AO7417
P-Channel Enhancement Mode Field Effect Transistor

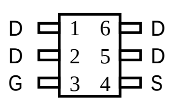
General Description

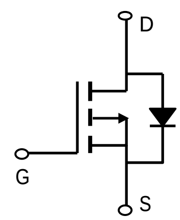
The AO7417/L uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.5V, in the small SOT363 footprint. This device is suitable for use in buck convertor.
AO7417 and AO7417L are electrically identical.
-RoHS Compliant
-AO7417L is Halogen Free

Features

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

SC-70-6
(SOT-363)
Top View





Absolute Maximum Ratings T_A=25°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]	T_A=25°C		-2	-1.9	
	T_A=70°C	I_D	-1.7	-1.6	A
Pulsed Drain Current [B]		I_{DM}	-20		
Power Dissipation [A]	T_A=25°C	P_D	0.63	0.57	W
	T_A=70°C		0.4	0.36	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150		°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	160	200	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		180	220	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	130	160	°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				-1	µA
			T_J=55°C			-5	
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			65	80	mΩ
			T_J=125°C		90	110	
		V_{GS}=-2.5V, I_D=-1.8A			80	100	mΩ
		V_{GS}=-1.8V, I_D=-1.5A			100	125	mΩ
		V_{GS}=-1.5V, I_D=-0.5A			115	150	mΩ
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 $R_{\theta JA}$ is measured with the device mounted on 1in^2 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 $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ 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 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.
Rev0: May 2008

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

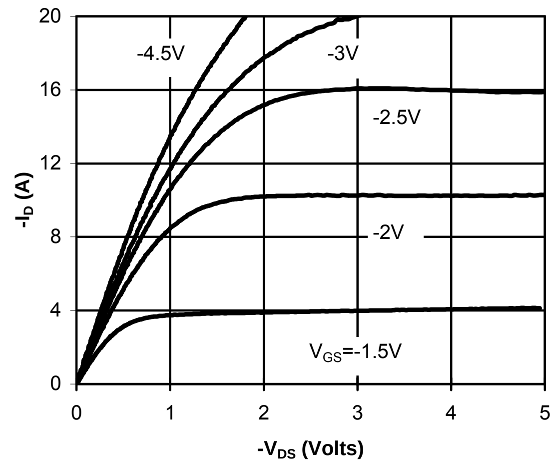


Fig 1: On-Region Characteristics

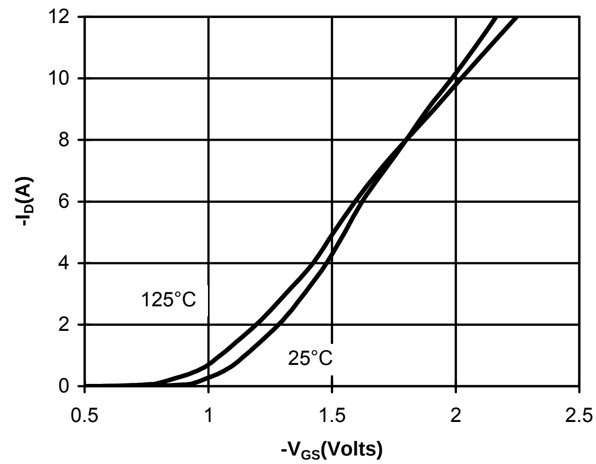


Figure 2: Transfer Characteristics

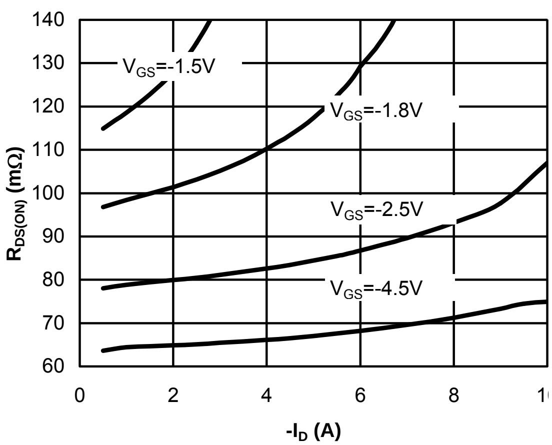


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

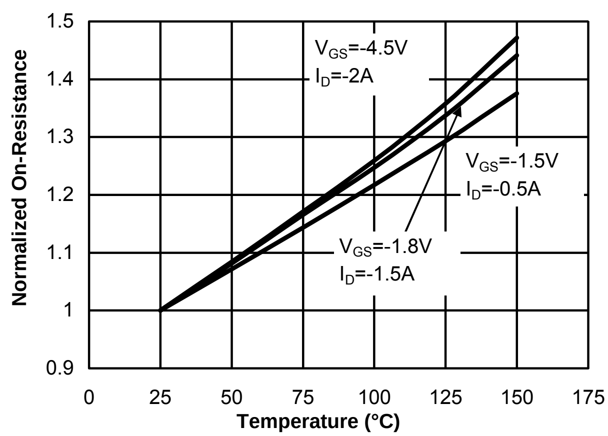


Figure 4: On-Resistance vs. Junction Temperature

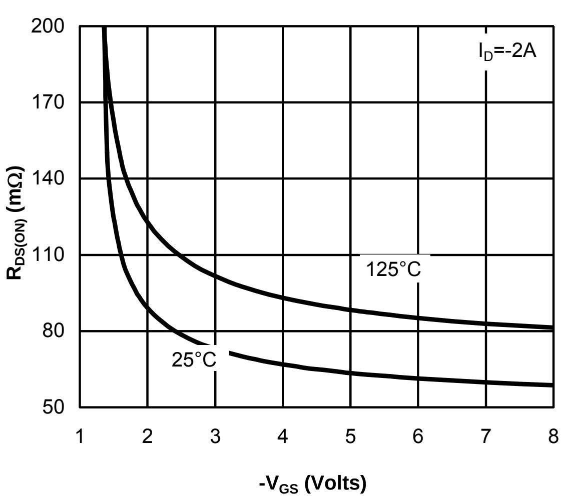


Figure 5: On-Resistance vs. Gate-Source Voltage

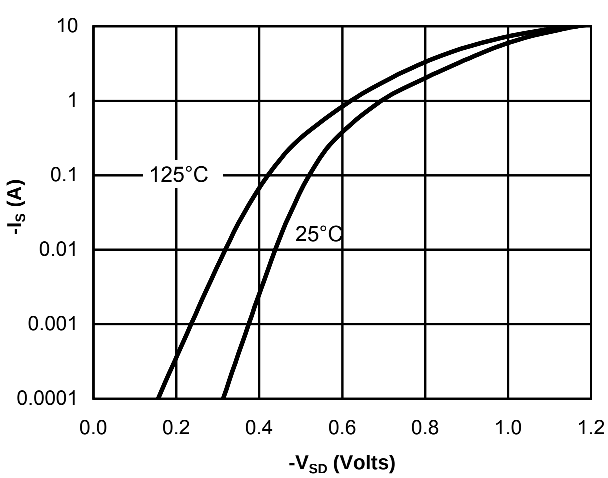


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

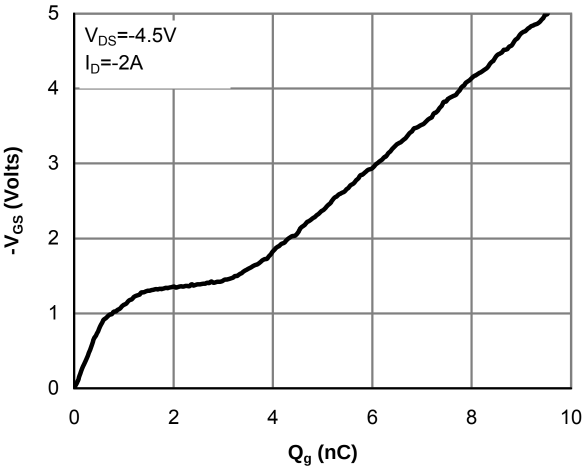


Figure 7: Gate-Charge Characteristics

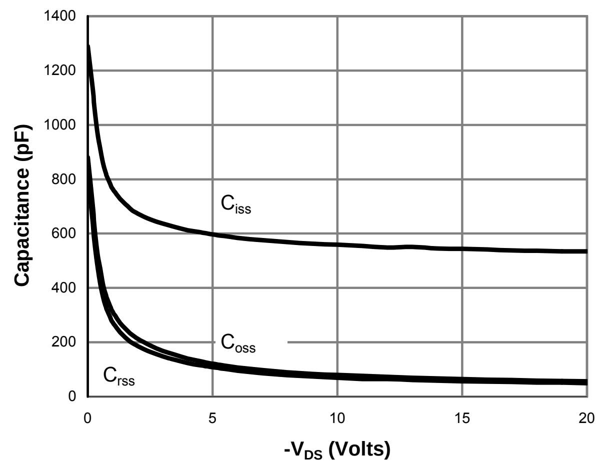


Figure 8: Capacitance Characteristics

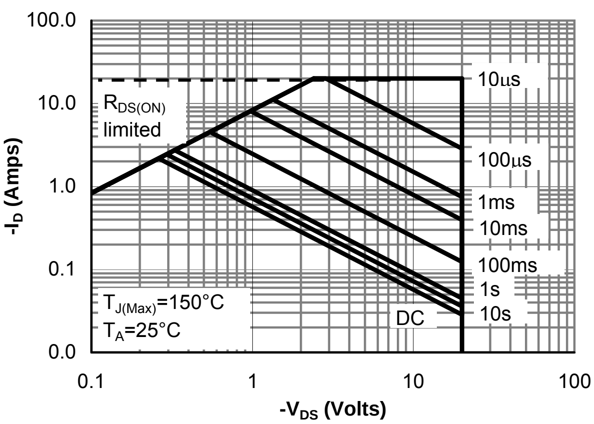


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

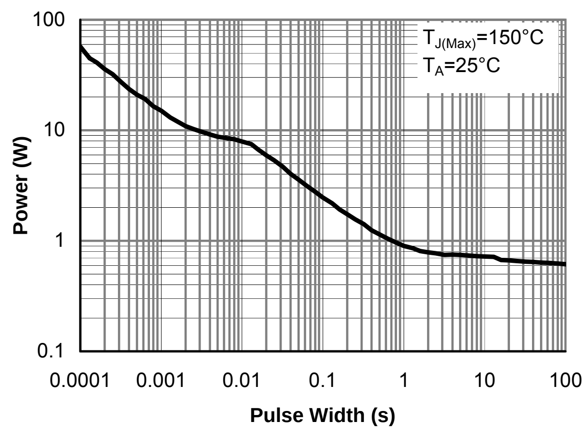


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

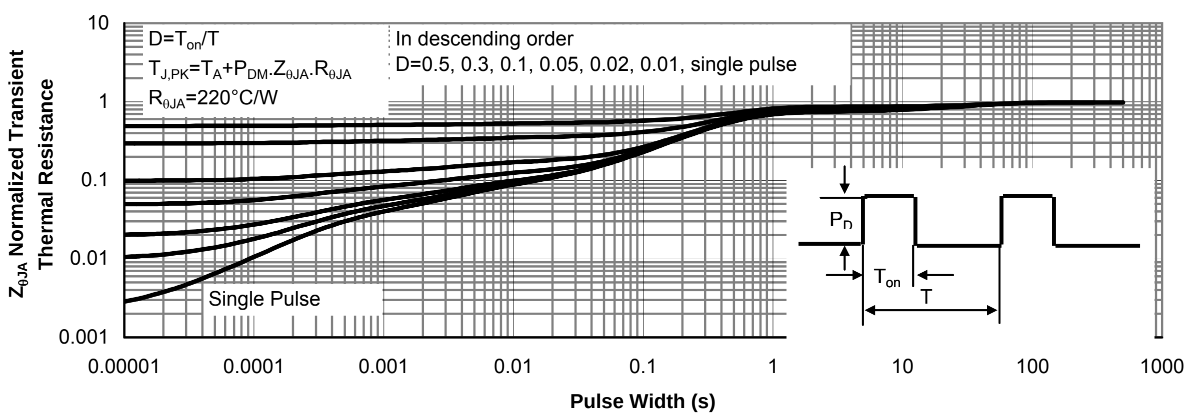


Figure 11: Normalized Maximum Transient Thermal Impedance