

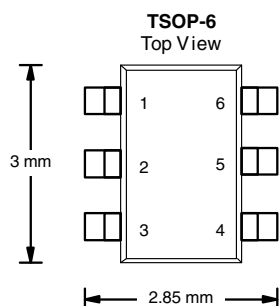
Automotive N-Channel 20 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

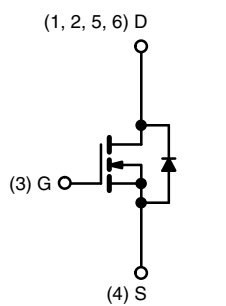
V_{DS} (V)	20
$R_{DS(on)}$ (Ω) at $V_{GS} = 4.5$ V	0.030
$R_{DS(on)}$ (Ω) at $V_{GS} = 2.5$ V	0.034
$R_{DS(on)}$ (Ω) at $V_{GS} = 1.8$ V	0.038
I_D (A)	8
Configuration	Single

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- AEC-Q101 Qualified^d
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



Marking Code: 8Jxxx



ORDERING INFORMATION

Package	TSOP-6
Lead (Pb)-free and Halogen-free	SQ3460EV-T1-GE3

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 8	
Continuous Drain Current	I_D	8	A
		4.8	
Continuous Source Current (Diode Conduction)	I_S	4.6	
Pulsed Drain Current ^b	I_{DM}	32	
Single Pulse Avalanche Current	I_{AS}	10	mJ
Single Pulse Avalanche Energy	E_{AS}	5	
Maximum Power Dissipation ^b	P_D	3.6	W
		1.2	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 175	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient	R_{thJA}	110	°C/W
Junction-to-Foot (Drain)	R_{thJF}	41	

Notes

- Package limited.
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR-4 material).
- Parametric verification ongoing.

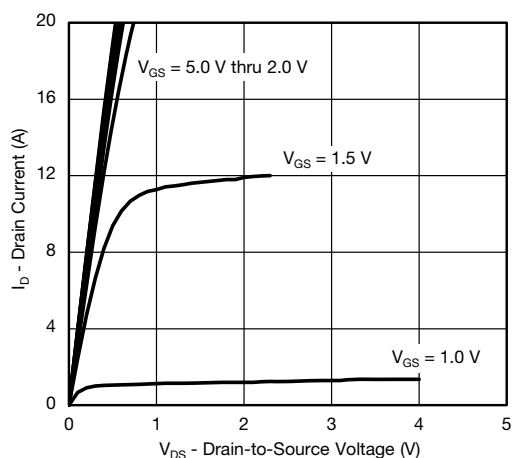
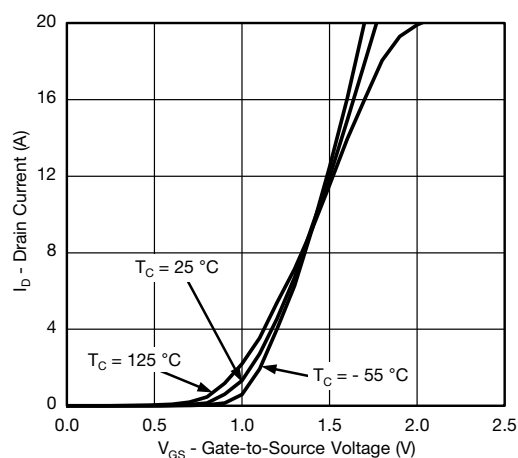
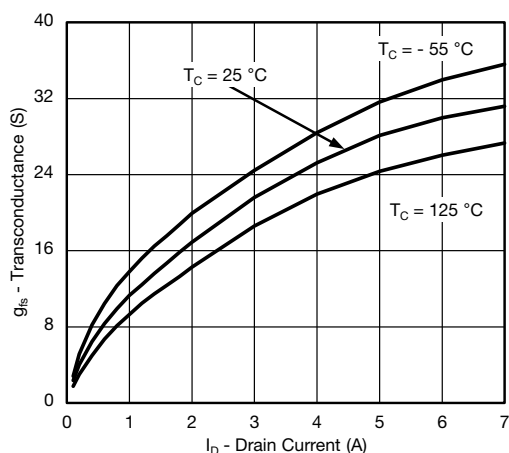
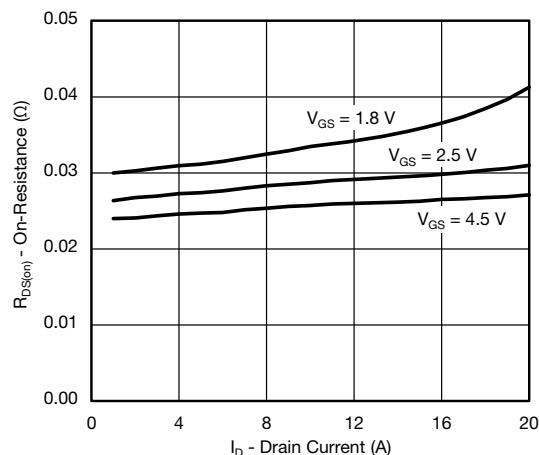
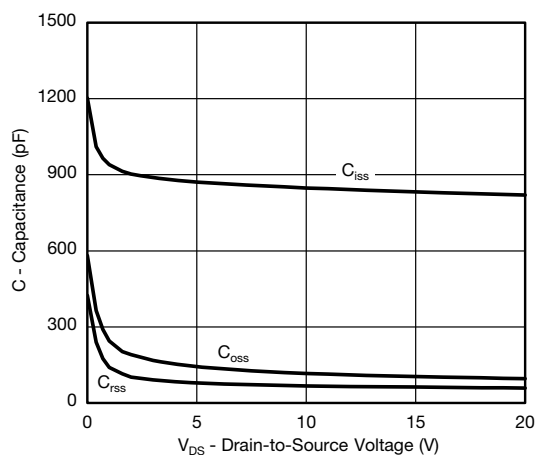
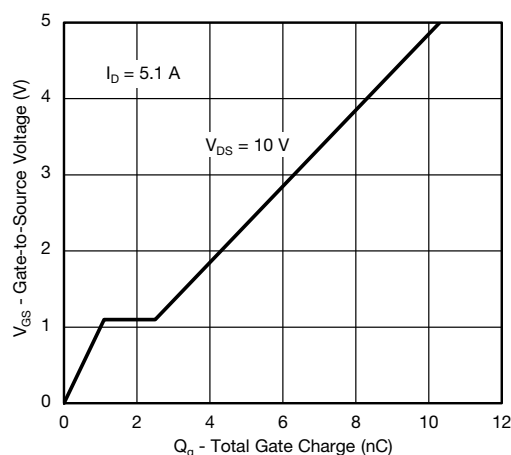


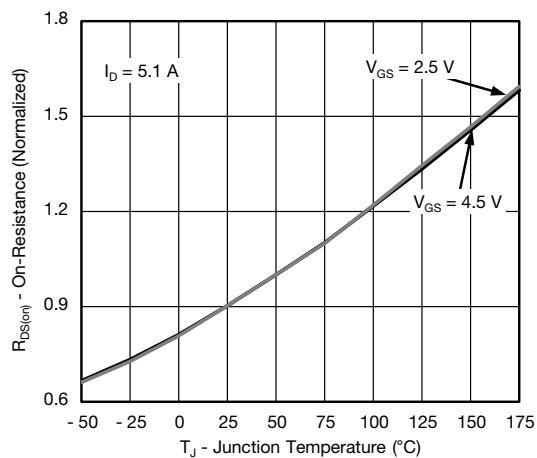
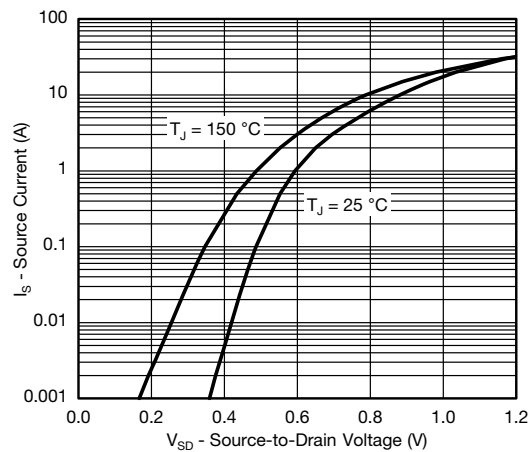
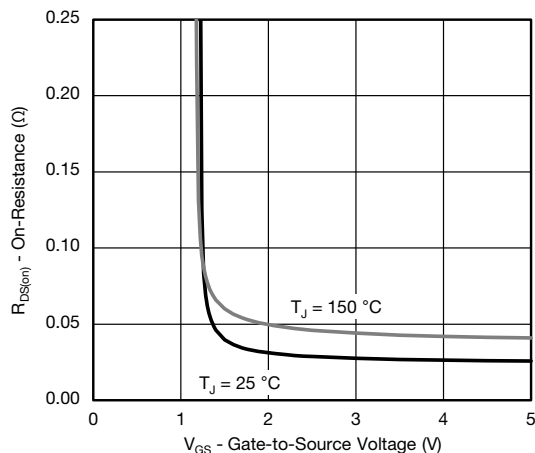
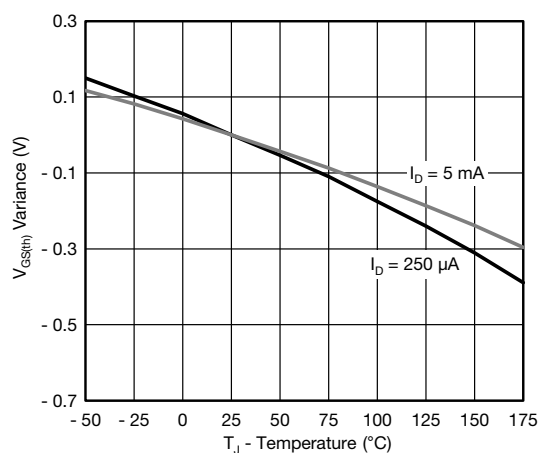
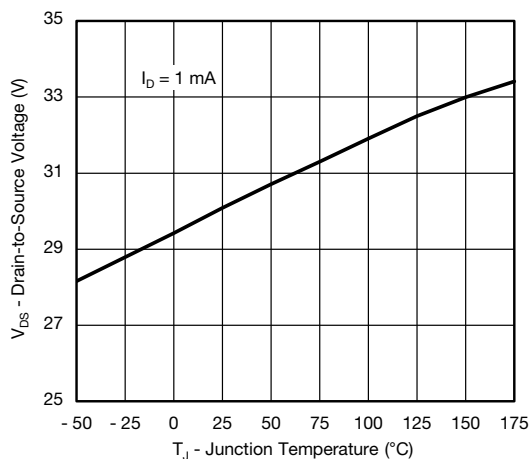
SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0, I _D = 250 μA		20	-	-	V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		0.4	0.6	1.0	
Gate-Source 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} = 20 V	-	-	1	μA
		V _{GS} = 0 V	V _{DS} = 20 V, T _J = 125 °C	-	-	50	
		V _{GS} = 0 V	V _{DS} = 20 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 = 5.1 A	-	0.025	0.030	Ω
		V _{GS} = 4.5 V	I _D = 5.1 A, T _J = 125 °C	-	-	0.045	
		V _{GS} = 4.5 V	I _D = 5.1 A, T _J = 175 °C	-	-	0.053	
		V _{GS} = 2.5 V	I _D = 4.7 A	-	0.027	0.034	
		V _{GS} = 1.8 V	I _D = 2.5 A	-	0.031	0.038	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 5.1 A		-	28	-	S
Dynamic ^b							
Input Capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = 10 V, f = 1 MHz	-	848	1060	pF
Output Capacitance	C _{oss}			-	117	146	
Reverse Transfer Capacitance	C _{rss}			-	68	85	
Total Gate Charge ^c	Q _g	V _{GS} = 4.5 V	V _{DS} = 10 V, I _D = 5.1 A	-	9.3	14	nC
Gate-Source Charge ^c	Q _{gs}			-	1.1	-	
Gate-Drain Charge ^c	Q _{gd}			-	1.4	-	
Gate Resistance	R _g	f = 1 MHz		6.2	12.4	18.6	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 10 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 4.5 V, R _g = 1 Ω		-	8	12	ns
Rise Time ^c	t _r			-	8	12	
Turn-Off Delay Time ^c	t _{d(off)}			-	21	32	
Fall Time ^c	t _f			-	8	12	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed Current ^a	I _{SM}			-	-	32	A
Forward Voltage	V _{SD}	I _F = 5 A, V _{GS} = 0		-	0.77	1.2	V

Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

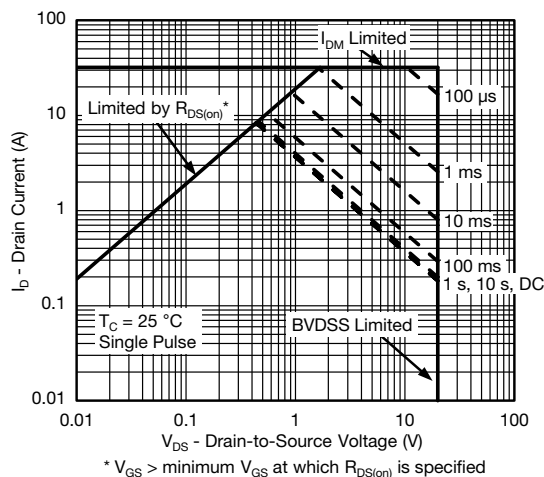
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

Gate Charge

TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

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

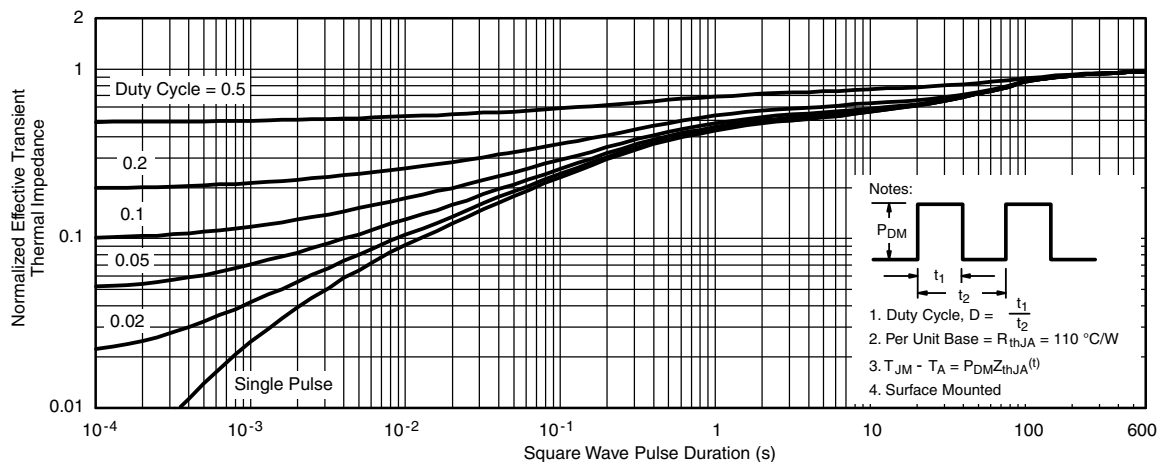


THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



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

Safe Operating Area



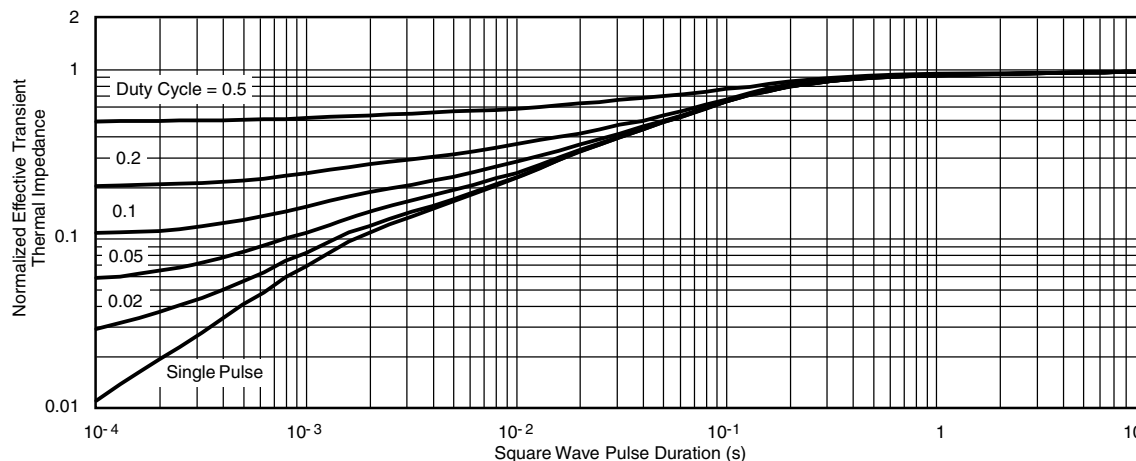
Notes:

1. Duty Cycle, $D = \frac{t_1}{t_2}$
2. Per Unit Base = $R_{thJA} = 110\text{ }^{\circ}\text{C/W}$
3. $T_{JM} - T_A = P_{DM}Z_{thJA}(t)$
4. Surface Mounted

Normalized Thermal Transient Impedance, Junction-to-Ambient



THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Foot

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient ($25\text{ }^{\circ}\text{C}$)
 - Normalized Transient Thermal Impedance Junction-to-Foot ($25\text{ }^{\circ}\text{C}$)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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TSOP: 5/6-LEAD

JEDEC Part Number: MO-193C



5-LEAD TSOP



6-LEAD TSOP



Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A ₁	0.01	-	0.10	0.0004	-	0.004
A ₂	0.90	-	1.00	0.035	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E ₁	1.55	1.65	1.70	0.061	0.065	0.067
e	0.95 BSC			0.0374 BSC		
e ₁	1.80	1.90	2.00	0.071	0.075	0.079
L	0.32	-	0.50	0.012	-	0.020
L ₁	0.60 Ref			0.024 Ref		
L ₂	0.25 BSC			0.010 BSC		
R	0.10	-	-	0.004	-	-
θ	0°	4°	8°	0°	4°	8°
θ ₁	7° Nom			7° Nom		
ECN: C-06593-Rev. I, 18-Dec-06						
DWG: 5540						

Recommended Land Pattern For TSOP-5L / TSOP-6L



TSOP 5L



TSOP 6L


Note

- All dimensions are in inches (millimeter)

ECN: C22-0860-Rev. B, 24-Oct-2022
DWG: 3010



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