

P2402CAG-VB Datasheet N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY						
V _{DS} (V)	$R_{DS(on)}\left(\Omega\right)$	I _D (A) ^{a, e}	Q _g (Typ.)			
30	0.023 at V _{GS} = 10 V	6	4.2 nC			
	0.027 at V _{GS} = 4.5 V	6	4.2110			

TSOP-6 D 1 6 D G 3 4 S

Top View

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- Low On-Resistance
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



APPLICATIONS

• DC/DC Converters, High Speed Switching

Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V _{DS}	30	V	
Gate-Source Voltage		V _{GS}	± 20	V	
	T _C = 25 °C		6 ^e		
Continuous Proin Current /T 150 °C	T _C = 70 °C	,	6 ^e		
Continuous Drain Current (T _J = 150 °C)	T _A = 25 °C	I _D	5.5 ^{b, c}		
	T _A = 70 °C		4.4 ^{b, c}	A	
Pulsed Drain Current (t = 300 μs)		I _{DM} 25			
Continuous Source-Drain Diode Current	T _C = 25 °C		2.1		
Continuous Source-Diam Diode Current	T _A = 25 °C	- I _S	1.1 ^{b, c}		
	T _C = 25 °C		2.5		
Maximum Dayyar Dissination	T _C = 70 °C	D .	1.6	W	
Maximum Power Dissipation	T _A = 25 °C	P _D	1.3 ^{b, c}	VV	
	T _A = 70 °C		0.8 ^{b, c}		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150	°C	
Soldering Recommendations (Peak Tempera		260			

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	Typical	Maximum	Unit			
Maximum Junction-to-Ambient ^{b, d}	t ≤ 5 s	R _{thJA}	75	100	°C/W		
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	40	50	C/ VV		

Notes:

- a. Based on $T_C = 25$ °C.
- b. Surface mounted on 1" x 1" FR4 board.
- c t = 5 s
- d. Maximum under steady state conditions is 166 °C/W.
- e. Package limited.

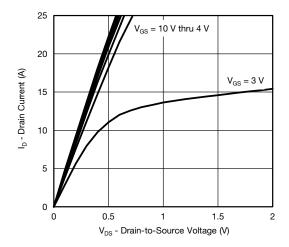


Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit
Static						-1
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V, I}_{D} = 250 \mu\text{A}$	30			V
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I _D = 250 μA		30		mV/°C
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_{J}$	1 _D = 230 μA		- 4.8		
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$	0.5		1.5	V
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zara Cata Valtaga Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	^
Zero Gate Voltage Drain Current		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 70 °C			10	μA
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \le 5 \text{ V}, V_{GS} = 10 \text{ V}$	20			Α
Drain Course On Chata Desistance	В	$V_{GS} = 10 \text{ V}, I_D = 5.5 \text{ A}$		0.023		0
Drain-Source On-State Resistance ^a	R _{DS(on)}	$V_{GS} = 4.5 \text{ V}, I_D = 5 \text{ A}$		0.027		Ω
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 5.5 A		24		S
Dynamic ^b						
Input Capacitance	C _{iss}			424		
Output Capacitance	C _{oss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		100		pF
Reverse Transfer Capacitance	C _{rss}			42		
Total Gate Charge	Qg	$V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 5.5 \text{ A}$		8.2	13	nC
				4.2	7	
Gate-Source Charge	Q _{gs}	$V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_{D} = 5.5 \text{ A}$		1.4		
Gate-Drain Charge	Q _{gd}			1.4		
Gate Resistance	R _g	f = 1 MHz	2.5	12.6	25.2	Ω
Turn-On Delay Time	t _{d(on)}			6	12	ns
Rise Time	t _r	V_{DD} = 15 V, R_L = 3.4 Ω		20	30	
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 4.4 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$		14	21	
Fall Time	t _f			10	20	
Turn-On Delay Time	t _{d(on)}			3	6	
Rise Time	t _r	V_{DD} = 15 V, R_L = 3.4 Ω		11	20	
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 4.4 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$		20	30	
Fall Time	t _f			7	14	
Drain-Source Body Diode Characteristi	cs			"		
Continuous Source-Drain Diode Current	I _S	$T_C = 25 ^{\circ}C$			2.1	۸
Pulse Diode Forward Current	I _{SM}				25	A
Body Diode Voltage	V_{SD}	$I_S = 4.4 \text{ A}, V_{GS} = 0 \text{ V}$		0.82	1.2	V
Body Diode Reverse Recovery Time	t _{rr}			13	20	ns
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = 4.4 A, dI/dt = 100 A/μs, T _{.I} = 25 °C		6	12	nC
Reverse Recovery Fall Time	t _a	$_{1F} = 4.4 \text{ A}, \text{ u/u} = 100 \text{ A/}\mu\text{s}, 1_{\text{J}} = 25 ^{\circ}\text{C}$		8		
Reverse Recovery Rise Time t _b				5		ns

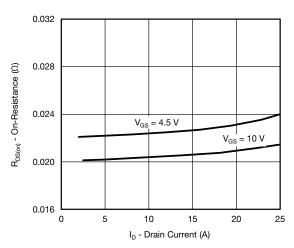
- a. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %. b. Guaranteed by design, not subject to production testing.

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.

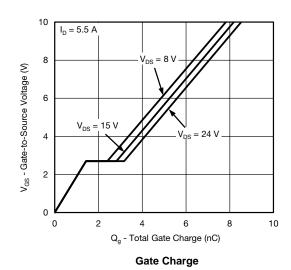




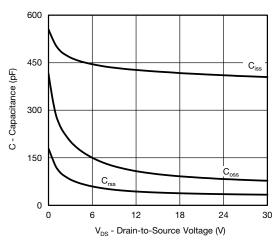
Output Characteristics



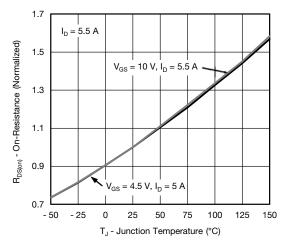
On-Resistance vs. Drain Current and Gate Voltage



Transfer Characteristics

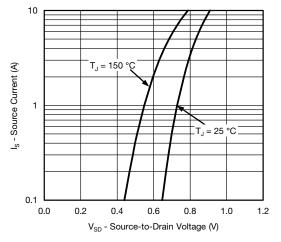


Capacitance

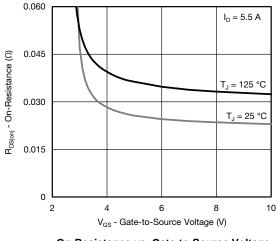


On-Resistance vs. Junction Temperature

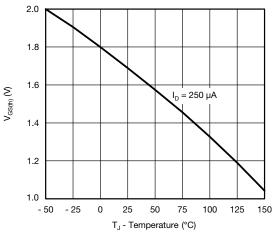




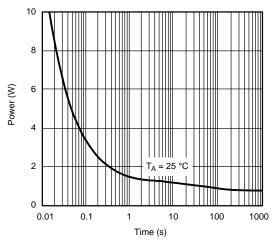
Source-Drain Diode Forward Voltage



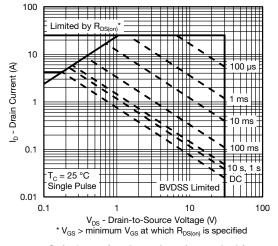
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

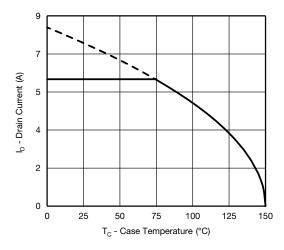


Single Pulse Power (Junction-to-Ambient)

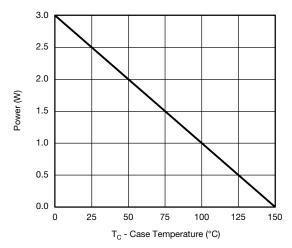


Safe Operating Area, Junction-to-Ambient

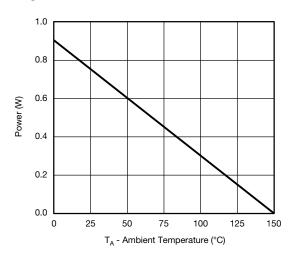




Current Derating*



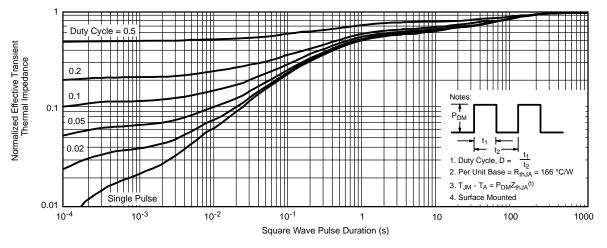




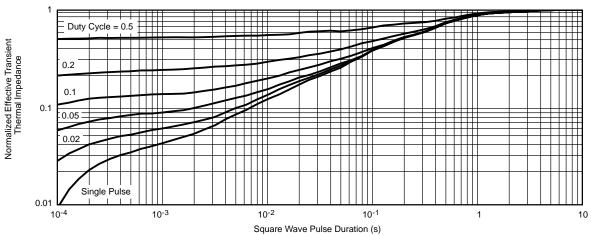
Power Derating, Junction-to-Ambient

^{*} 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-Ambient

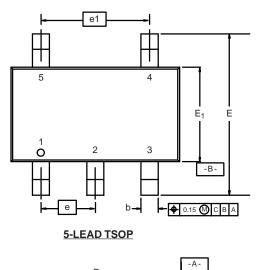


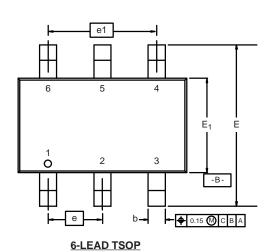
Normalized Thermal Transient Impedance, Junction-to-Foot

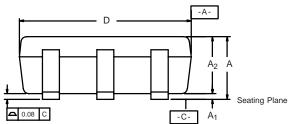


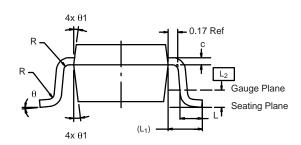
TSOP: 5/6-LEAD

JEDEC Part Number: MO-193C





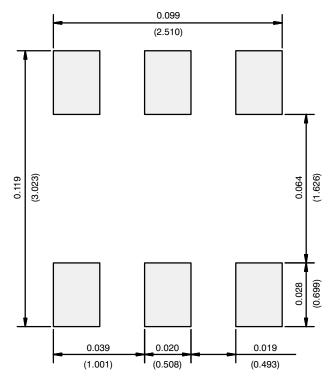




	MILLIMETERS			INCHES			
Dim	Min	Nom	Max	Min	Nom	Max	
Α	0.91	-	1.10	0.036	-	0.043	
A ₁	0.01	-	0.10	0.0004	-	0.004	
A ₂	0.90	-	1.00	0.035	0.038	0.039	
b	0.30	0.32	0.45	0.012	0.013	0.018	
С	0.10	0.15	0.20	0.004	0.006	0.008	
D	2.95	3.05	3.10	0.116	0.120	0.122	
Е	2.70	2.85	2.98	0.106	0.112	0.117	
E ₁	1.55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



RECOMMENDED MINIMUM PADS FOR TSOP-6



Recommended Minimum Pads Dimensions in Inches/(mm)



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