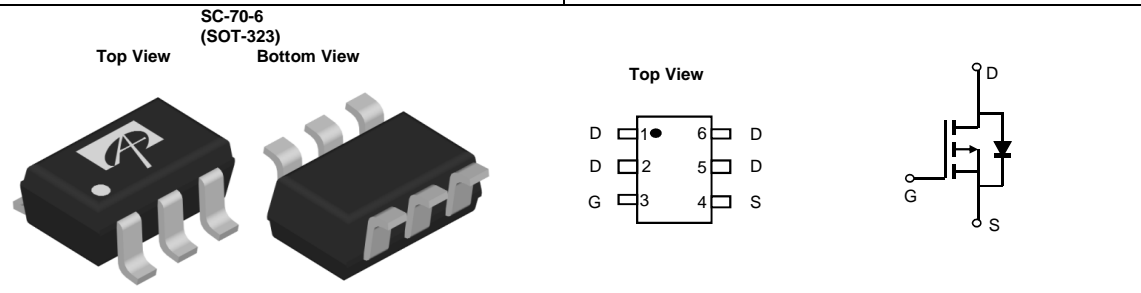


General Description

The AO7417 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.5V, in the small SOT363 footprint. This device is suitable for use in buck convertor.

Product Summary

V_{DS}	-20V
I_D (at $V_{GS}=-4.5V$)	-2A
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	< 80m Ω
$R_{DS(ON)}$ (at $V_{GS}=-2.5V$)	< 100m Ω
$R_{DS(ON)}$ (at $V_{GS}=-1.8V$)	< 125m Ω
$R_{DS(ON)}$ (at $V_{GS}=-1.5V$)	< 150m Ω



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

Parameter	Symbol	10 Sec	Steady State	Units
Drain-Source Voltage	V_{DS}		-20	V
Gate-Source Voltage	V_{GS}		± 8	V
Continuous Drain Current ^A	I_D	$T_A=25^\circ\text{C}$	-2	A
		$T_A=70^\circ\text{C}$	-1.7	
Pulsed Drain Current ^B	I_{DM}		-20	
Power Dissipation ^A	P_D	$T_A=25^\circ\text{C}$	0.63	W
		$T_A=70^\circ\text{C}$	0.4	
Junction and Storage Temperature Range	T_J, T_{STG}		-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	160	200	$^\circ\text{C/W}$
$t \leq 10\text{s}$				
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	180	220	$^\circ\text{C/W}$
Steady-State				
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	130	160	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-20V, V _{GS} =0V T _J =55°C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±8V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =-250μA	-0.5	-0.65	-1	V
I _{D(ON)}	On state drain current	V _{GS} =-4.5V, V _{DS} =-5V	-20			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-2A T _J =125°C		65 90	80 110	mΩ
		V _{GS} =-2.5V, I _D =-1.8A		80	100	
		V _{GS} =-1.8V, I _D =-1.5A		100	125	
		V _{GS} =-1.5V, I _D =-0.5A		115	150	
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-2A		10		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.7	-1	V
I _S	Maximum Body-Diode Continuous Current				-1	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-10V, f=1MHz		560	745	pF
C _{oss}	Output Capacitance			80		pF
C _{rss}	Reverse Transfer Capacitance			70		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		15	23	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-10V, I _D =-2A		8.5	11	nC
Q _{gs}	Gate Source Charge			1.2		nC
Q _{gd}	Gate Drain Charge			2.1		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-4.5V, V _{DS} =-10V, R _L =5Ω, R _{GEN} =6Ω		7.2		ns
t _r	Turn-On Rise Time			36		ns
t _{D(off)}	Turn-Off DelayTime			53		ns
t _f	Turn-Off Fall Time			56		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-2A, di/dt=100A/μs		37	49	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-2A, di/dt=100A/μs		27		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The value in any a given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C. The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D. The static characteristics in Figures 1 to 6 are obtained using 300 μs pulse width, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

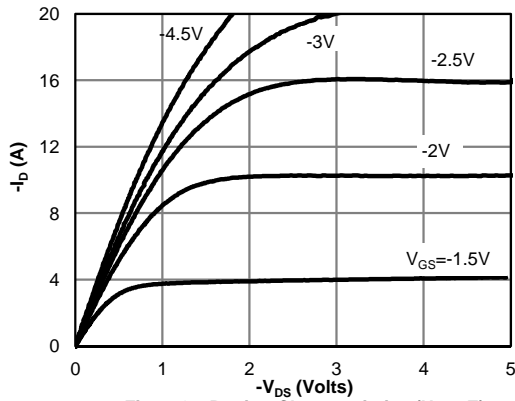


Fig 1: On-Region Characteristics (Note E)

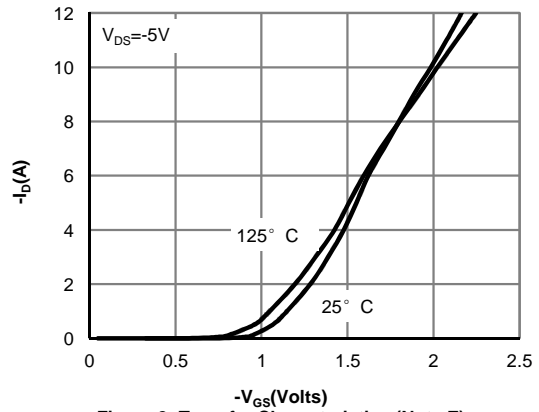


Figure 2: Transfer Characteristics (Note E)

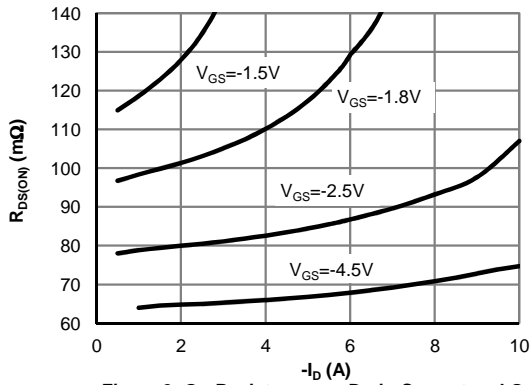


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

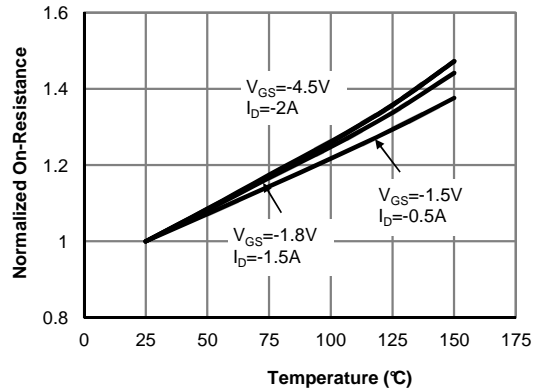


Figure 4: On-Resistance vs. Junction Temperature (Note E)

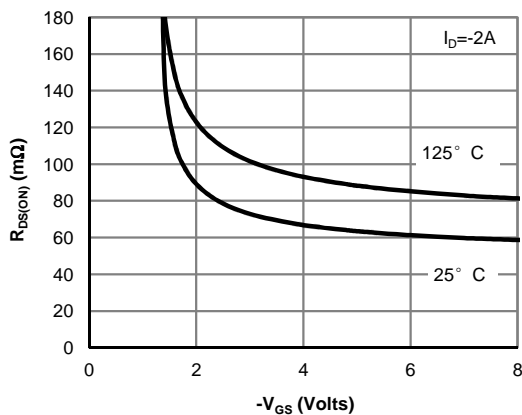


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

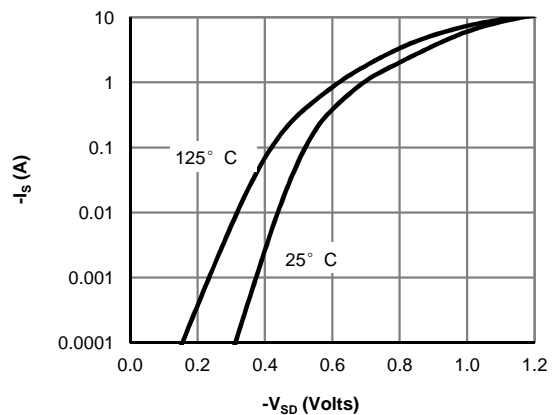


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

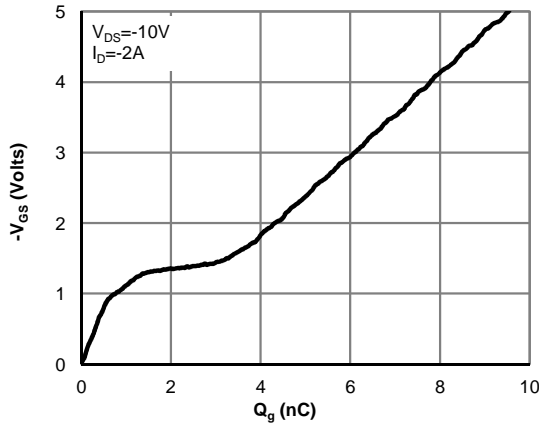


Figure 7: Gate-Charge Characteristics

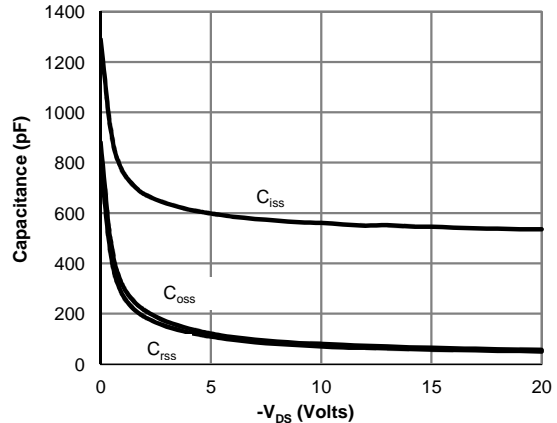


Figure 8: Capacitance Characteristics

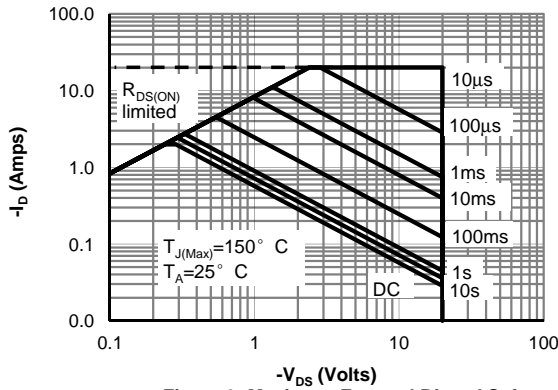


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

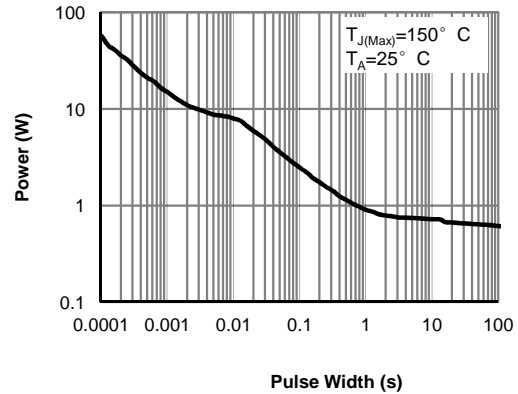


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

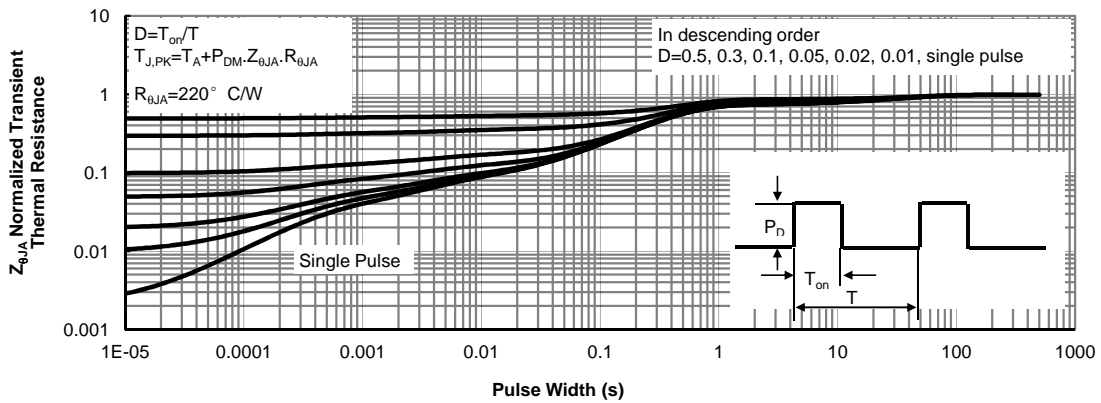


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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