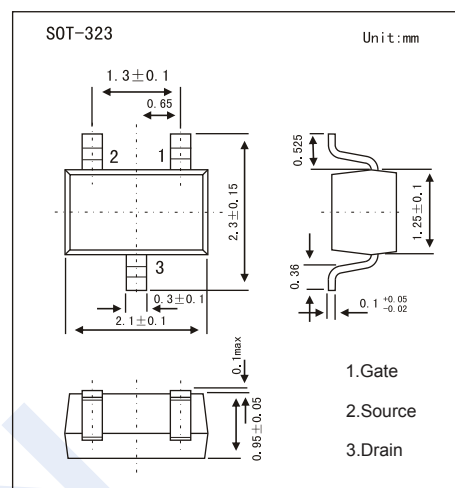


P-Channel MOSFET

AO7401 (KO7401)

■ Features

- V_{DS} -30V
- I_D (at $V_{GS}=-10V$) -1.4A
- $R_{DS(ON)}$ (at $V_{GS}=-10V$) < 115m Ω
- $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) < 140m Ω
- $R_{DS(ON)}$ (at $V_{GS}=-2.5V$) < 200m Ω

■ Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted.

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current	$T_A=25^\circ\text{C}$	I_D	-1.4	A
	$T_A=70^\circ\text{C}$		-1.0	
Pulsed Drain Current ^C		I_{DM}	-10	
Power Dissipation ^B	$T_A=25^\circ\text{C}$	P_D	0.35	W
	$T_A=70^\circ\text{C}$		0.22	
Thermal Resistance.Junction- to-Ambient ^A	$t \leq 10s$	$R_{\theta JA}$	360	$^\circ\text{C}/\text{W}$
Thermal Resistance.Junction- to-Ambient ^{A D}	Steady-State		425	
Thermal Resistance.Junction- to-Lead	Steady-State	$R_{\theta JL}$	320	
Junction Temperature		T_J	150	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-55 to 150	

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using $\leq 10s$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

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■ Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DS}	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$			-1	μA
		$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$, $T_J = 55^\circ\text{C}$			-5	
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 12\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$	-0.6		-1.4	V
On state drain current	$I_{D(ON)}$	$V_{GS} = -10\text{V}$, $V_{DS} = -5\text{V}$	-10			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = -10\text{V}$, $I_D = -1.4\text{A}$			115	m Ω
		$V_{GS} = -10\text{V}$, $I_D = -1.4\text{A}$, $T_J = 125^\circ\text{C}$			160	
		$V_{GS} = -4.5\text{V}$, $I_D = -1.2\text{A}$			140	
		$V_{GS} = -2.5\text{V}$, $I_D = -1\text{A}$			200	
Forward Transconductance	g_{FS}	$V_{DS} = -5\text{V}$, $I_D = -1.4\text{A}$		6		S
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = -15\text{V}$, $f = 1\text{MHz}$		260	315	pF
Output Capacitance	C_{oss}			37		
Reverse Transfer Capacitance	C_{rss}			20		
Gate resistance	R_g	$V_{GS} = 0\text{V}$, $V_{DS} = 0\text{V}$, $f = 1\text{MHz}$	4		12	Ω
Total Gate Charge	$Q_g(10\text{V})$	$V_{DS} = -15\text{V}$, $I_D = -1.4\text{A}$ $V_{GS} = -10\text{V}$		5.9	7.2	nC
	$Q_g(4.5\text{V})$			2.8	3.5	
Gate Source Charge	Q_{gs}			0.7		
Gate Drain Charge	Q_{gd}			1		
Turn-On DelayTime	$t_{d(on)}$	$V_{GS} = -10\text{V}$, $V_{DS} = -15\text{V}$, $R_L = 10\Omega$, $R_{GEN} = 3\Omega$		6		ns
Turn-On Rise Time	t_r			3.5		
Turn-Off DelayTime	$t_{d(off)}$			20		
Turn-Off Fall Time	t_f			5		
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -1.4\text{A}$, $dI/dt = 100\text{A}/\mu\text{s}$		11.5	15	
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = -1.4\text{A}$, $dI/dt = 100\text{A}/\mu\text{s}$		4.5		nC
Maximum Body-Diode Continuous Current	I_S				-0.5	A
Diode Forward Voltage	V_{SD}	$I_S = -1\text{A}$, $V_{GS} = 0\text{V}$			-1	V

E. The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)} = 150^\circ\text{C}$. The SOA curve provides a single pulse rating.

P-Channel MOSFET

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■ Typical Electrical and Thermal Characteristics

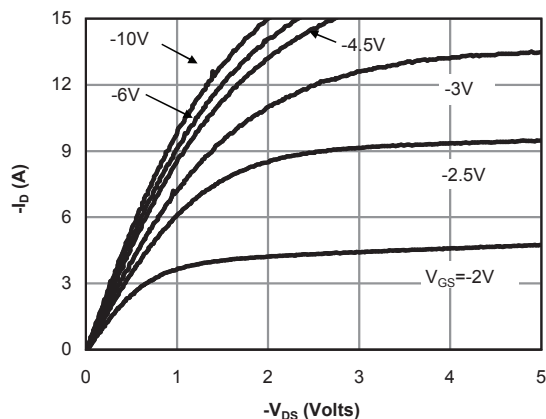


Figure 1: On-Region Characteristics (Note E)

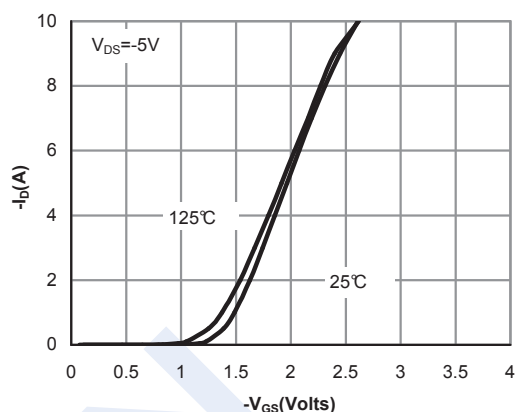


Figure 2: Transfer Characteristics (Note E)

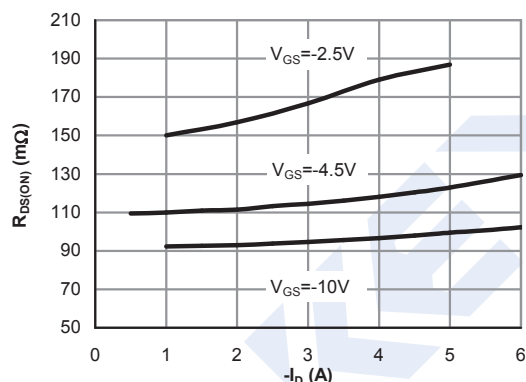


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

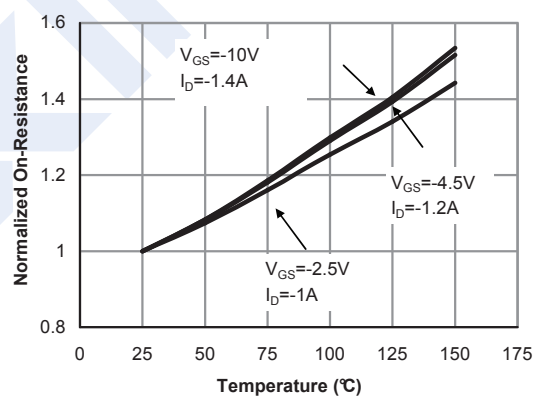


Figure 4: On-Resistance vs. Junction Temperature (Note E)

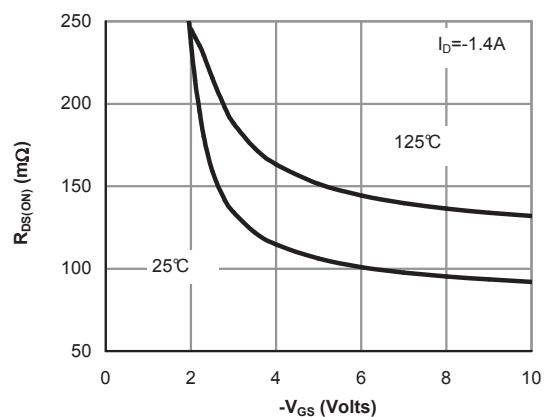


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

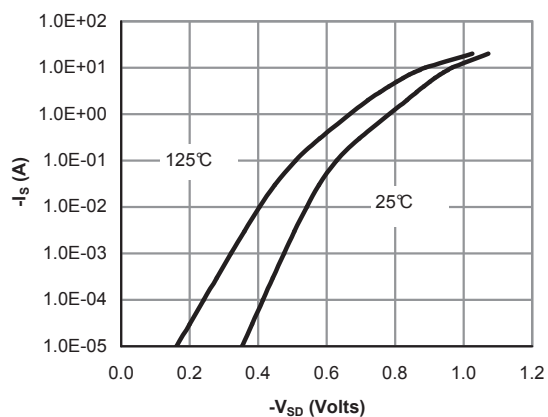


Figure 6: Body-Diode Characteristics (Note E)

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■ Typical Electrical and Thermal Characteristics

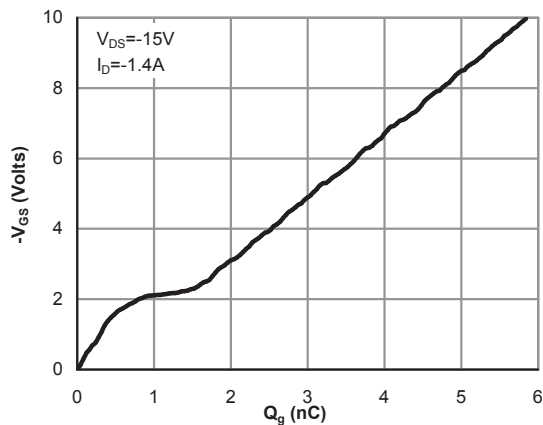


Figure 7: Gate-Charge Characteristics

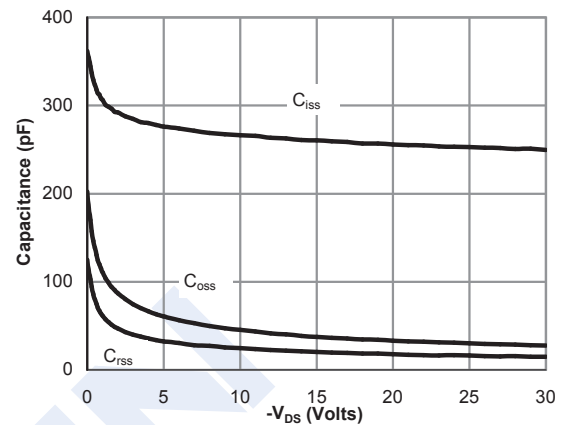


Figure 8: Capacitance Characteristics

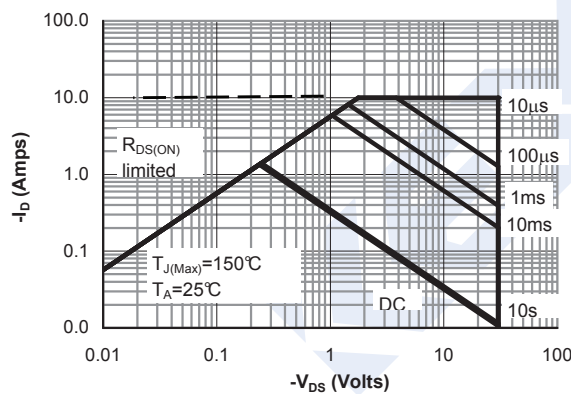


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

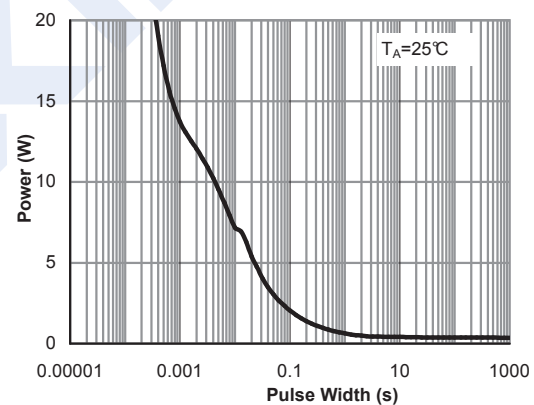


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

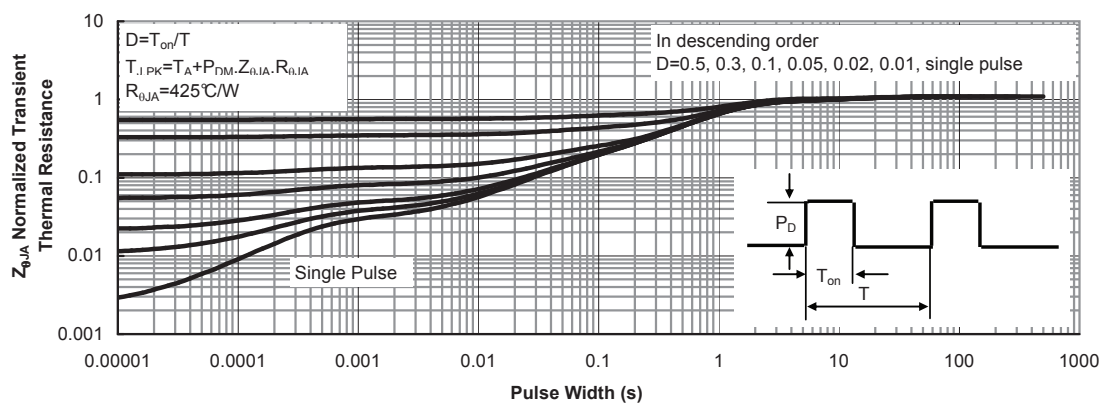
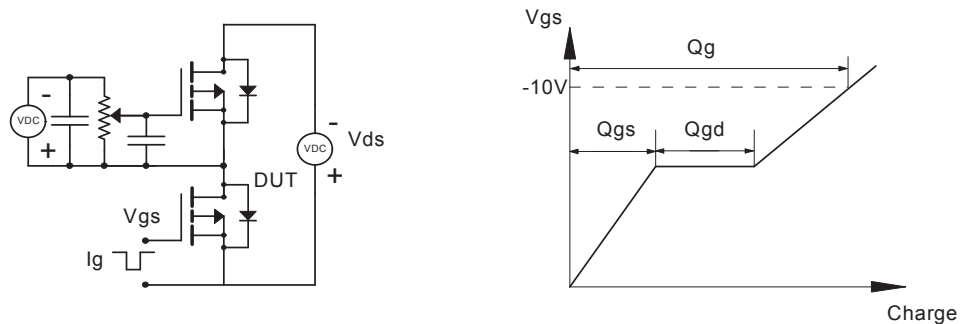


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

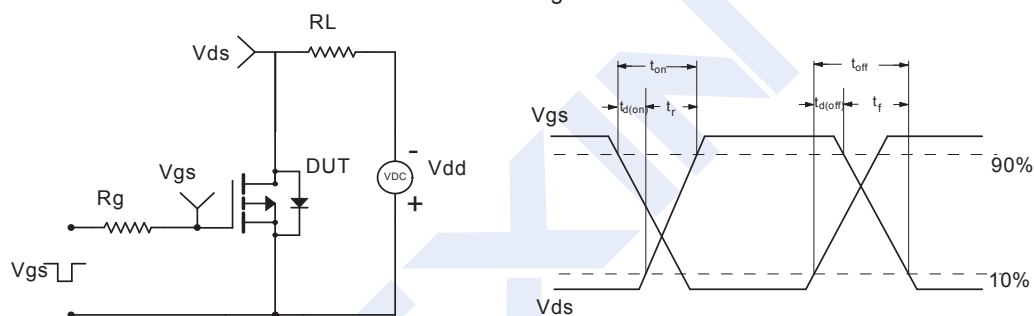
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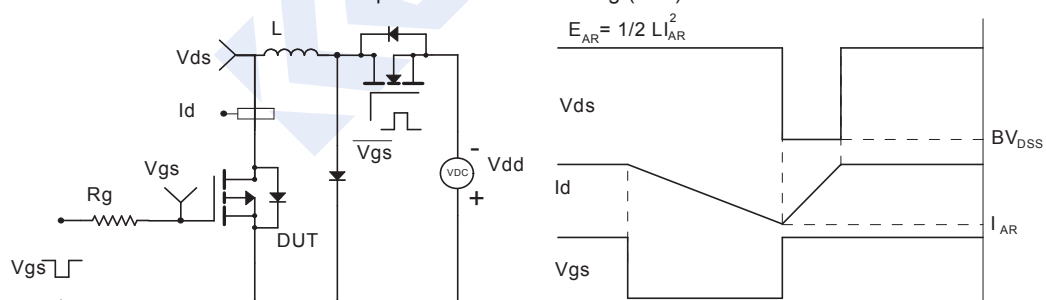
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

