Conversion to Copper (Cu) Wire – SQ3456BEV

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 SQ3456CEV-T1_GE3, which has the exact same product performance and fit as SQ3456BEV. There will be no change to the wafer fab or assembly location. There will be no changes to the parameters on the datasheet (reference: SQ3456CEV Doc # 62060 Rev.B).

Classification of Change: Standardization of materials

Expected Influence on Quality/Reliability/Performance: None

Part Numbers/Series/Families Affected: SQ3456BEV-T1_GE3

Vishay Brand(S): Vishay Siliconix

Time Schedule:

Last Time Buy Date: Wed Dec 20, 2023

Last Time Ship Date: Sun Jun 16, 2024

Sample Availability: Samples available on request

Product Identification: SQ3456CEV-T1_GE3

Qualification Data: Qualification data available on request

This PTN is considered approved, without further notification, unless we receive specific customer concerns before Sun Dec 17, 2023 or as specified by contract.

Issued By: Vishay Siliconix, business-americas@vishay.com

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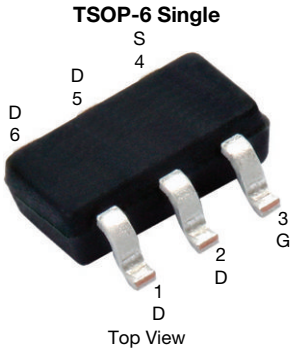
Automotive N-Channel 30 V (D-S) 175 °C MOSFET



Marking Code: 9Gxxx

FEATURES

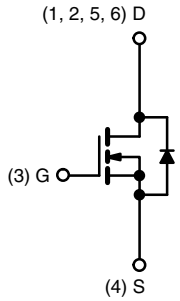
- TrenchFET® power MOSFET
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

RoHS COMPLIANT

HALOGEN FREE



N-Channel MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	30
$R_{DS(on)}$ (Ω) at V_{GS} = 10 V	0.035
$R_{DS(on)}$ (Ω) at V_{GS} = 4.5 V	0.052
I_D (A)	7.8
Configuration	Single

ORDERING INFORMATION	
Package	TSOP-6
Lead (Pb)-free and halogen-free	SQ3456CEV (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}	30	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current	T_C = 25 °C	I_D	7.8	A
	T_C = 125 °C		4.5	
Continuous source current (diode conduction)		I_S	5	
Pulsed drain current [a]		I_{DM}	31	
Single pulse avalanche current	L = 0.1 mH	I_{AS}	10	
Single pulse avalanche energy		E_{AS}	5	mJ
Maximum power dissipation	T_C = 25 °C	P_D	4	W
	T_C = 125 °C		1.3	
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}	110	°C/W
Junction to foot (drain)		R_{thJF}	38	

Notes

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

b. When mounted on 1" square PCB (FR-4 material)

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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		30	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA		1.5	2.0	2.5	
Gate-source leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V		-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	V_{GS} = 0 V	V_{DS} = 30 V	-	-	1	µA
		V_{GS} = 0 V	V_{DS} = 30 V, T_J = 125 °C	-	-	50	
		V_{GS} = 0 V	V_{DS} = 30 V, T_J = 175 °C	-	-	150	
On-state drain current [a]	$I_{D(on)}$	V_{GS} = 10 V	V_{DS} ≥ 5 V	10	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 6 A	-	0.028	0.035	Ω
		V_{GS} = 4.5 V	I_D = 4.9 A	-	0.036	0.052	
		V_{GS} = 10 V	I_D = 6 A, T_J = 125 °C	-	-	0.054	
		V_{GS} = 10 V	I_D = 6 A, T_J = 175 °C	-	-	0.064	
Forward transconductance [b]	g_{fs}	V_{DS} = 15 V, I_D = 5 A		-	21	-	S
Dynamic [b]							
Input capacitance	C_{iss}	V_{GS} = 0 V	V_{DS} = 15 V, f = 1 MHz	-	295	370	pF
Output capacitance	C_{oss}			-	73	85	
Reverse transfer capacitance	C_{rss}			-	25	35	
Total gate charge [c]	Q_g	V_{GS} = 10 V	V_{DS} = 15 V, I_D = 6 A	-	6	10	nC
Gate-source charge [c]	Q_{gs}			-	1.2	-	
Gate-drain charge [c]	Q_{gd}			-	1	-	
Gate resistance	R_g	f = 1 MHz		3.0	6.65	11	Ω
Turn-on delay time [c]	$t_{d(on)}$	V_{DD} = 15 V, R_L = 2.5 Ω I_D ≅ 6 A, V_{GEN} = 10 V, R_g = 1 Ω		-	6	9	ns
Rise time [c]	t_r			-	12	18	
Turn-off delay time [c]	$t_{d(off)}$			-	13	20	
Fall time [c]	t_f			-	8	12	
Source-Drain Diode Ratings and Characteristics [b]							
Pulsed current [a]	I_{SM}			-	-	31	A
Forward voltage	V_{SD}	I_F = 3 A, V_{GS} = 0 V		-	0.8	1.1	V
Body diode reverse recovery time	t_{rr}	I_F = 5 A, di/dt = 100 A/µs		-	10	20	ns
Body diode reverse recovery charge	Q_{rr}			-	5	10	nC
Reverse recovery fall time	t_a			-	7	-	ns
Reverse recovery rise time	t_b			-	3	-	
Body diode peak reverse recovery current	$I_{RM(REC)}$			-	-0.88	-	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.

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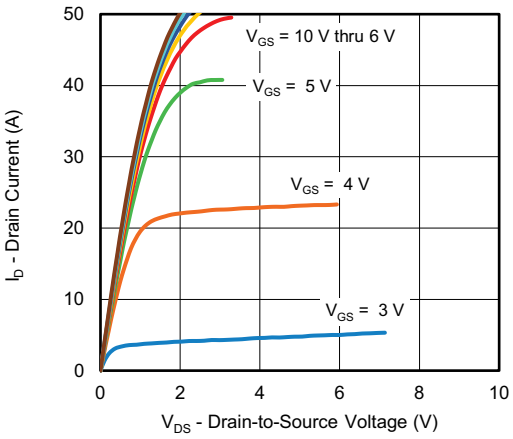
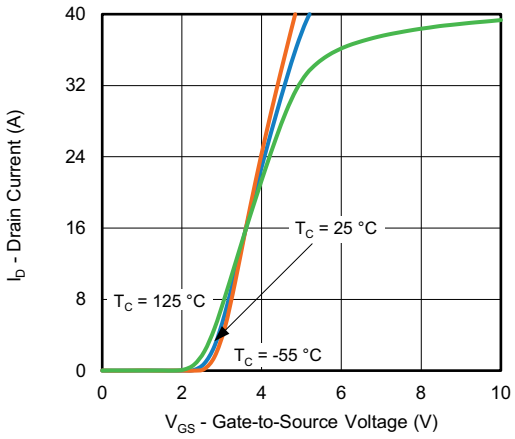
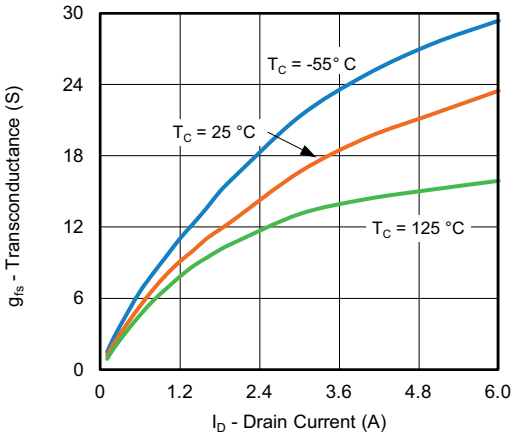
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



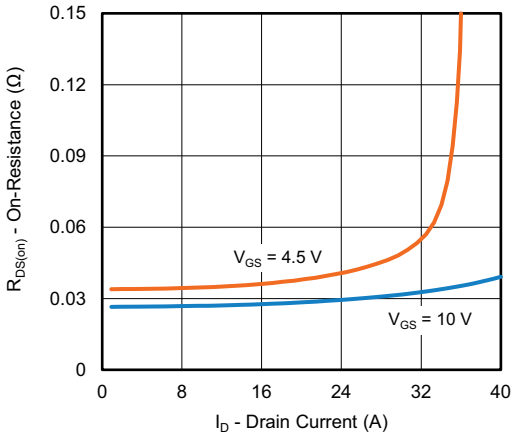
Output Characteristics



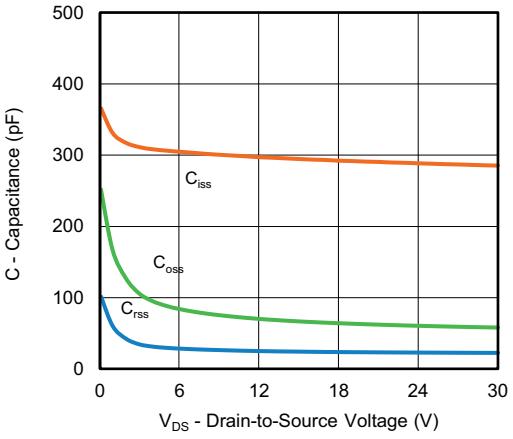
Transfer Characteristics



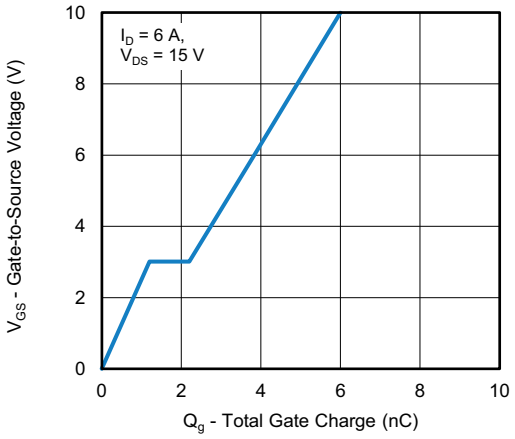
Transconductance



On-Resistance vs. Drain Current



Capacitance



Gate Charge

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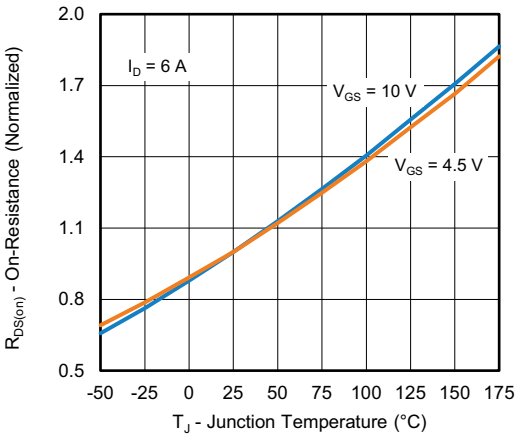
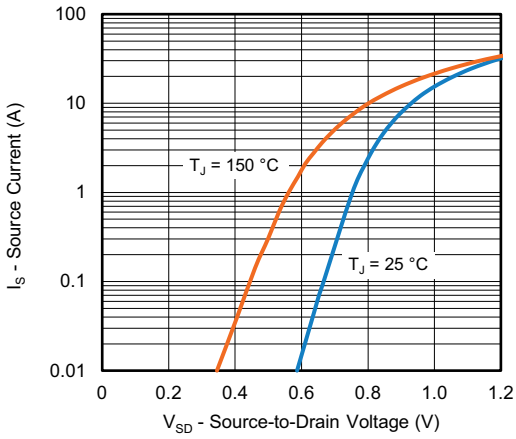
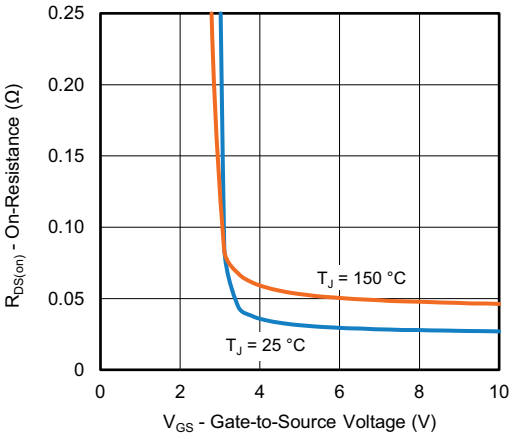


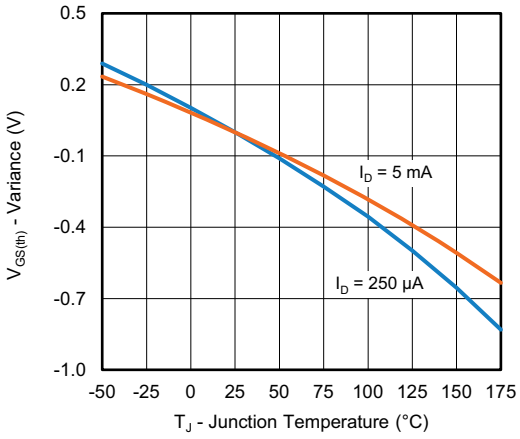
On-Resistance vs. Junction Temperature



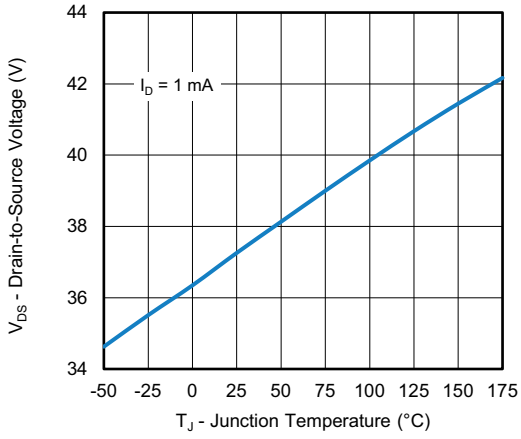
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Drain Source Breakdown vs. Junction Temperature

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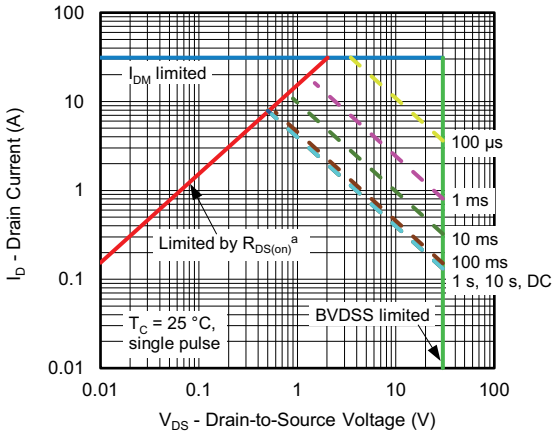
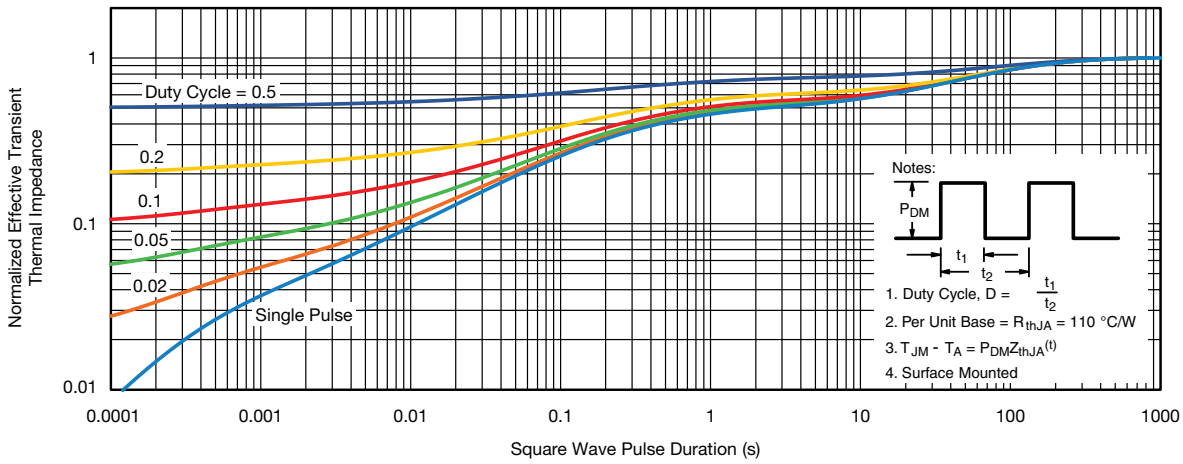


Safe Operating Area

Note

a. V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified



Normalized Thermal Transient Impedance, Junction-to-Ambient

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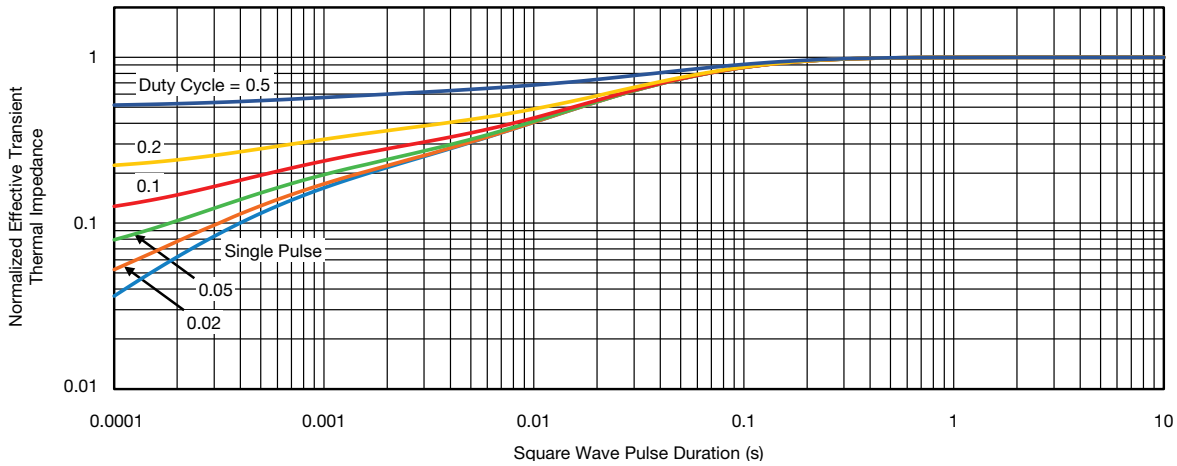

Normalized Thermal Transient Impedance, Junction-to-Foot

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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