

ELM16401EA-N-VB Datasheet P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY						
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)			
- 30	0.049 at V _{GS} = - 10 V	- 4.8	5.1 nC			
	0.054 at V_{GS} = - 4.5 V	- 4.1	5.1110			

FEATURES

• Halogen-free According to IEC 61249-2-21 Available

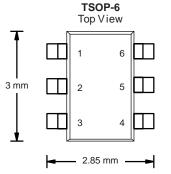
(3) G O

• Trench Power MOSFET

APPLICATIONS

· Load Switch





(1, 2, 5, 6) D P-Channel MOSFET

(4) S

Parameter	Symbol	Limit	Unit		
Drain-Source Voltage		V _{DS}	- 30	V	
Gate-Source Voltage		V _{GS}	s ± 20		
	T _C = 25 °C		- 4.8		
Continuous Drain Current ($T_1 = 150 \ ^{\circ}C$)	T _C = 70 °C		- 4.1		
Continuous Drain Current $(1) = 150^{\circ}$ C)	T _A = 25 °C	I _D	- 4.0 ^{b, c}		
	T _A = 70 °C		- 3.5 ^{b, c}	A	
Pulsed Drain Current		I _{DM}	I _{DM} - 20		
	T _C = 25 °C		- 2.5		
Continuous Source-Drain Diode Current	T _A = 25 °C	I _S	- 1.67 ^{b, c}		
	T _C = 25 °C		3.0		
Maximum Dawar Dissinction	T _C = 70 °C	P _D	2.0	w	
Maximum Power Dissipation	T _A = 25 °C		2.0 ^{b, c}	VV	
	T _A = 70 °C	1	1.3 ^{b, c}		
Operating Junction and Storage Temperature Range		T _J , T _{stq}	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	Typical	Maximum	Unit		
Maximum Junction-to-Ambient ^{b, d}	t ≤ 5 s	R _{thJA}	55	62.5	°C/W		
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	34	41	0/11		

Notes:

a. Based on $T_C = 25 \text{ °C}$. b. Surface Mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under Steady State conditions is 110 °C/W.



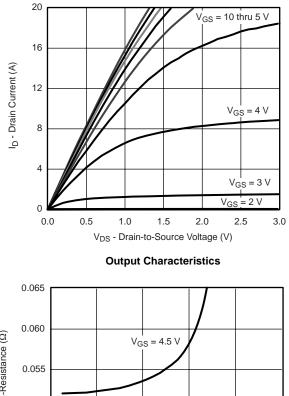
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit
Static	1 -				1	
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 V, I_D = -250 \mu A$	- 30			V
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	1 250 4		- 31		m\//º(
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = - 250 μΑ		4.5		mV/°C
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = -250 \ \mu A$	- 0.5		- 2.0	V
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
		$V_{DS} = -30 \text{ V}, V_{GS} = 0 \text{ V}$			- 1	μA
Zero Gate Voltage Drain Current	IDSS	V_{DS} = - 30 V, V_{GS} = 0 V, T_{J} = 55 °C			- 10	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le$ - 5 V, V_{GS} = - 10 V	- 20			Α
		V _{GS} = - 10 V, I _D = - 4.1 A		0.049		Ω
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 4.5 V, I _D = - 1.0 A		0.054		
Forward Transconductance ^a	9 _{fs}	V _{DS} = - 15 V, I _D = - 4.1 A		8		S
Dynamic ^b					1	1
Input Capacitance	C _{iss}			450		pF
Output Capacitance	C _{oss}	V_{DS} = - 15 V, V_{GS} = 0 V, f = 1 MHz		80		
Reverse Transfer Capacitance	C _{rss}			63		
Total Gate Charge	Qg	V_{DS} = - 15 V, V_{GS} = - 10 V, I_D = - 4.1 A		10	15	nC
				5.1	8	
Gate-Source Charge	Q _{gs}	V_{DS} = - 15 V, V_{GS} = - 4.5 V, I_D = - 4.1 A		1.8		
Gate-Drain Charge	Q _{gd}			2.5		
Gate Resistance	R _g	f = 1 MHz		7		Ω
Turn-On Delay Time	t _{d(on)}			40	60	- ns
Rise Time	t _r	V_{DD} = - 15 V, R_L = 4.6 Ω		80	120	
Turn-Off Delay Time	t _{d(off)}	$\rm I_D \cong$ - 3.3 A, $\rm V_{GEN}$ = - 4.5 V, $\rm R_g$ = 1 Ω		20	30	
Fall Time	t _f			12	20	
Turn-On Delay Time	t _{d(on)}			5	10	
Rise Time	t _r	V_{DD} = - 15 V, R_L = 4.6 Ω		13	20	
Turn-Off Delay Time	t _{d(off)}	$\text{I}_\text{D}\cong$ - 3.3 A, V_GEN = - 10 V, R_g = 1 Ω		20	30	
Fall Time	t _f			10	15	
Drain-Source Body Diode Characteristic	cs					
Continuous Source-Drain Diode Current	۱ _S	T _C = 25 °C			- 2.5	^
Pulse Diode Forward Current ^a	I _{SM}				- 20	
Body Diode Voltage	V _{SD}	I _S = - 3.3 A		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t _{rr}			20	30	ns
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = - 3.3 A, di/dt = 100 A/μs, T _{.1} = 25 °C		20	30	nC
Reverse Recovery Fall Time	t _a	$r_F = -3.5 \text{ A}, \text{ u/ul} = 100 \text{ A/}\mu\text{s}, \text{ I}_J = 25 \text{ °C}$		14		
Reverse Recovery Rise Time	t _b	—		6		ns

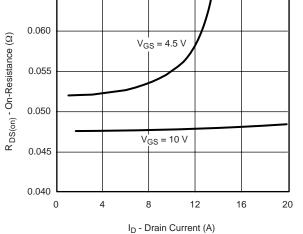
Notes:

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

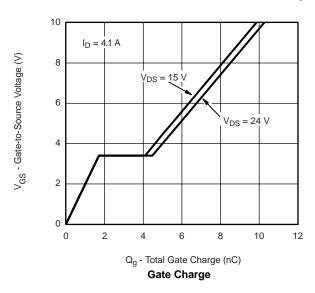
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

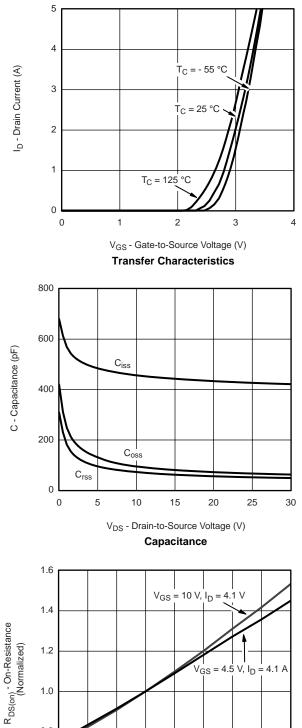


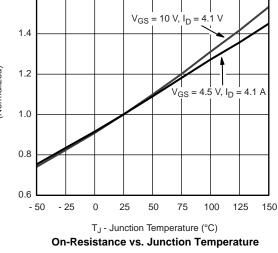




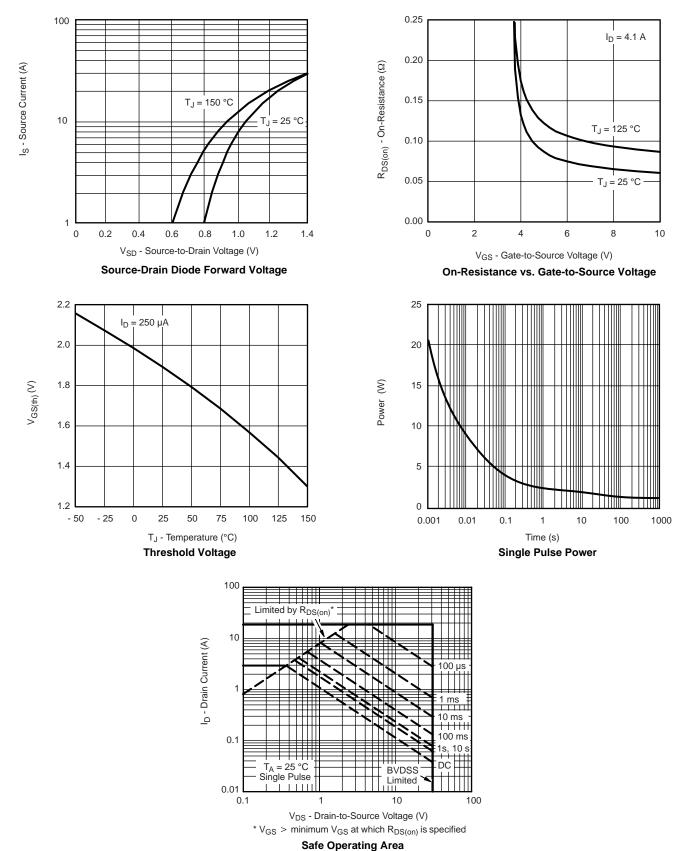
On-Resistance vs. Drain Current and Gate Voltage



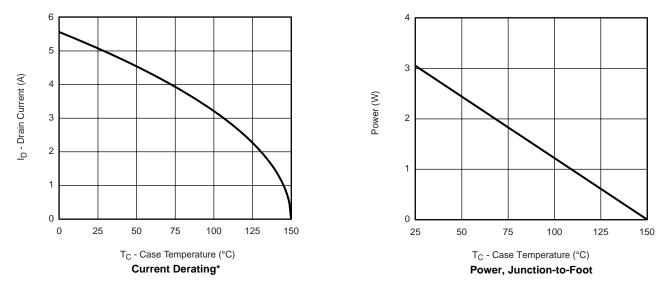






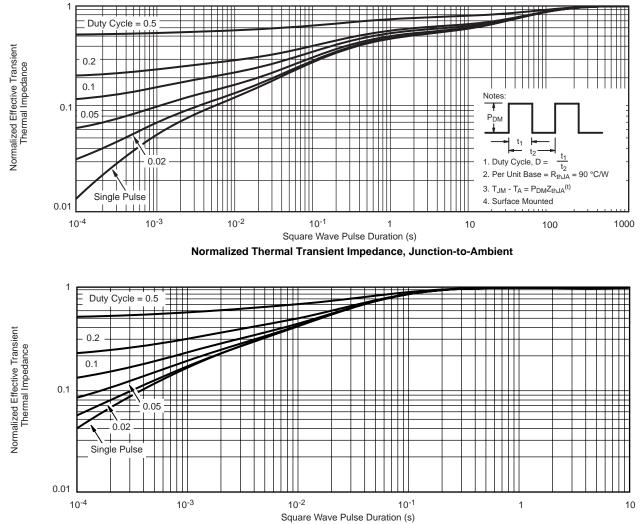






* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

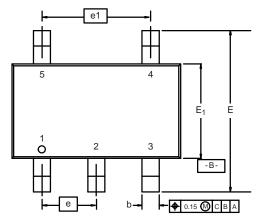




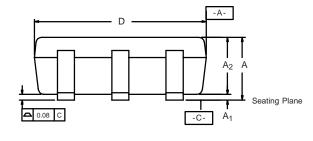
Normalized Thermal Transient Impedance, Junction-to-Foot

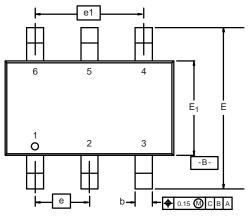


TSOP: 5/6-LEAD JEDEC Part Number: MO-193C

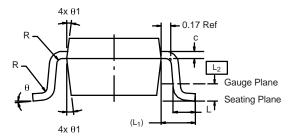








6-LEAD TSOP

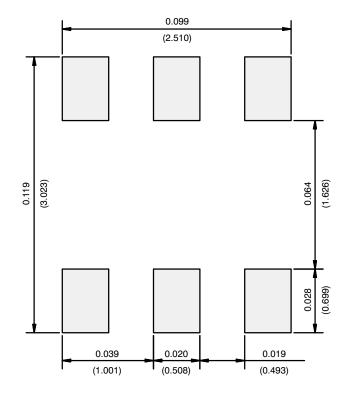


	MILLIMETERS			INCHES			
Dim	Min	Nom	Max	Min	Nom	Max	
Α	0.91	-	1.10	0.036	-	0.043	
A ₁	0.01	-	0.10	0.0004	-	0.004	
A ₂	0.90	-	1.00	0.035	0.038	0.039	
b	0.30	0.32	0.45	0.012	0.013	0.018	
С	0.10	0.15	0.20	0.004	0.006	0.008	
D	2.95	3.05	3.10	0.116	0.120	0.122	
Е	2.70	2.85	2.98	0.106	0.112	0.117	
E ₁	1.55	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	0.079	
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							

ELM16401EA-N-VB



RECOMMENDED MINIMUM PADS FOR TSOP-6



Recommended Minimum Pads Dimensions in Inches/(mm)



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