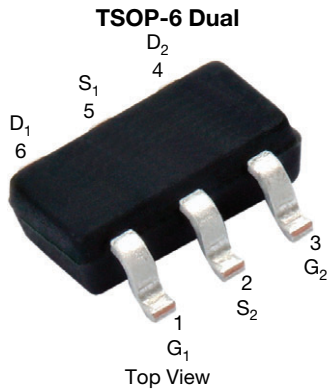


Automotive Dual P-Channel 30 V (D-S) 175 °C MOSFET



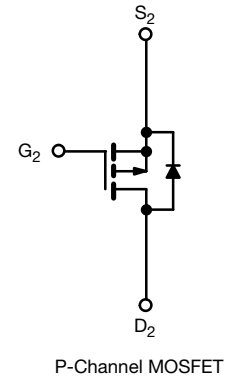
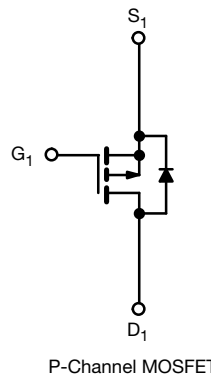
Marking code: 8X

PRODUCT SUMMARY	
V_{DS} (V)	-30
$R_{DS(on)}$ (Ω) at $V_{GS} = -10$ V	-0.110
$R_{DS(on)}$ (Ω) at $V_{GS} = -4.5$ V	-0.185
I_D (A)	-2.75
Configuration	Dual
Package	TSOP-6

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

RoHS
COMPLIANT
HALOGEN
FREE


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		
Continuous drain current ($T_J = 150$ °C) ^a	I_D	$T_C = 25$ °C	-3	A
		$T_C = 125$ °C	-1.74	
Pulsed drain current	I_{DM}	-11		
Continuous source current (diode conduction) ^a	I_S	-2.1		
Maximum power dissipation ^a	P_D	$T_C = 25$ °C	1.67	W
		$T_C = 125$ °C	0.56	
Unclamped inductive surge UIS	I_{AV}	-5	A	
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	R_{thJA}	150	°C/W	
Maximum junction-to-foot (drain)	R_{thJF}	90		

Note

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



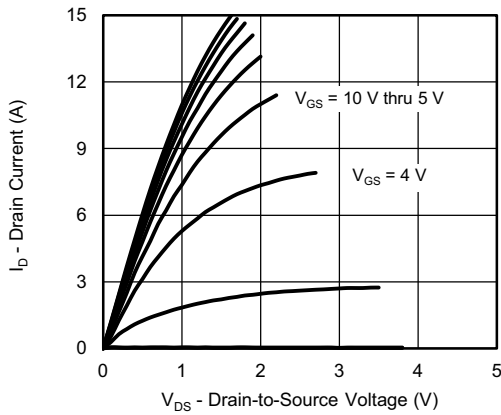
SPECIFICATIONS (T _J = 25°C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA		-1.5	-	-2.5	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V		-	-	± 100	nA
Zero gate voltage drain current	I _{DSS}	V _{GS} = 0 V	V _{DS} = -30 V	-	-	-1	μA
		V _{GS} = 0 V	V _{DS} = -30 V, T _J = 175 °C	-	-	-50	
On-state drain current ^a	I _{D(on)}	V _{GS} = -10 V	V _{DS} ≤ -5 V	-4	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = -10 V	I _D = -1.5 A	-	0.085	0.133	Ω
		V _{GS} = -4.5 V	I _D = -2 A	-	0.135	0.185	
Forward transconductance ^a	g _{fs}	V _{DS} = -5 V, I _D = -1 A		-	4.2	-	S
Diode forward voltage ^a	V _{SD}	I _S = -0.5 A, V _{GS} = 0 V		-	-0.83	-1.10	V
Dynamic ^b							
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = -15 V	-	456	570	pF
Output capacitance	C _{oss}			-	85	106	
Reverse capacitance	C _{rss}			-	59	74	
Total gate charge	Q _g	V _{GS} = -10 V	V _{DS} = -15 V, I _D = -3 A	-	9.7	12.2	nC
Gate-source charge	Q _{gs}			-	1.3	-	
Gate-drain charge	Q _{gd}			-	2	-	
Gate resistance	R _g	f = 1 MHz		9	-	24	Ω
Turn-on delay time	t _{d(on)}	V _{DD} = -10 V, R _L = 10 Ω, I _D ≅ -1 A, V _{GEN} = -10 V, R _g = 1 Ω		-	6.6	8.3	ns
Rise time	t _r			-	2.4	3	
Turn-off delay time	t _{d(off)}			-	18.4	23	
Fall time	t _f			-	2.2	2.8	
Source-Drain Diode Ratings and Characteristic ^b							
Pulsed current	I _{SM}			-	-	-11	A
Forward voltage	V _{SD}	I _F = 0.5 A, V _{GS} = 0 V		-	-0.83	-1.1	V
Reverse recovery fall time	t _a	V _{DD} = -24 V, I _{FM} = -1.5 A, di/dt = 100 A/μs, R = 160 Ω, L = 1 mH, pulse W = 2 μs		-	9.1	-	ns
Reverse recovery rise time	t _b			-	4.8	-	ns
Body diode reverse recovery time	t _{rr}			-	14	28	ns
Body diode reverse recovery charge	Q _{rr}			-	9	18	μC
Body diode peak reverse recovery current	I _{RM(REC)}			-	-1.4	-	A

Notes

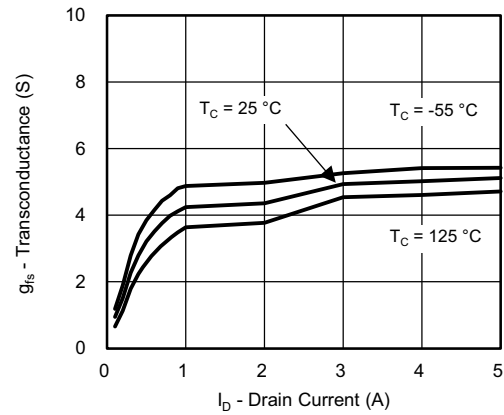
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %
- b. Guaranteed by design, not subject to production testing

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.

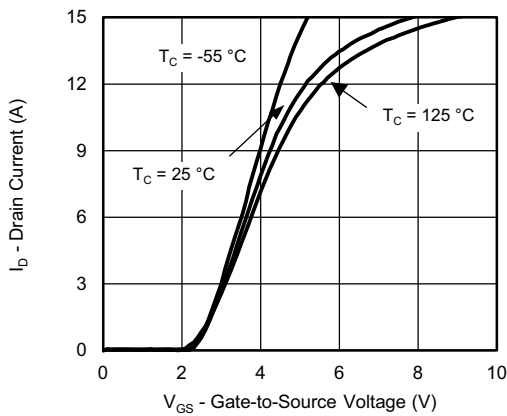
TYPICAL CHARACTERISTICS (25 °C unless otherwise noted)



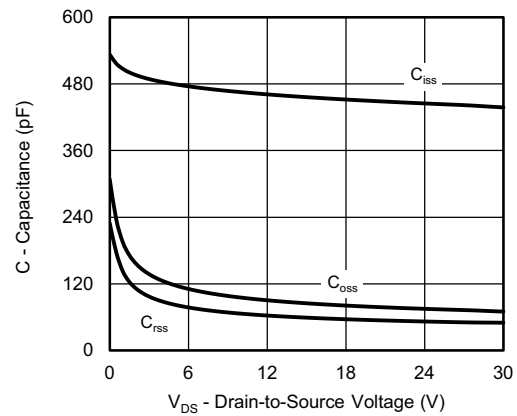
Output Characteristics



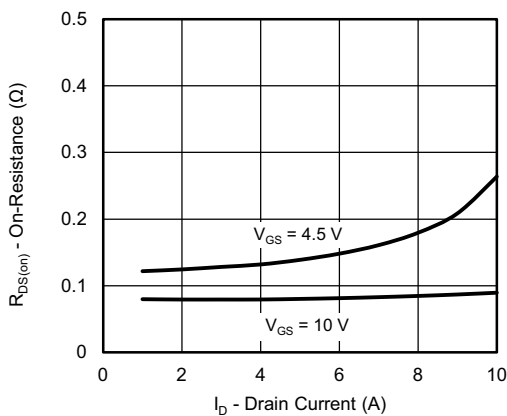
Transconductance



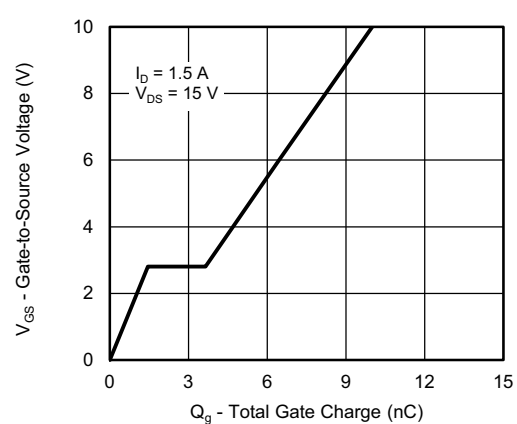
Transfer Characteristics



Capacitance

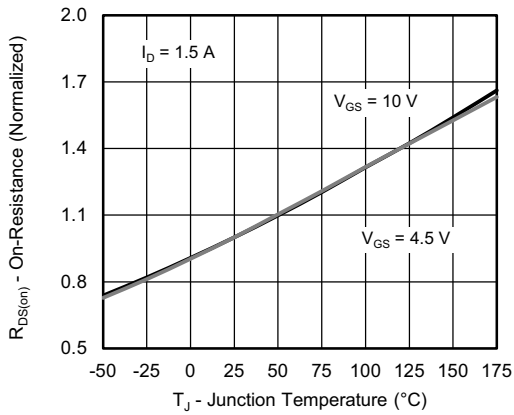


On-Resistance vs. Drain Current

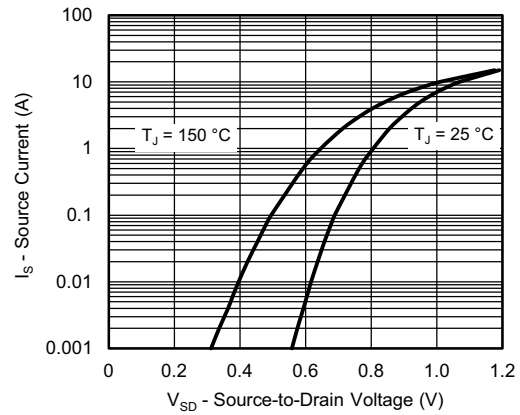


Gate Charge

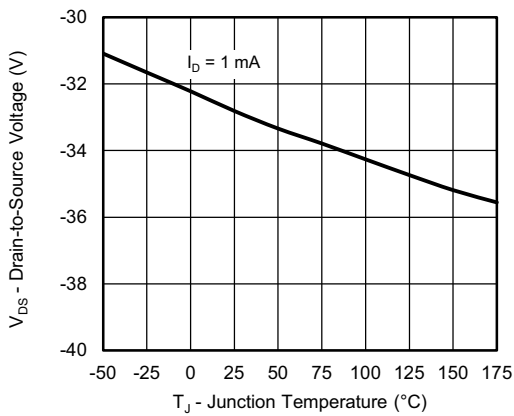
TYPICAL CHARACTERISTICS (25 °C unless otherwise noted)



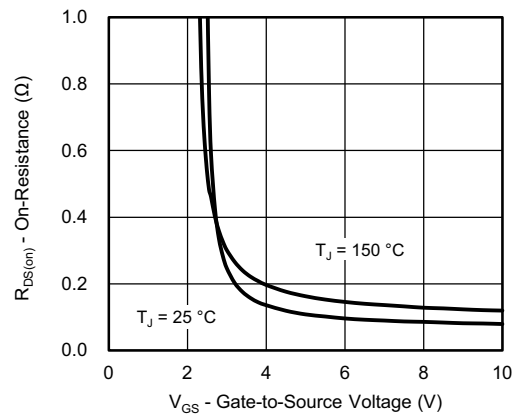
On-Resistance vs. Junction Temperature



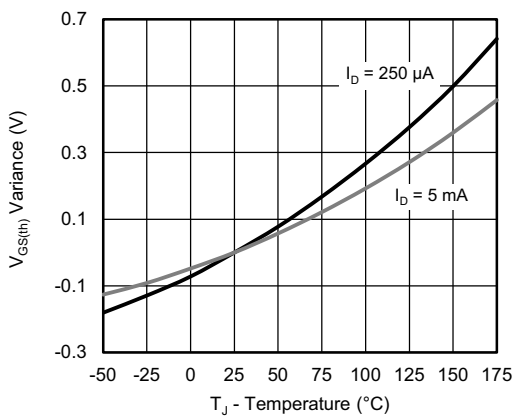
Source-Drain Diode Forward Voltage



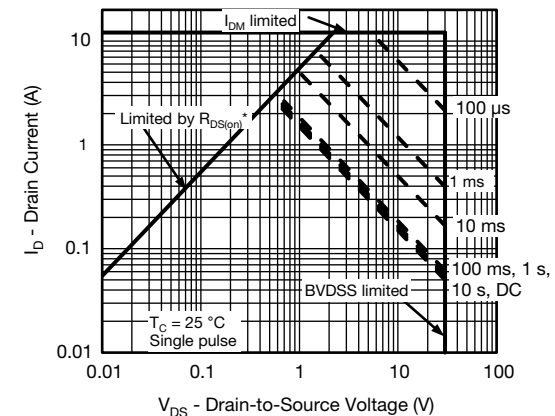
Drain Source Breakdown vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

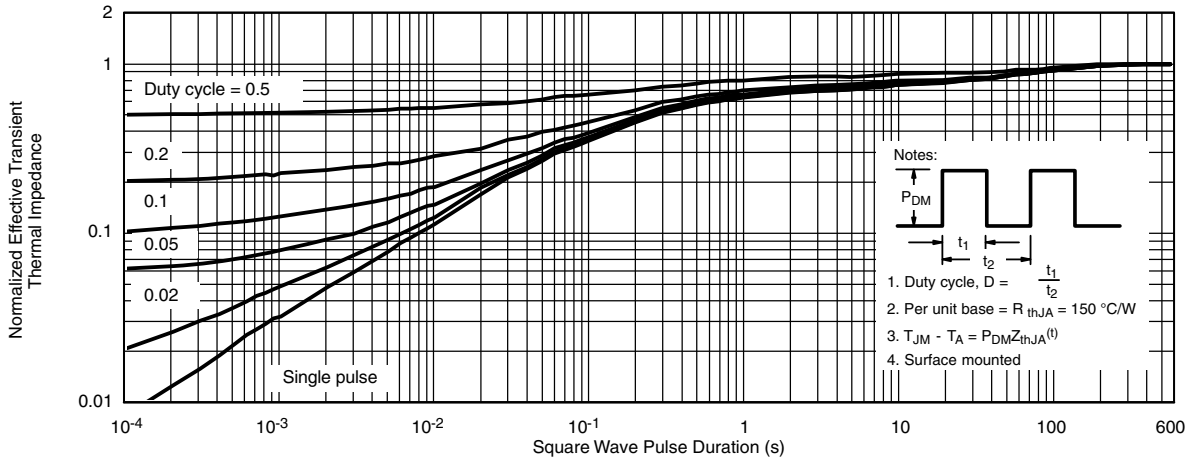


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

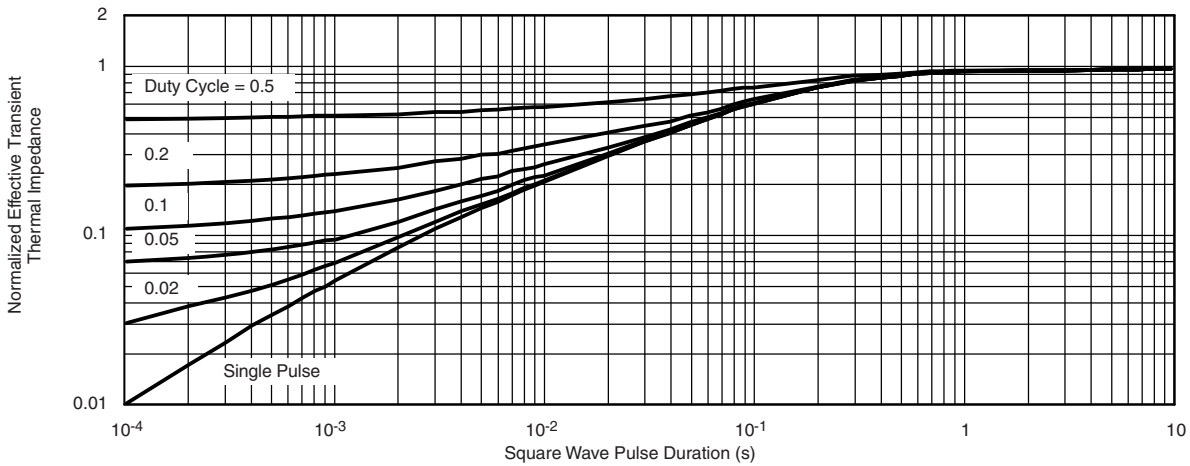
Safe Operating Area, Junction-to-Case



TYPICAL CHARACTERISTICS (25 °C unless otherwise noted)



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



5-LEAD TSOP



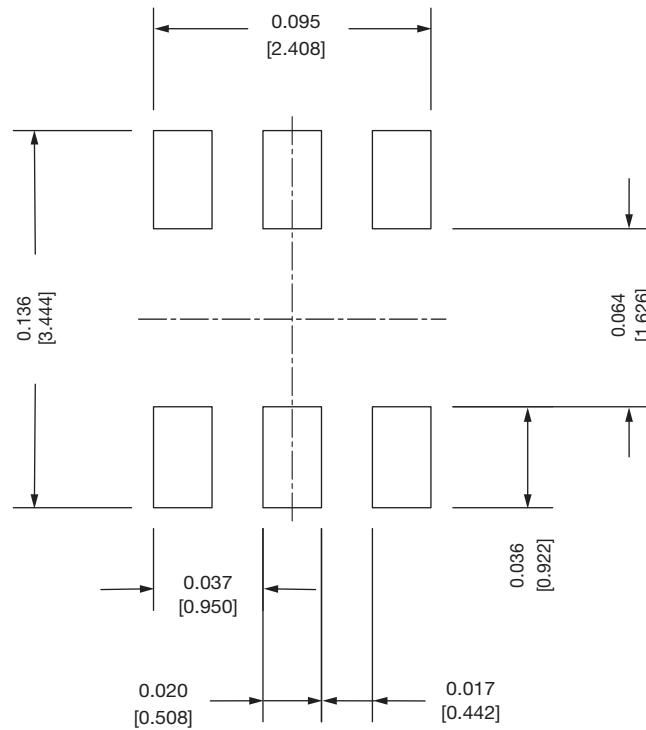
6-LEAD TSOP



Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A₁	0.01	-	0.10	0.0004	-	0.004
A₂	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
E₁	1.55	1.65	1.70	0.061	0.065	0.067
e	0.95 BSC			0.0374 BSC		
e₁	1.80	1.90	2.00	0.071	0.075	0.079
L	0.32	-	0.50	0.012	-	0.020
L₁	0.60 Ref			0.024 Ref		
L₂	0.25 BSC			0.010 BSC		
R	0.10	-	-	0.004	-	-
θ	0°	4°	8°	0°	4°	8°
θ₁	7° Nom			7° Nom		
ECN: C-06593-Rev. I, 18-Dec-06						
DWG: 5540						



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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