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# Product Termination Notification



Product Group: SIL/Wed Mar 1, 2023/PTN-SIL-011-2023-REV-0

## Conversion to Copper (Cu) Wire – SQS405EN-T1\_GE3

For further information, please contact your regional Vishay office.

### CONTACT INFORMATION

#### Americas

Vishay Siliconix  
2565 Junction Ave  
-  
San Jose CA United States 95134  
Phone: 4089705799  
Fax: 4089705799  
business-america@vishay.com

#### Europe

Vishay Electronic GmbH  
Dr.-Felix-Zandman-Platz 1  
-  
Selb Germany 95100  
Phone: 49-9287-71 0  
Fax: 49-9287-70435  
business-europe@vishay.com

#### Asia

Vishay Intertechnology Asia Pte. Ltd  
37A Tampines Street 92 #07-01  
-  
Singapore Singapore 528886  
Phone: 65 6788 6668  
Fax: 65 6788 0988  
business-asia@vishay.com

**Description of Change:** The affected part number listed in this notification will be converted to a Copper wire material set. The SQS405CENW-T1\_GE3 replaces the SQS405EN-T1\_GE3 and offers a long-term solution that is compatible with our latest package assembly methods. This silicon die uses exactly the same technology, process and "in-house" wafer fabrication facility as the existing parts. Any minor specification changes, (documented in the comparison sheets provided), reflect small lot to lot variations and improvements that have occurred over time since the original parts were released more than ten years ago. No final test limits have been changed apart from the avalanche test. In this case we have adopted new consistency rules whereby we test at or below the maximum rated current for the device which is -16A. Previously this test was performed at -19A in violation of the maximum rated current.

**Classification of Change:** Standardization of materials

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

**Part Numbers/Series/Families Affected:** SQS405EN-T1\_GE3

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

#### Time Schedule:

Last Time Buy Date: Mon Sep 4, 2023

Last Time Ship Date: Mon Mar 4, 2024

**Sample Availability:** Qualified samples of replacement product are available immediately

**Product Identification:** SQS405CENW-T1\_GE3

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

**This PTN is considered approved, without further notification, unless we receive specific customer concerns before Fri Sep 1, 2023 or as specified by contract.**

**Issued By:** Lance Gurrola, business-america@vishay.com

Affected Part Number				Replacement Part Number			
SQ5405EN				SQ5405ENW			
AEC Q101 Qualified				AEC Q101 Qualified			
Yes				Yes			
Package Type				Package Type			
PPAK 1212-B				PPAK 1212-8W			
Process Technology				Process Technology			
90M cells/in <sup>2</sup>				90M cells/in <sup>2</sup>			
Bondwire Material				Bondwire Material			
Gold (Au)				Copper (Cu)			
100% Rg & UIS Tested				100% Rg and UIS Tested			
Yes				Yes			
Datasheet Rev				Datasheet Rev			
D				B			

  

Absolute Maximum Ratings	Symbol	Test Conditions	Limit	Units	Type of Change	Risk
Drain-Source Voltage	VDS		-12	V	None	None
Gate-Source Voltage	VGS		±8	V	None	None
Continuous Drain Current	ID	TC = 25°C	-16	A	None	None
Continuous Drain Current	ID	TC = 125°C	-16	A	None	None
Continuous Source Current (Diode Conduction)	IS		-16	A	None	None
Pulsed Drain Current	IDM		-64	A	None	None
Single Pulse Avalanche Current	IAS	L = 0.1mH	-19	A	Reduction	None
Single Pulse Avalanche Energy	EAS	TC = 25°C	18	mJ	Reduction	None
Max Power Dissipation	PD	TC = 25°C	39	W	None	None
Max Power Dissipation	PD	TC = 125°C	13	W	None	None
Operating Junction and storage temperature range	TJ		-55 to +175	°C	None	None
Thermal Resistance J-A	RthJA	PCB Mount	81	°C/W	None	None
Thermal Resistance J-C	RthJC	PCB Mount	3.8	°C/W	None	None
Soldering recommendations (peak temperature)			260		None	None

  

Specifications Tj=25°C unless otherwise noted	Symbol	Test Conditions	MIN	TYP	MAX	Units	Type of Change	Risk	
Drain-Source Breakdown Voltage	VDS	VGS=0V, ID=250uA	-12			V	None	None	
Gate-Source Threshold Voltage	VGS(th)	VDS=VGS, ID=250uA	-0.45	-0.6	-1	V	None	None	
Gate-Source Leakage	IGSS	VDS=0V, VGS=±8V			±100	nA	None	None	
Zero Voltage Drain Current	IDSS	VGS=0V			-1	uA	None	None	
		VGS=0V	VDS=12V, Tj=125°C			-50	uA	None	None
		VGS=0V	VDS=12V, Tj=175°C			-150	uA	None	None
On-State Drain Current	ID(on)	VGS=4.5V	VDS=5V	-20		A	None	None	
		VGS=4.5V	ID=13.5A	0.014	0.020	Q	Improvement	None	
Drain-Source On-State Resistance	RDS(on)	VGS=4.5V	ID=11.5A, Tj=125°C	0.024		Q	Improvement	None	
		VGS=4.5V	ID=11.5A, Tj=175°C	0.036		Q	Improvement	None	
		VGS=2.5V	ID=12A	0.017	0.026	Q	Improvement	None	
Forward Transconductance	gfs	VDS=6V, ID=13.5A		34		S	None	None	
Input Capacitance	Ciss			2210	2650		None	None	
Output Capacitance	Coss	VGS=0V	VDS=6V, f=1MHz		815	1100	pF	None	None
Reverse Transfer Capacitance	Cris			660	850		None	None	
Total Gate Charge	Qg			49.8	75		nC	None	None
Gate-Source Charge	Qgs	VGS=8V	VDS=6V, ID=10A	3.8	5.9		nC	None	None
Gate-Drain Charge	Qgd			8.2	15			None	None
Gate Resistance	Rg	f=1MHz	1.1	2.37	4		Q	None	None
Turn-On Delay Time	td(on)			27	34.5		ns	None	None
Rise Time	tr	VDD=6V, RL=0.6Q, ID=1.5A, VGS=4.5V, Rg=1Q		29	35		ns	None	None
Turn-Off Delay Time	td(off)			59	72		ns	None	None
Fall Time	tf	VDD=6V, RL=1.5Q, ID=4A, VGS=8V, Rg=1Q		26	33		ns	None	None
Pulsed Source-Drain Current	ISM			-64		A	None	None	
Forward Voltage	VSD	If=10A VGS=0V	-0.8	-1.1		V	None	None	
Body diode reverse recovery time	trr			44	88	ns	None	None	
Body diode reverse recovery charge	Qrr			32	64	nC	None	None	
Reverse recovery fall time	ta			22		ns	None	None	
Reverse recovery rise time	tb			22		ns	None	None	
Body diode peak reverse recovery current	Irmsm			-1.2		A	None	None	

  

Specifications Tj=25°C unless otherwise noted	Symbol	Test Conditions	MIN	TYP	MAX	Units	Type of Change	Risk	
Drain-Source Breakdown Voltage	VDS	VGS=0V, ID=250uA	-12			V	None	None	
Gate-Source Threshold Voltage	VGS(th)	VDS=VGS, ID=250uA	-0.45	-0.6	-1	V	None	None	
Gate-Source Leakage	IGSS	VDS=0V, VGS=±8V			±100	nA	None	None	
Zero Voltage Drain Current	IDSS	VGS=0V			-1	uA	None	None	
		VGS=0V	VDS=12V, Tj=125°C			-50	uA	None	None
		VGS=0V	VDS=12V, Tj=175°C			-150	uA	None	None
On-State Drain Current	ID(on)	VGS=4.5V	VDS=5V	20		A	None	None	
		VGS=4.5V	ID=13.5A	0.0106	0.0150	Q	Improvement	None	
Drain-Source On-State Resistance	RDS(on)	VGS=4.5V	ID=11.5A, Tj=125°C	0.0205		Q	Improvement	None	
		VGS=4.5V	ID=11.5A, Tj=175°C	0.0319		Q	Improvement	None	
		VGS=2.5V	ID=12A	0.0166	0.0220	Q	Improvement	None	
Forward Transconductance	gfs	VDS=6V, ID=13.5A		41		S	None	None	
Input Capacitance	Ciss			2260	3050		None	None	
Output Capacitance	Coss	VGS=0V	VDS=6V, f=1MHz		815	1100	pF	None	None
Reverse Transfer Capacitance	Cris			630	850		None	None	
Total Gate Charge	Qg			53.6	81		nC	None	None
Gate-Source Charge	Qgs	VGS=8V	VDS=6V, ID=4A	4			nC	None	None
Gate-Drain Charge	Qgd			9.6				None	None
Gate Resistance	Rg	f=1MHz	1.55	3.1	4.65		Q	None	None
Turn-On Delay Time	td(on)			11	20		ns	None	None
Rise Time	tr	VDD=6V, RL=1.5Q, ID=4A, VGS=8V, Rg=1Q		6	12		ns	None	None
Turn-Off Delay Time	td(off)			58	90		ns	None	None
Fall Time	tf			26	40		ns	None	None
Pulsed Source-Drain Current	ISM			-64		A	None	None	
Forward Voltage	VSD	If=10A VGS=0V	-0.81	-1.1		V	None	None	
Body diode reverse recovery time	trr			44	88	ns	None	None	
Body diode reverse recovery charge	Qrr			32	64	nC	None	None	
Reverse recovery fall time	ta			22		ns	None	None	
Reverse recovery rise time	tb			22		ns	None	None	
Body diode peak reverse recovery current	Irmsm			-1.2		A	None	None	