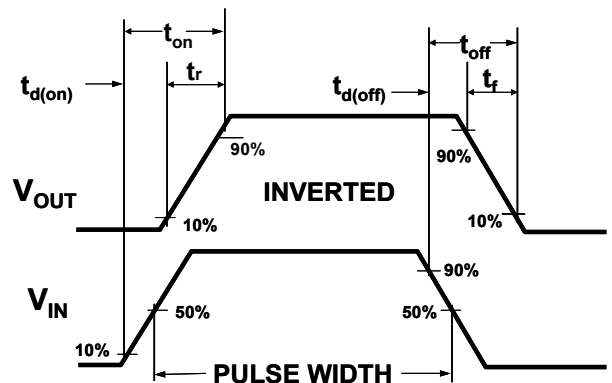


Figure 2: Switching Waveforms

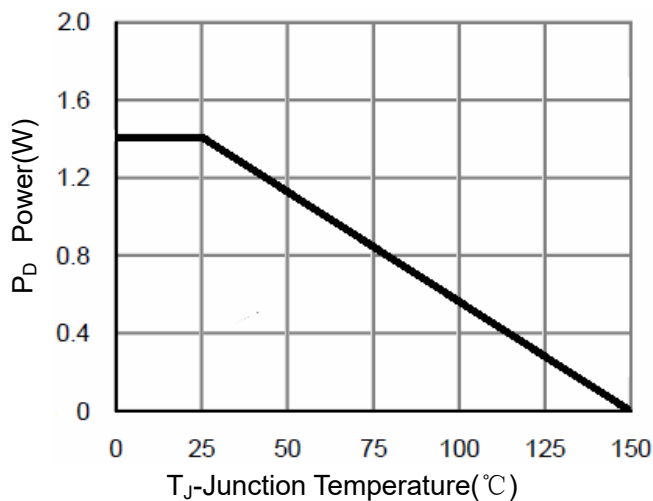


Figure 3 Power Dissipation

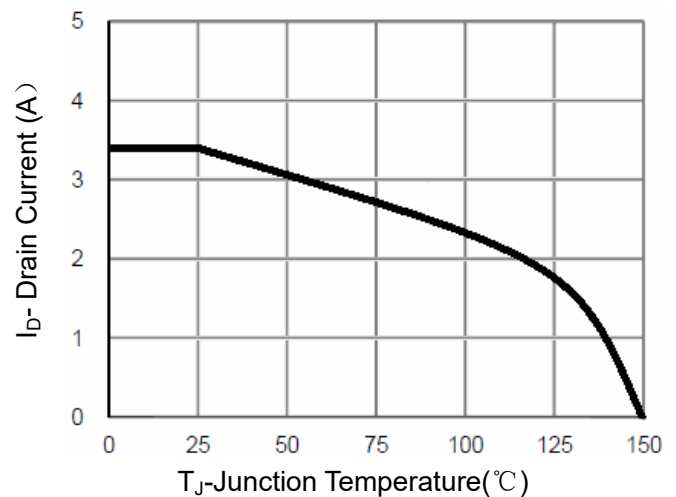


Figure 4 Drain Current

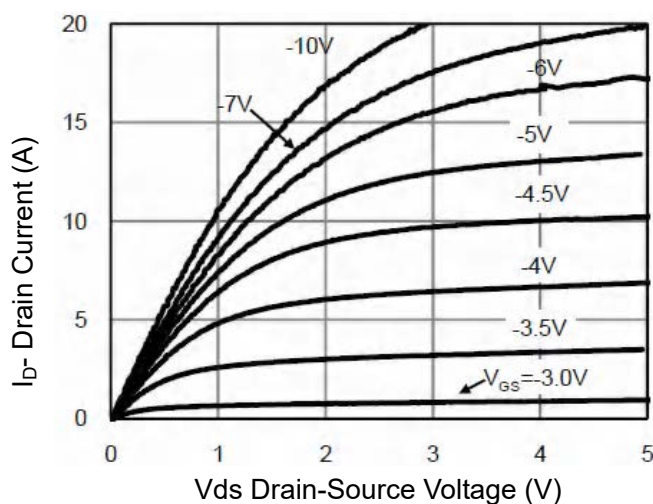


Figure 5 Output Characteristics

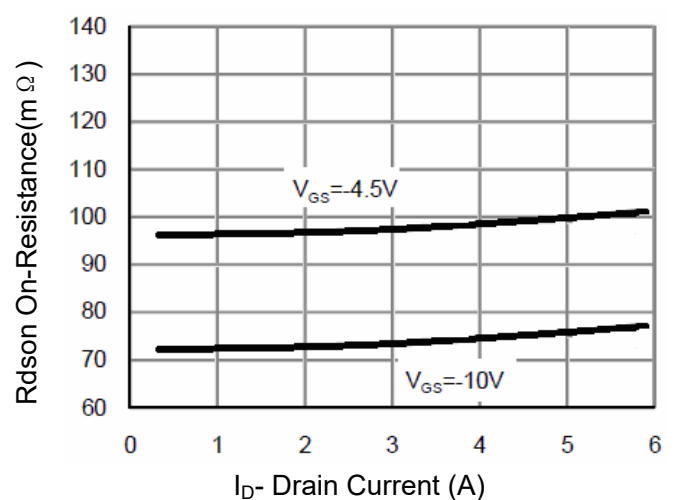


Figure 6 Drain-Source On-Resistance

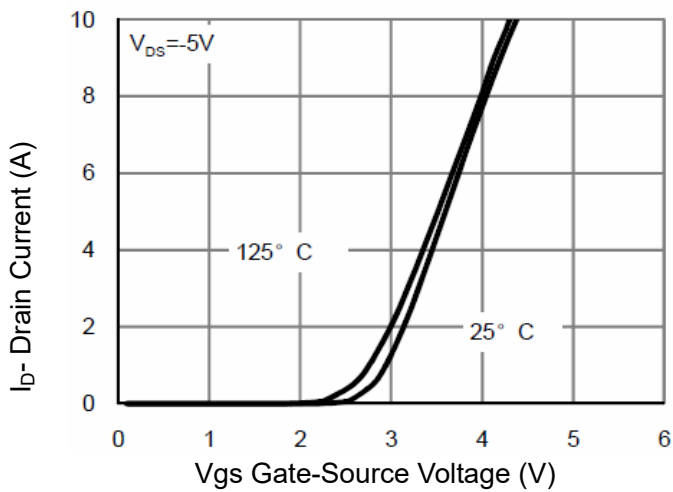


Figure 7 Transfer Characteristics

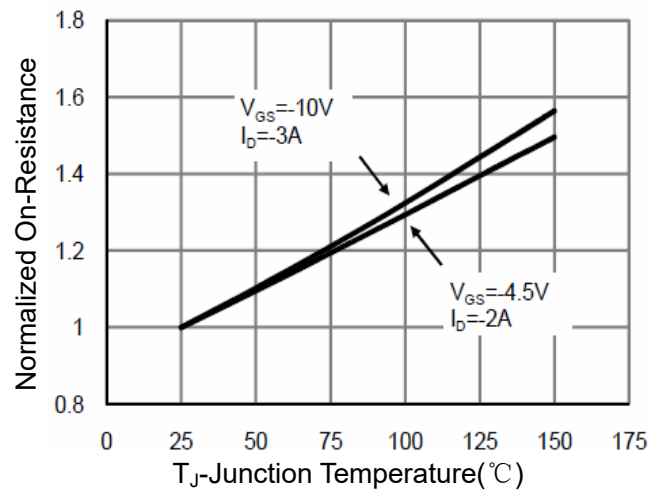


Figure 8 Drain-Source On-Resistance

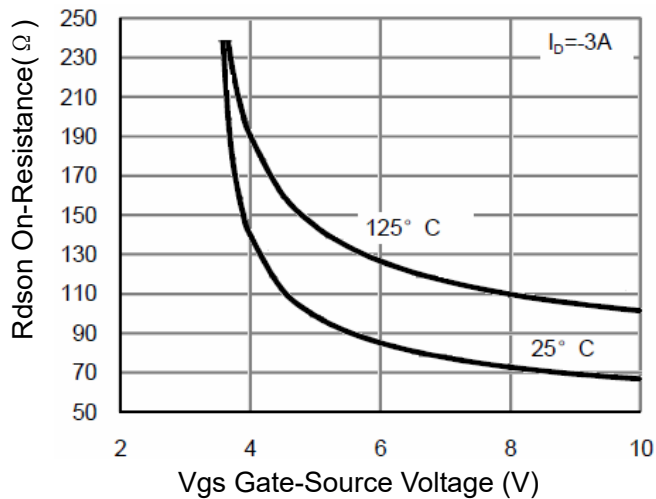


Figure 9 Rdson vs Vgs

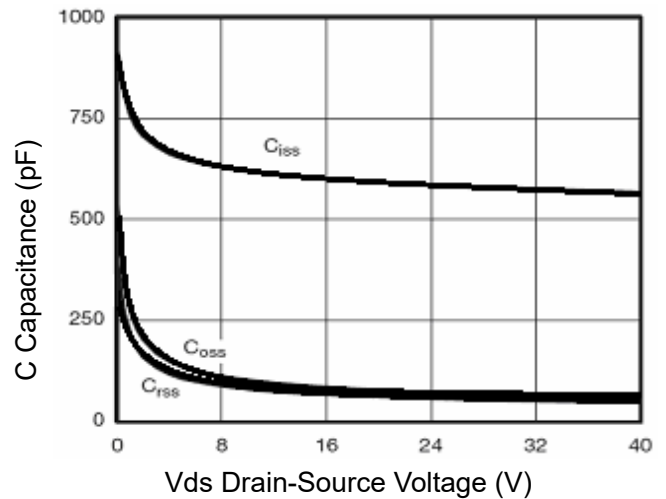


Figure 10 Capacitance vs Vds

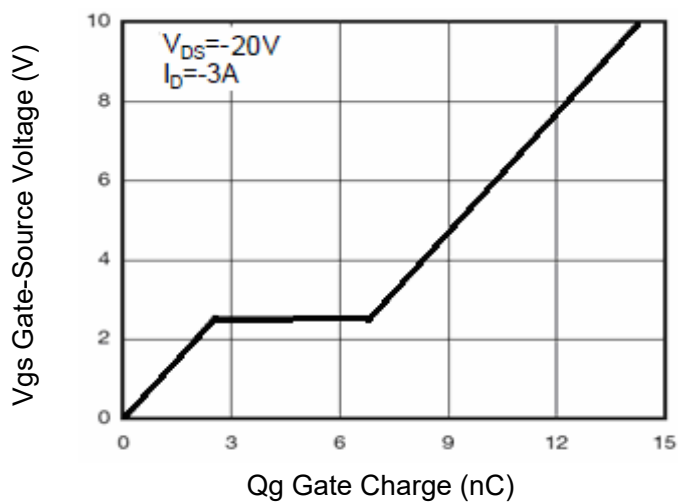


Figure 11 Gate Charge

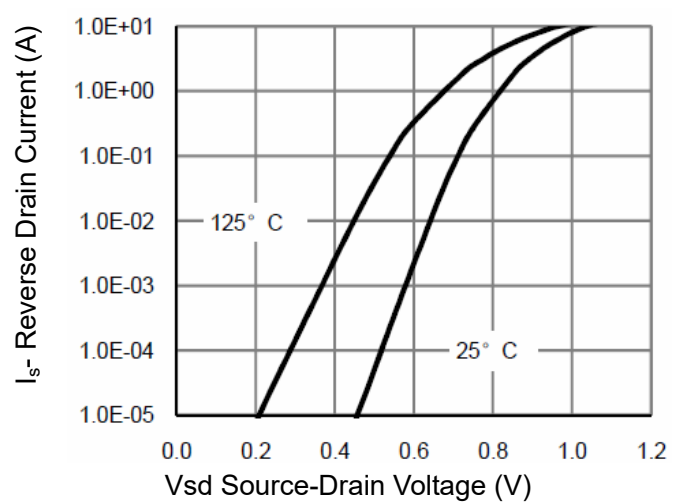


Figure 12 Source- Drain Diode Forward

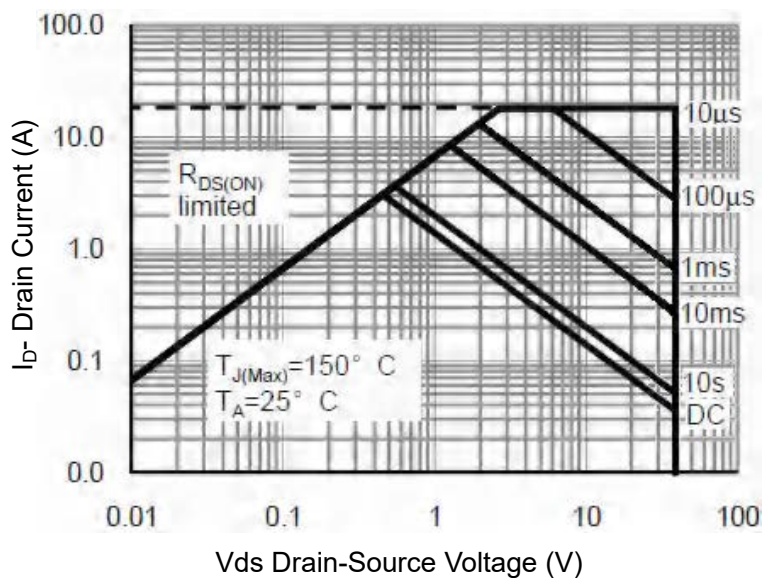


Figure 13 Safe Operation Area

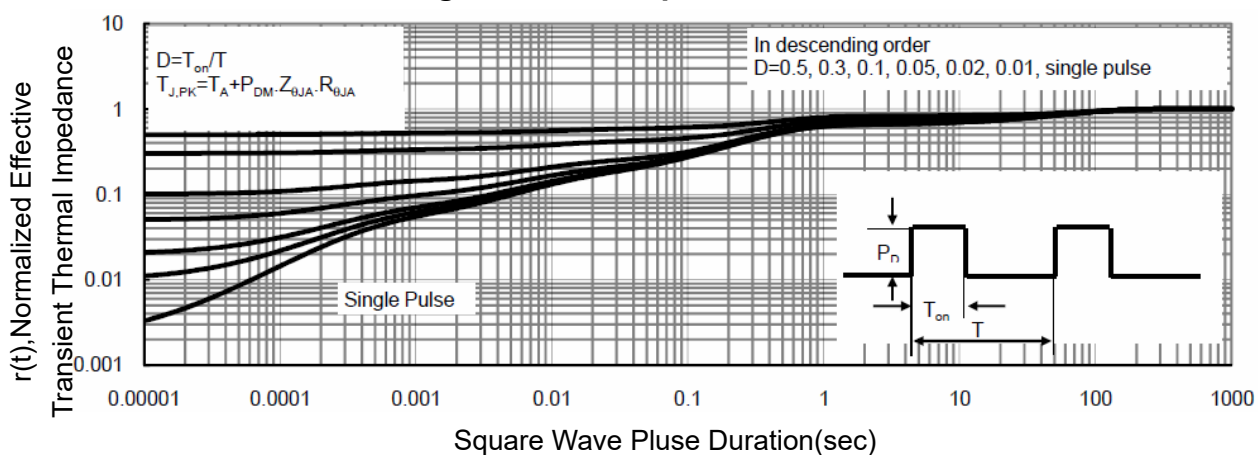
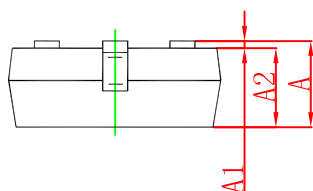
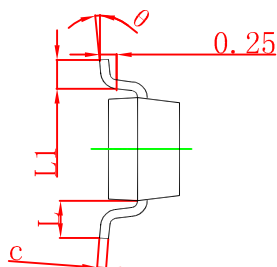
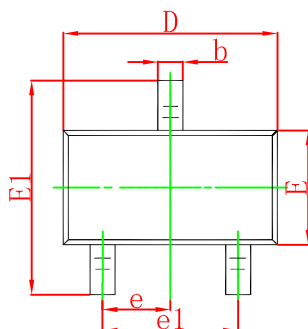


Figure 14 Normalized Maximum Transient Thermal Impedance

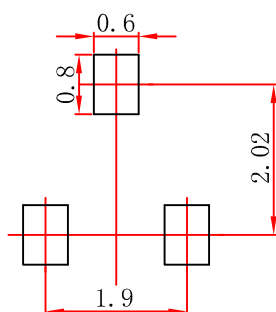


## SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF                 |       | 0.022 REF            |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-23 Suggested Pad Layout



### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.



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