# Conversion to Copper (Cu) Wire – SQ2315ES

**For further information, please contact your regional Vishay office.**

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**Description of Change:** The affected part number listed in this notification will be converted to a Copper wire material set. The new ordering code is SQ2315ES-T1_GE3 which has Identical silicon technology and silicon die design as SQ2315CES. Small changes to the data sheet AC parameters are a consequence of lot to lot variation and/or updated characterization methods (reference: SQ2315CES Doc # 62255 Rev. A). Device performance in the application will not be impacted. There will be no change to the wafer fab location.

**Reason for Change:** Standardization of materials

**Expected Influence on Quality/Reliability/Performance:** None

**Part Numbers/Series/Families Affected:** SQ2315ES-T1_GE3

**Vishay Brand(S):** Vishay Siliconix

**Time Schedule:**

Last Time Buy Date: Friday August 15, 2025

Last Time Ship Date: Saturday February 14, 2026

**Sample Availability:** Qualified samples of replacement product are available on request.

**Product Identification:** SQ2315CES-T1_GE3

**Qualification Data:** AEC Q101 qualification data of replacement product is available. Qualification PPAP is available on request.

**This PTN is considered approved, without further notification, unless we receive specific customer concerns before Friday August 15, 2025 or as specified by contract.**

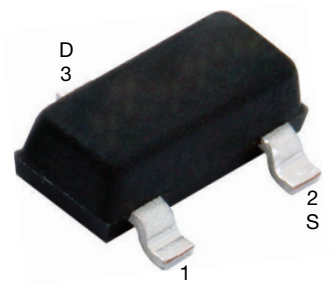
**Issued By:** Lance Gurrola, automostechsupport@vishay.com

# SQ2315CES

Vishay Siliconix

# Automotive P-Channel 12 V (D-S) 175 °C MOSFET

**SOT-23 (TO-236)**




Top View

**Marking Code**: 9T

## FEATURES

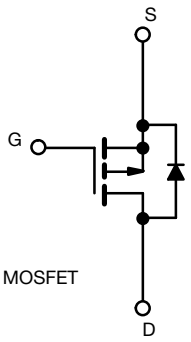
- TrenchFET® power MOSFET
- AEC-Q101 qualified
- 100 % $R_g$ and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

RoHS COMPLIANT

HALOGEN FREE




P-Channel MOSFET

| PRODUCT SUMMARY | |
|---|---|
| $V_{DS}$ (V) | -12 |
| $R_{DS(on)}$ (Ω) at $V_{GS}$ = -4.5 V | 0.050 |
| $R_{DS(on)}$ (Ω) at $V_{GS}$ = -2.5 V | 0.068 |
| $R_{DS(on)}$ (Ω) at $V_{GS}$ = -1.8 V | 0.100 |
| $I_D$ (A) | -5 |
| Configuration | Single |

| ORDERING INFORMATION | |
|---|---|
| Package | SOT-23 |
| Lead (Pb)-free and halogen-free | SQ2315CES (for detailed order number please see www.vishay.com/doc?79771) |

**ABSOLUTE MAXIMUM RATINGS** ($T_C$ = 25 °C, unless otherwise noted)

| PARAMETER | | SYMBOL | LIMIT | UNIT |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DS}$ | -12 | V |
| Gate-source voltage | | $V_{GS}$ | ± 8 | |
| Continuous drain durrent | $T_C$ = 25 °C | $I_D$ | -5 | A |
| | $T_C$ = 125 °C | | -3 | |
| Continuous source current (diode conduction) | | $I_S$ | -2.5 | |
| Pulsed drain current [a] | | $I_{DM}$ | -20 | |
| Single pulse avalanche current | L = 0.1 mH | $I_{AS}$ | -11 | |
| Single pulse avalanche energy | | $E_{AS}$ | 6 | mJ |
| Maximum power dissipation | $T_C$ = 25 °C | $P_D$ | 2 | W |
| | $T_C$ = 125 °C | | 0.67 | |
| Operating junction and storage temperature range | | $T_J$, $T_{stg}$ | -55 to +175 | °C |

**THERMAL RESISTANCE RATINGS**

| PARAMETER | | SYMBOL | LIMIT | UNIT |
|---|---|---|---|---|
| Junction-to-ambient | PCB mount [b] | $R_{thJA}$ | 175 | °C/W |
| Junction-to-foot (drain) | | $R_{thJF}$ | 75 | |

**Notes**

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %

b. When mounted on 1" square PCB (FR4 material)

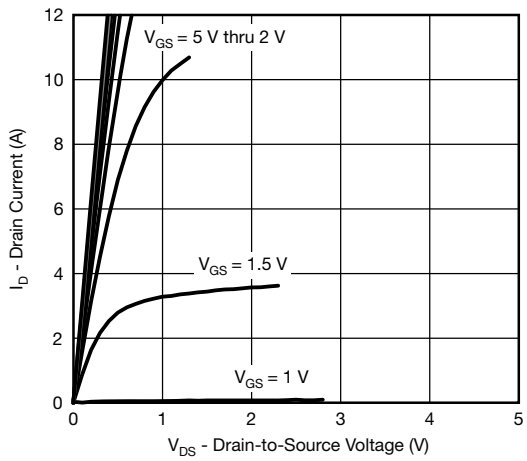
| **SPECIFICATIONS** ($T_C$ = 25 °C, unless otherwise noted) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TEST CONDITIONS** | | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| **Static** | | | | | | | |
| Drain-source breakdown voltage | $V_{DS}$ | $V_{GS}$ = 0 V, $I_D$ = -250 µA | | -12 | - | - | V |
| Gate-source threshold voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = -250 µA | | -0.45 | - | -1 | |
| Gate-source leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ± 8 V | | - | - | ± 100 | nA |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{GS}$ = 0 V | $V_{DS}$ = -12 V | - | - | -1 | µA |
| | | $V_{GS}$ = 0 V | $V_{DS}$ = -12 V, $T_J$ = 125 °C | - | - | -50 | |
| | | $V_{GS}$ = 0 V | $V_{DS}$ = -12 V, $T_J$ = 175 °C | - | - | -150 | |
| On-state drain current [a] | $I_{D(on)}$ | $V_{GS}$ = -4.5 V | $V_{DS}$ ≤ -5 V | -10 | - | - | A |
| Drain-source on-state resistance [a] | $R_{DS(on)}$ | $V_{GS}$ = -4.5 V | $I_D$ = -3.5 A | - | 0.042 | 0.050 | Ω |
| | | $V_{GS}$ = -4.5 V | $I_D$ = -3.5 A, $T_J$ = 125 °C | - | - | 0.066 | |
| | | $V_{GS}$ = -4.5 V | $I_D$ = -3.5 A, $T_J$ = 175 °C | - | - | 0.075 | |
| | | $V_{GS}$ = -2.5 V | $I_D$ = -3 A | - | 0.059 | 0.068 | |
| | | $V_{GS}$ = -1.8 V | $I_D$ = -2 A | - | 0.084 | 0.100 | |
| Forward transconductance [b] | $g_{fs}$ | $V_{DS}$ = -5 V, $I_D$ = -1.6 A | | - | 7 | - | S |
| **Dynamic [b]** | | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{GS}$ = 0 V | $V_{DS}$ = -6 V, f = 1 MHz | - | 704 | 870 | pF |
| Output capacitance | $C_{oss}$ | | | - | 276 | 335 | |
| Reverse transfer capacitance | $C_{rss}$ | | | - | 215 | 240 | |
| Total gate charge [c] | $Q_g$ | $V_{GS}$ = -4.5 V | $V_{DS}$ = -6 V, $I_D$ = -3.85 A | - | 9.3 | 13 | nC |
| Gate-source charge [c] | $Q_{gs}$ | | | - | 1.4 | - | |
| Gate-drain charge [c] | $Q_{gd}$ | | | - | 3.0 | - | |
| Gate resistance | $R_g$ | f = 1 MHz | | 2.4 | 4.9 | 12.3 | Ω |
| Turn-on delay time [c] | $t_{d(on)}$ | $V_{DD}$ = -6 V, $R_L$ = 1.6 Ω<br>$I_D$ ≅ -3.85 A, $V_{GEN}$ = -4.5 V, $R_g$ = 1 Ω | | - | 11 | 26 | ns |
| Rise time [c] | $t_r$ | | | - | 27 | 30 | |
| Turn-off delay time [c] | $t_{d(off)}$ | | | - | 24 | 42 | |
| Fall time [c] | $t_f$ | | | - | 14 | 20 | |
| **Source-Drain Diode Ratings and Characteristics [b]** | | | | | | | |
| Pulsed current [a] | $I_{SM}$ | | | - | - | -20 | A |
| Forward voltage | $V_{SD}$ | $I_F$ = -2 A, $V_{GS}$ = 0 V | | - | -0.8 | -1.2 | V |
| Body diode reverse recovery time | $t_{rr}$ | $I_F$ = -1.2 A, di/dit = 100 A/µs | | - | 22 | 44 | ns |
| Body diode reverse recovery charge | $Q_{rr}$ | | | - | 9 | 18 | nC |
| Reverse recovery fall time | $t_a$ | | | - | 10 | - | ns |
| Reverse recovery rise time | $t_b$ | | | - | 12 | - | |
| Body diode peak reverse recovery current | $I_{RM(REC)}$ | | | - | -0.674 | - | A |

**Notes**

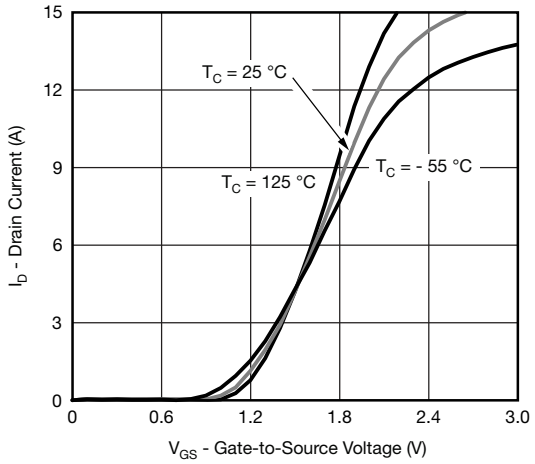
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing
c. Independent of operating temperature

*Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.*

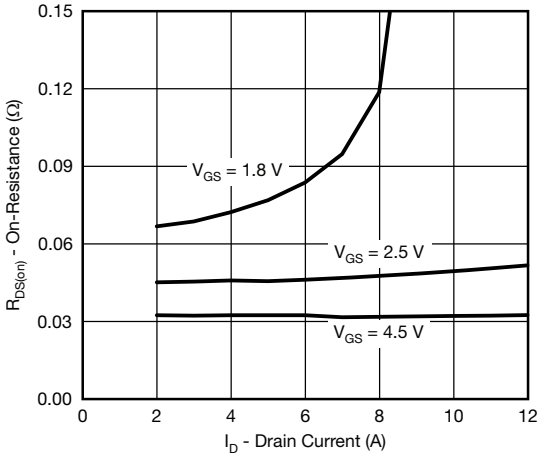
## TYPICAL CHARACTERISTICS ($T_A$ = 25 °C, unless otherwise noted)



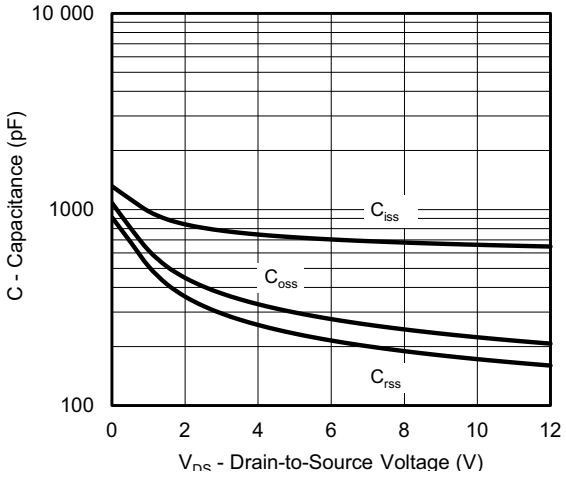

**Output Characteristics**



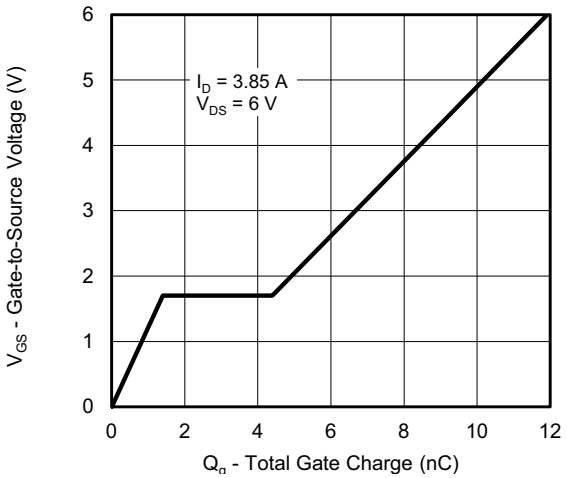

**Transfer Characteristics**



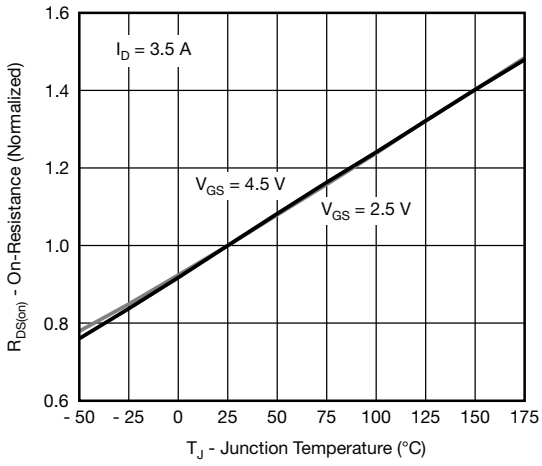

**On-Resistance vs. Drain Current**




**Capacitance**

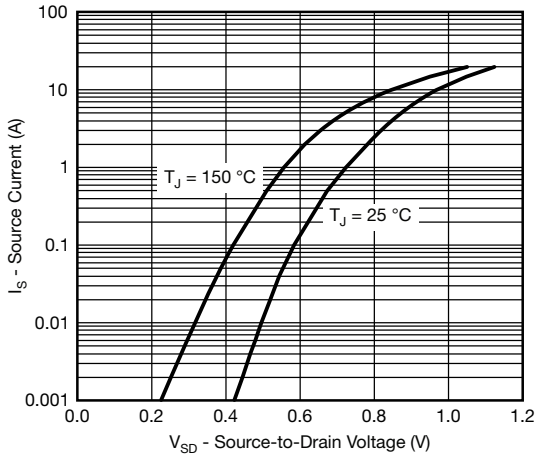



**Gate Charge**

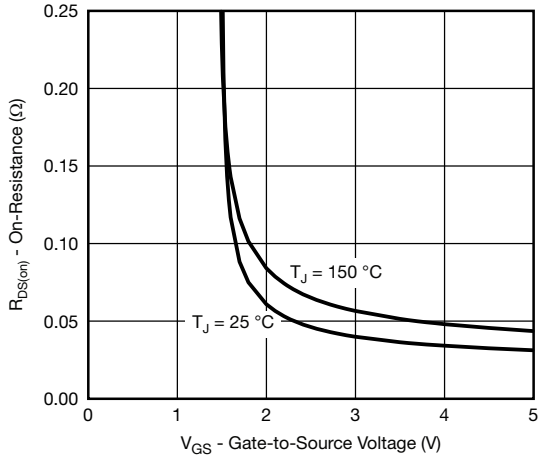



**On-Resistance vs. Junction Temperature**

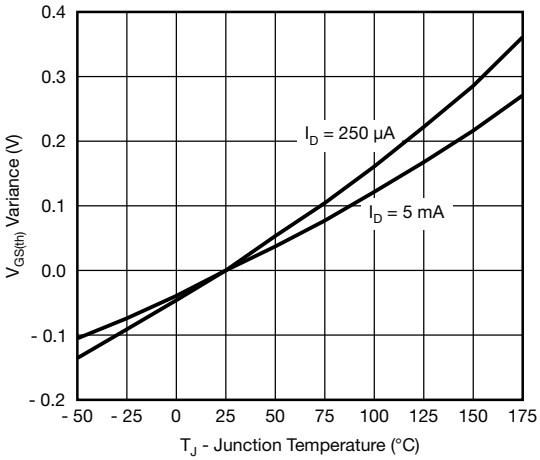
## TYPICAL CHARACTERISTICS ($T_A$ = 25 °C, unless otherwise noted)



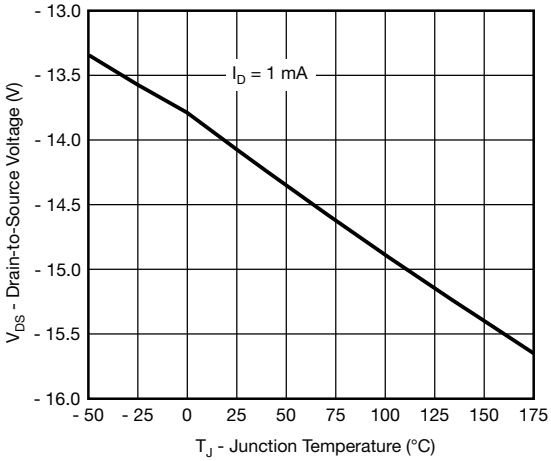

**Source-Drain Diode Forward Voltage**



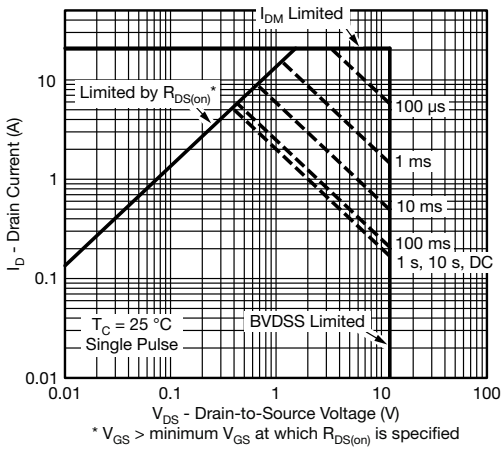

**On-Resistance vs. Gate-to-Source Voltage**




**Threshold Voltage**

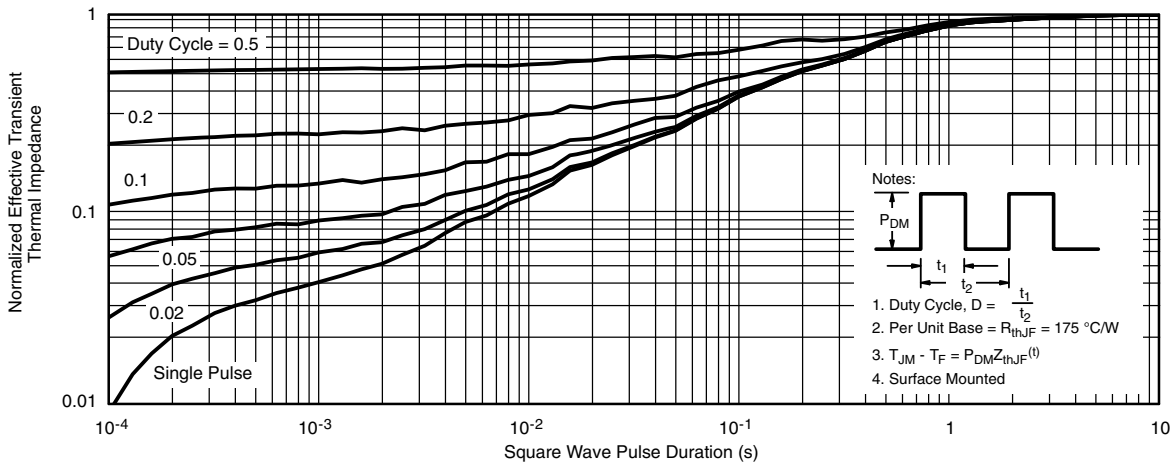



**Drain Source Breakdown vs. Junction Temperature**

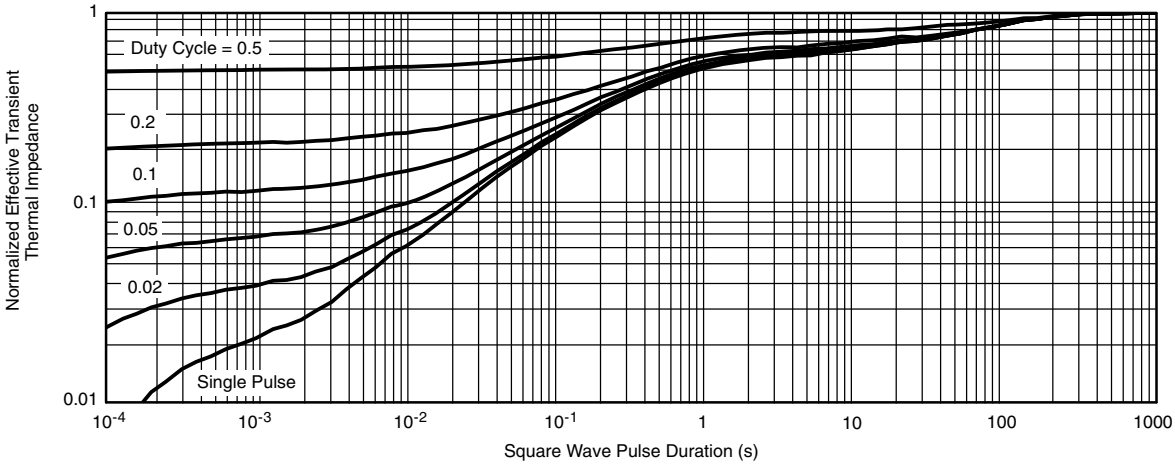



**Safe Operating Area**

**THERMAL RATINGS** ($T_A$ = 25 °C, unless otherwise noted)




**Normalized Thermal Transient Impedance, Junction-to-Foot**




**Normalized Thermal Transient Impedance, Junction-to-Ambient**

**Note**

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction-to-Case (25 °C)

  are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions

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