

SuperMOS – SOT-323 20V BV_{DSS} , 220m Ω $R_{DS(ON)}$, N-channel MOSFET

1. Description

The SI3134KW-TP-ES is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product SI3134KW-TP-ES is Pb-free.

2. Features

- 20V, $R_{DS(ON)}=220m\Omega(Typ.) @ V_{GS}=4.5V$
- $R_{DS(ON)}=290m\Omega(Typ.) @V_{GS}=2.5V$
- $R_{DS(ON)}=420m\Omega(Typ.) @V_{GS}=1.8V$
- Use trench MOSFET technology
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

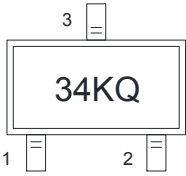
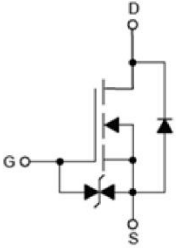
3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

4. Ordering Information

| Part Number | Package | Marking | Material | Packing | Quantity per reel | Flammability Rating | Reel Size |
|----------------|---------|---------|--------------|-------------|-------------------|---------------------|-----------|
| SI3134KW-TP-ES | SOT-323 | 34KQ | Halogen free | Tape & Reel | 3,000 PCS | UL 94V-0 | 7 inches |

5. Pin Configuration and Functions

| Pin | Function | Outline | Circuit Diagram |
|-----|----------|---|---|
| 1 | Gate |  |  |
| 2 | Source | | |
| 3 | Drain | | |

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

| Parameter | Symbol | Limit | Unit |
|--------------------------------|------------|------------------------|------------------|
| Drain-Source Voltage | BV_{DSS} | 20 | V |
| Gate-Source Voltage | V_{GS} | ± 12 | V |
| Continuous Drain Current | I_D | $T_A=25^\circ\text{C}$ | 0.88 |
| | | $T_A=75^\circ\text{C}$ | 0.68 |
| Maximum Power Dissipation | P_D | 0.35 | W |
| Pulsed Drain Current | I_{DM} | 3.52 | A |
| Operating Junction Temperature | T_J | 150 | $^\circ\text{C}$ |
| Lead Temperature | T_L | 260 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -55 to 150 | $^\circ\text{C}$ |

Thermal resistance ratings

| Single Operation | | | | | |
|--|---------------------|-----------------|---------|---------|--------------------|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Junction-to-Ambient Thermal Resistance | $t \leq 10\text{s}$ | $R_{\theta JA}$ | | 357 | $^\circ\text{C/W}$ |

Electrical Characteristics

At TA = 25°C unless otherwise specified

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|--|--------------|--|------|------|----------|------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-to-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 20 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=20V, V_{GS}=0V$ | | | 1 | μA |
| Gate-to-source Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 10V$ | | | ± 10 | μA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 0.35 | 0.75 | 1.1 | V |
| Drain-to-source On-resistance | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=0.5A$ | | 220 | 300 | m Ω |
| | | $V_{GS}=2.5V, I_D=0.4A$ | | 290 | 400 | |
| | | $V_{GS}=1.8V, I_D=0.2A$ | | 420 | 700 | |
| CHARGES, CAPACITANCES AND GATE RESISTANCE | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS}=0V, f=1MHz,$ $V_{DS}=10V$ | | 33 | | pF |
| Output Capacitance | C_{OSS} | | | 20 | | |
| Reverse Transfer Capacitance | C_{RSS} | | | 10 | | |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS}=4.5V, V_{DS}=10V,$ $I_D=0.5A$ | | 0.8 | | nC |
| Gate-to-Source Charge | Q_{GS} | | | 0.3 | | |
| Gate-to-Drain Charge | Q_{GD} | | | 0.15 | | |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | $t_{d(ON)}$ | $V_{GS}=4.5V, V_{DS}=10V,$ $I_D=0.5A, R_G=10\Omega$ | | 4 | | ns |
| Rise Time | t_r | | | 18.8 | | |
| Turn-Off Delay Time | $t_{d(OFF)}$ | | | 10 | | |
| Fall Time | t_f | | | 23 | | |
| BODY DIODE CHARACTERISTICS | | | | | | |
| Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=0.5A$ | | | 1.2 | V |

7. Typical Characteristic

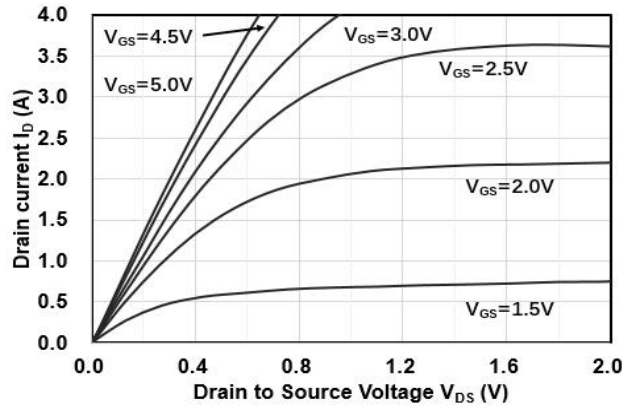
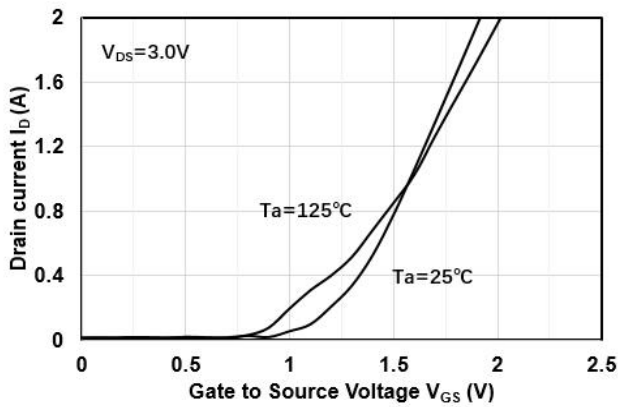


Figure1. Output Characteristics

Figure2.



Transfer Characteristics

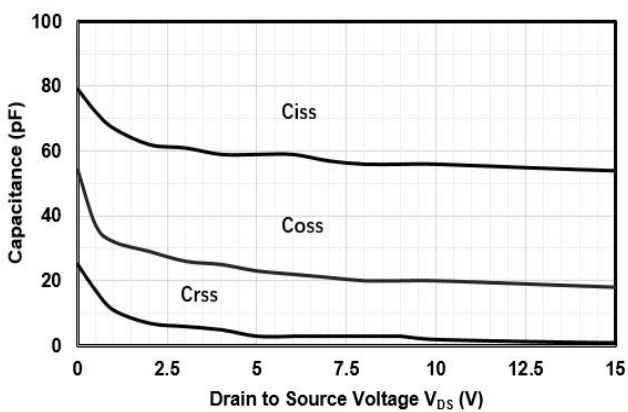


Figure3. Capacitance Characteristics

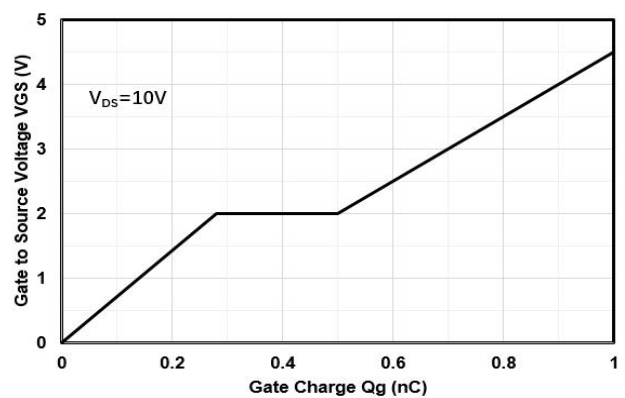


Figure4. Gate Charge

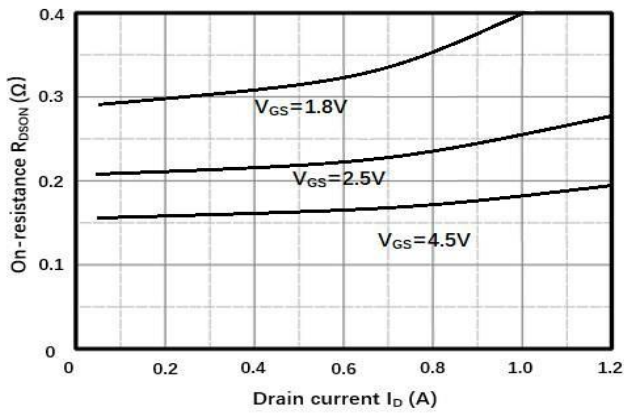


Figure5. Drain-Source on Resistance

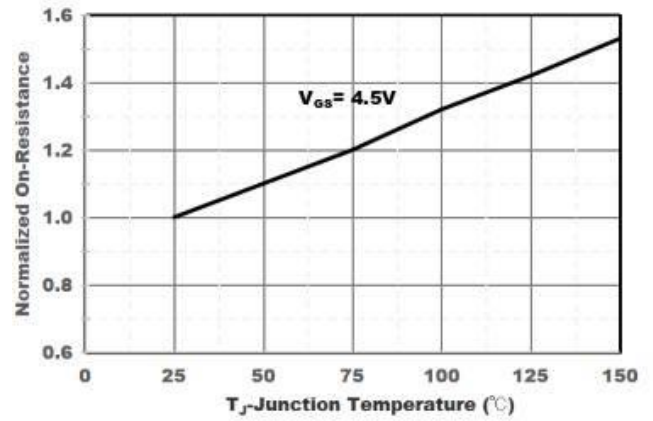


Figure6. Drain-Source on Resistance

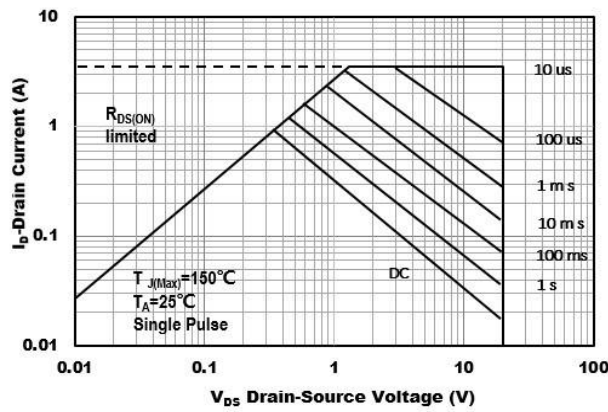
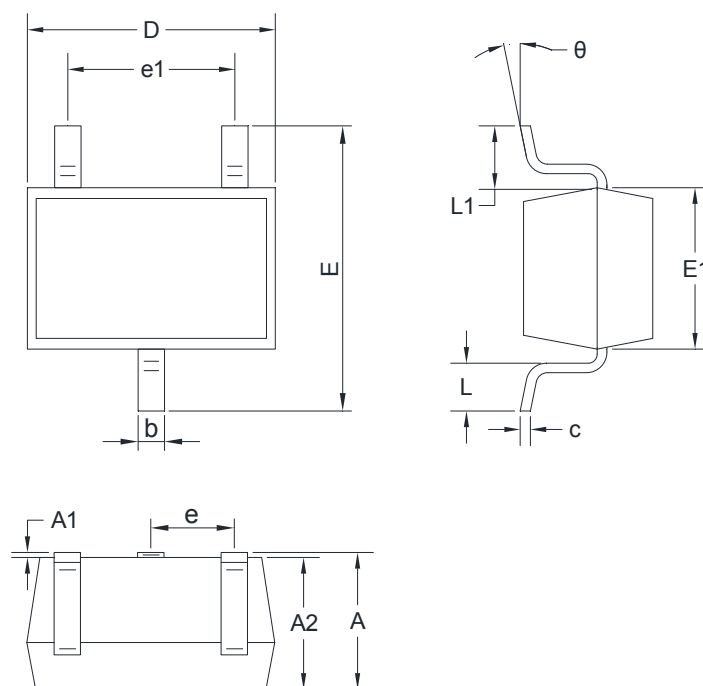


Figure7. Safe Operation Area

8. Dimension (SOT-323)



| Symbol | Millimeters | | Symbol | Millimeters | |
|--------|-------------|------|--------|-------------|------|
| | Min | Max | | Min | Max |
| A | 0.90 | 1.10 | E1 | 1.15 | 1.35 |
| A1 | 0.00 | 0.10 | e | 0.65 TYP | |
| A2 | 0.90 | 1.00 | e1 | 1.20 | 1.40 |
| b | 0.20 | 0.40 | L | 0.26 | 0.46 |
| c | 0.08 | 0.15 | L1 | 0.525 REF | |
| D | 2.00 | 2.20 | theta | 0° | 8° |
| E | 2.15 | 2.45 | | | |

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