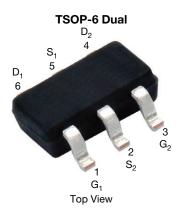




Automotive Dual P-Channel 30 V (D-S) 175 °C MOSFET



Marking code: 9B

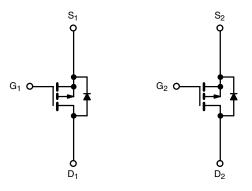
PRODUCT SUMMARY					
V _{DS} (V)	-30				
$R_{DS(on)}(\Omega)$ at $V_{GS} = -10 \text{ V}$	-0.155				
$R_{DS(on)}(\Omega)$ at $V_{GS} = -4.5 \text{ V}$	-0.300				
I _D (A)	-2.32				
Configuration	Dual				

FEATURES

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







P-Channel MOSFET

P-Channel MOSFET

ORDERING INFORMATION					
Package	TSOP-6				
Lead (Pb)-free and halogen-free	SQ3989EV (for detailed order number please see www.vishay.com/doc?79771)				

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)					
PARAMETER	SYMBOL	LIMIT	UNIT		
Drain-source voltage	V _{DS}	-30	V		
Gate-source voltage	V _{GS}	± 20	v		
Continuous dusin surrent /T 150 °C\ 3	T _C = 25 °C		-2.5	Α	
Continuous drain current (T _J = 150 °C) ^a	T _C = 125 °C	I _D	-1.5		
Pulsed drain current	I _{DM}	-10.2	А		
Continuous source current (diode conduction) a	I _S	-2.1			
Maximum power dissipation ^a	T _C = 25 °C	P _D	1.67	w	
iviaximum power dissipation "	T _C = 125 °C		0.56	v v	
Unclamped inductive surge UIS		I _{AV}	-7	А	
Operating junction and storage temperature range		T _J , T _{stg}	-55 to +175	°C	

THERMAL RESISTANCE RATINGS						
PARAMETER		SYMBOL	LIMIT	UNIT		
Maximum junction-to-ambient ^a	Steady state	R _{thJA}	150	°C/W		
Maximum junction-to-foot (drain)	Steady state	R_{thJF}	90			

Note

a. Surface mounted on 1" x 1" FR4 board



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SPECIFICATIONS (T _J = 25°C, unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Static								
Gate threshold voltage	V _{GS(th)}	V _{DS}	$_{S} = V_{GS}, I_{D} = -250 \mu A$	-0.6	-	-1.5	V	
Gate-body leakage	I _{GSS}	V_{DS}	$_{S} = 0 \text{ V}, \text{ V}_{GS} = \pm 20 \text{ V}$	-	-	± 100	nA	
Zero gate voltage drain		$V_{GS} = 0 V$	V _{DS} = -30 V		-	-1		
current	I _{DSS}	$V_{GS} = 0 V$	$V_{DS} = -30 \text{ V}, T_{J} = 55 ^{\circ}\text{C}$	-	-	-5	μA	
On-state drain current a	I _{D(on)}	V _{GS} = -10 V	V _{DS} ≤ -5 V	-4	-	-	Α	
Drain-source on-state		V _{GS} = -10 V	I _D = -0.4 A	-	0.140	0.155	Ω	
resistance ^a	R _{DS(on)}	V _{GS} = -4.5 V	I _D = -0.2 A	-	0.265	0.300		
Forward transconductance ^a	9 _{fs}	V _{DS} = -5 V, I _D = -1 A		-	2.2	-	S	
Diode forward voltage a	V _{SD}	I _S = -0.5 A, V _{GS} = 0 V		-	-0.83	-1.1	V	
Dynamic ^b								
Total gate charge	Q_g			-	8.6	11.1		
Gate-source charge	Q _{gs}	$V_{GS} = -10 \text{ V}$	$V_{DS} = -15 \text{ V}, I_D = -3 \text{ A}$	-	1.2	-	nC	
Gate-drain charge	Q_{gd}			-	3	-		
Gate resistance	R_g	f = 1 MHz		2.5	-	7.2	Ω	
Turn-on delay time	t _{d(on)}			-	5.7	8		
Rise time	t _r	V_{DD} = -10 V, R_L = 10 Ω $I_D \cong$ -1 A, V_{GEN} = -10 V, R_g = 1 Ω		-	3	4		
Turn-off delay time	t _{d(off)}			-	13.8	18	ns	
Fall time	t _f			-	2	3		

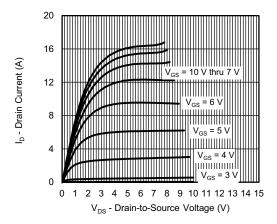
Notes

- a. Pulse test; pulse width \leq 300 μ s, duty cycle \leq 2 %
- b. Guaranteed by design, not subject to production testing

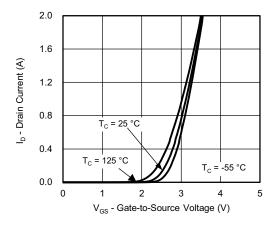
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



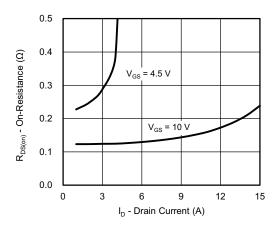
TYPICAL CHARACTERISTICS (25 °C unless otherwise noted)



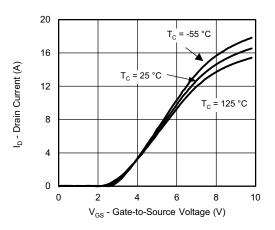
Output Characteristics



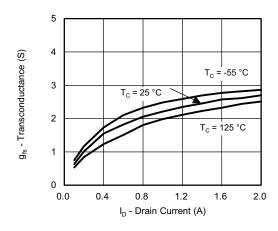
Transfer Characteristics



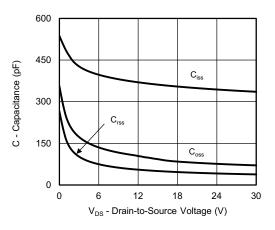
On-Resistance vs. Drain Current



Transfer Characteristics



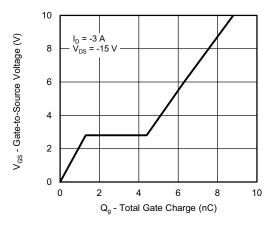
Transconductance



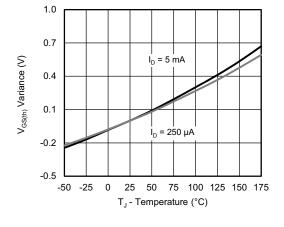
Capacitance



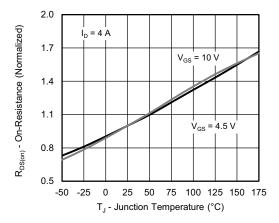
TYPICAL CHARACTERISTICS (25 °C unless otherwise noted)



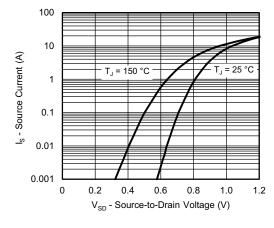
Gate Charge



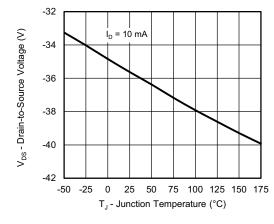
Threshold Voltage



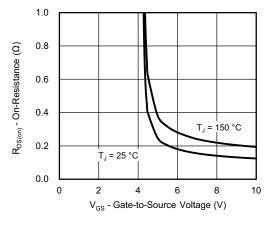
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



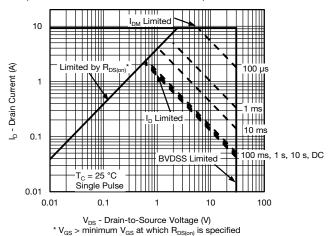
Drain Source Breakdown vs. Junction Temperature



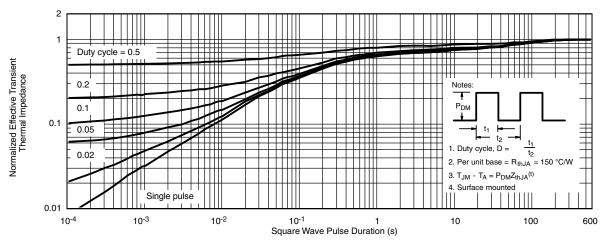
On-Resistance vs. Gate-to-Source Voltage



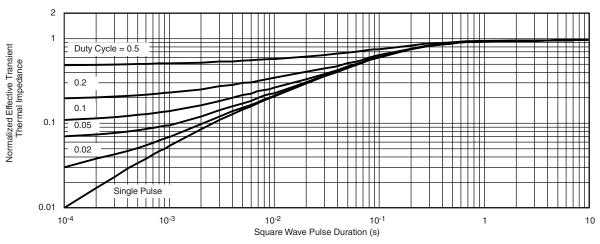
TYPICAL CHARACTERISTICS (25 °C unless otherwise noted)



Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

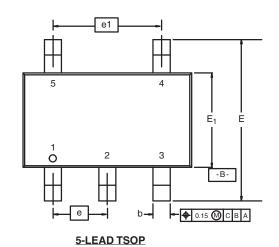
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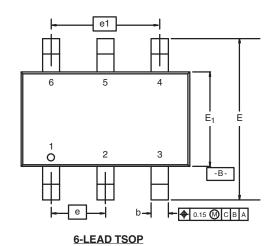


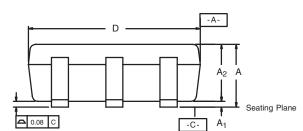


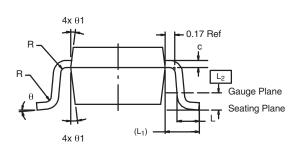
TSOP: 5/6-LEAD

JEDEC Part Number: MO-193C









	MILLIMETERS			ı	NCHES	
Dim	Min	Nom	Max	Min	Nom	Max
Α	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
С	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
е		0.95 BSC		0.0374 BSC		
e ₁	1.80	1.90	2.00	0.071 0.075 0.		
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						

Document Number: 71200 www.vishay.com 18-Dec-06



Recommended Land Pattern For 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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