

• General Description

AP4459 combines advanced MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is most suitable to load-switch or PWM applications.

• Applications

- DC-DC converter for portable devices
- Load switch



Product Summary

Vds	-30V
I_{D} (at $V_{GS} = -10V$)	-6.5A
$R_{DS(ON)}$ (at $V_{GS} = -10V$)	< 46mΩ
$R_{DS(ON)}$ (at $V_{GS} = -4.5V$)	< 72mΩ

• Absolute Maximum Ratings Ta = 25°C

Parameter		Symbol	Rating	Unit	
Drain-Source Voltage		V _{DS}	-30	V	
Gate-Source Voltage		V _{GS}	±20	V	
Continuous Drain Current	Ta = 25°C	Т	-6.5	4	
	Ta = 70°C	ID	-5.3		
Pulsed Drain Current	I _{DM}	-30	А		
Avalanche Current	I _{AS} , I _{AR}	17			
Avalanche Energy (L = 0.1 mH)		E _{AS} , E _{AR}	14	mJ	
Power Dissipation	Ta = 25°C	D	3.1	W	
	Ta = 70°C	PD	2		
Junction and Storage Temperature Range		T _J , T _{STG}	-55 to 150	°C	
Thermal Characteristics					
Thermal Desistance Junction to Ambient	t ≤ 10s	D	40	°C/W	
i nermar Resistance. junction-to-Ambient	Steady State	n θJA	75		
Thermal Resistance. Junction-to-Lead	Steady State	R _{0IL}	24		



• Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Тур	Max	Unit
Static Parameters	Static Parameters					
Drain-Source Breakdown Voltage	V _{DSS}	I _D =-250μA, V _{GS} =0V	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V			-1	
		V _{DS} =-30V, V _{GS} =0V, T _J =55°C			-5	ΨμA
Gate-Body Leakage Current	I _{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.4	-1.85	-2.4	V
On-State Drain Current	I _{D(ON)}	V _{GS} =-10V, V _{DS} =-5V	-30			А
Static Drain-Source On-Resistance		V _{GS} =-10V, I _D =-6.5A			46	
	R _{DS(ON)}	V _{GS} =-10V, I _D =-6.5A, T _J =125°C			68	mΩ
		V _{GS} =-4.5V, I _D =-5A			72	
Forward Transconductance	\mathbf{g}_{FS}	V _{DS} =-5V, I _D =-6.5A		14		S
Diode Forward Voltage	V _{SD}	I _S =-1A, V _{GS} =0V			-1	V
Maximum Body-Diode Continuous Current	Is				-3.5	А
Dynamic Parameters						
Input Capacitance	C _{iss}			520		
Output Capacitance	Coss	V _{GS} =0V, V _{DS} =-15V, f=1MHz		100		pF
Reverse Transfer Capacitance	C _{rss}			62		
Gate Resistance	Rg	V _{GS} =0V, V _{DS} =0V, f=1MHz	3.5		11.5	Ω
Switching Parameters						
Total Gate Charge (10V)				9.2	11	
Total Gate Charge (4.5V)	Qg			4.6	6	nC
Gate Source Charge	Q _{gs}	v_{GS} =-10V, v_{DS} =-15V, I_{D} =-6.5A		1.6		
Gate Drain Charge	Q_{gd}			2.2		
Turn-On Delay Time	t _{D(on)}			7.5		
Turn-On Rise Time	t _r	V _{GS} =-10V, V _{DS} =-15V, R _L =2.5Ω,		5.5		ns
Turn-Off Delay Time	t _{D(off)}	$R_{GEN}=3\Omega$		19		
Turn-Off Fall Time	t _f			7		
Body Diode Reverse Recovery Time	t _{rr}	I _F =-6.5A, d _i /d _t =100A/μs		11		
Body Diode Reverse Recovery Charge	Q _{rr}	I _F =-6.5A, d _i /d _t =100A/μs		5.3		nC

• Ordering Information

Ordering Part Number	Package	MOQ
AP4459	SOP-8	2,500 pcs / reel

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• Typical Electrical and Thermal Characteristics



Note 1: The static characteristics in Figure 1 to 6 are obtained using $<300\mu$ A pulses, duty cycle 0.5% max.

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Note 2: The curves in Figure 10 to 12 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 $T_{J(MAX)}=150^{\circ}$ C. The SOA curve provides a single pulse rating.

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