

• General Description

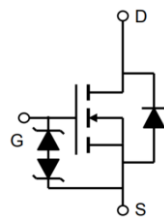
AP4480 combines advanced MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ESD protected. It is most suitable for load switch or PWM applications.

• Applications

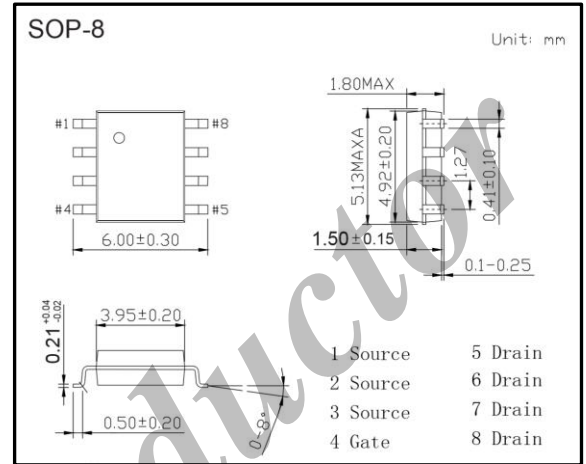
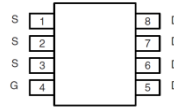
- As a low side switch in SMPS
- Load switch

• Product Summary

V_{DS}	40V
I_D (at $V_{GS} = 10V$)	14A
$R_{DS(ON)}$ (at $V_{GS} = 10V$)	< 11.5m Ω
$R_{DS(ON)}$ (at $V_{GS} = 4.5V$)	< 15.5m Ω
ESD Rating	4KV HBM



Top View



• Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_a = 25^\circ C$	14
		$T_a = 70^\circ C$	11
Pulsed Drain Current	I_{DM}	70	A
Power Dissipation	P_D	$T_a = 25^\circ C$	3.1
		$T_a = 70^\circ C$	2
Avalanche Current	I_{AR}	30	A
Repetitive avalanche energy ($L = 0.3mH$)	E_{AR}	135	mJ
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$
Thermal Characteristics			
Thermal Resistance. Junction-to-Ambient	$R_{\theta JA}$	$t \leq 10s$	40
		Steady State	75
Thermal Resistance. Junction-to-Lead	$R_{\theta JL}$	Steady State	24

• **Electrical Characteristics Ta = 25°C**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Static Parameters							
Drain-Source Breakdown Voltage	V_{DSS}	$I_D=250\mu A, V_{GS}=0V$	40			V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=32V, V_{GS}=0V$			1	μA	
		$V_{DS}=32V, V_{GS}=0V, T_J=55^\circ C$			5		
Gate-Body Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	μA	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1		3	V	
On-State Drain Current	$I_{D(ON)}$	$V_{GS}=10V, V_{DS}=5V$	70			A	
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=14A$			11.5	m Ω	
		$V_{GS}=10V, I_D=14A, T_J=125^\circ C$			13		
		$V_{GS}=4.5V, I_D=5A$			15.5		
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=5A$	50			S	
Diode Forward Voltage	V_{SD}	$I_S=1A, V_{GS}=0V$			1	V	
Maximum Body-Diode Continuous Current	I_S				4	A	
Dynamic Parameters							
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=20V, f=1MHz$		1600	1920	pF	
Output Capacitance	C_{oss}			320			
Reverse Transfer Capacitance	C_{rss}			100			
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$		3.4		Ω	
Switching Parameters							
Total Gate Charge (10V)	Q_g	$V_{GS}=10V, V_{DS}=20V, I_D=14A$		22		nC	
Total Gate Charge (4.5V)				10.5			
Gate Source Charge			Q_{gs}		4.2		
Gate Drain Charge			Q_{gd}		4.8		
Turn-On Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=20V, R_L=1.5\Omega, R_{GEN}=3\Omega$		3.5		ns	
Turn-On Rise Time	t_r			6			
Turn-Off Delay Time	$t_{D(off)}$			13.2			
Turn-Off Fall Time	t_f			3.5			
Body Diode Reverse Recovery Time	t_{rr}	$I_F=18A, d_i/d_t=100A/\mu s$		31			
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=18A, d_i/d_t=100A/\mu s$		33		nC	

• **Ordering Information**

Ordering Part Number	Package	MOQ
AP4480	SOP-8	2,500 pcs / reel

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• Typical Electrical and Thermal Characteristics

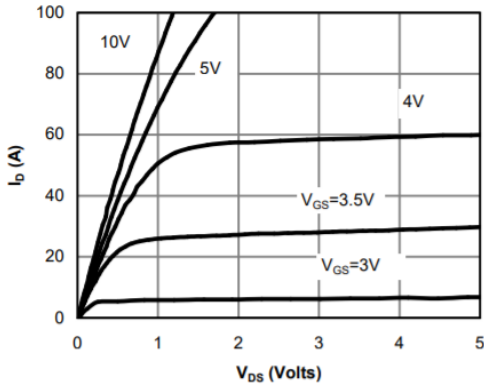


Figure 1: On-Region Characteristics

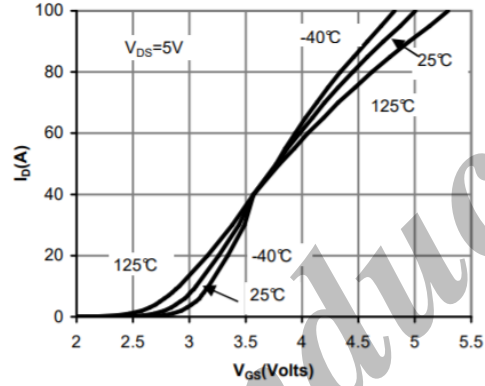


Figure 2: Transfer Characteristics

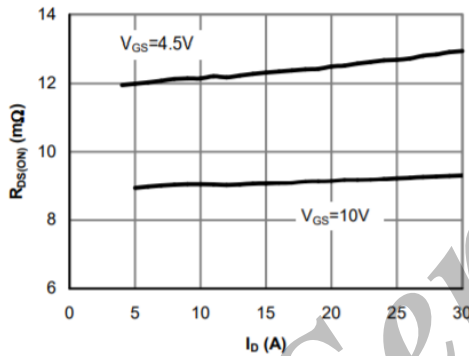


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

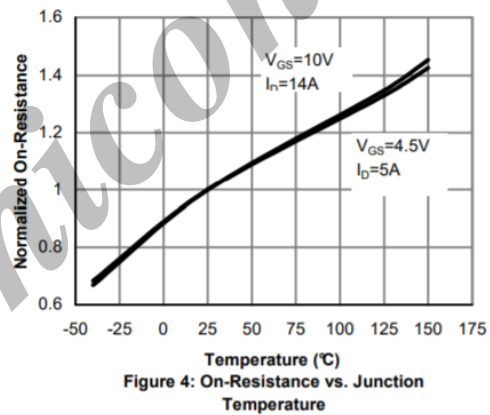


Figure 4: On-Resistance vs. Junction Temperature

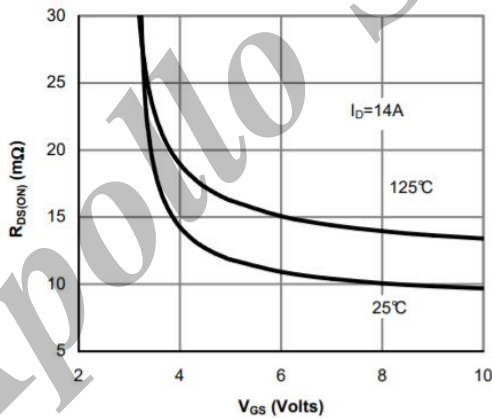


Figure 5: On-Resistance vs. Gate-Source Voltage

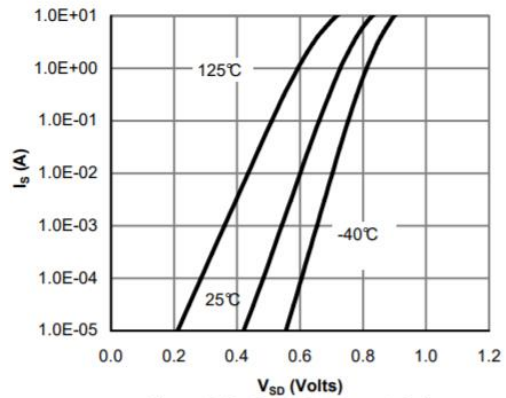


Figure 6: Body-Diode Characteristics

Note 1: The static characteristics in Figure 1 to 6 are obtained using <math><300\mu\text{A}</math> pulses, duty cycle 0.5% max.

• Typical Electrical and Thermal Characteristics

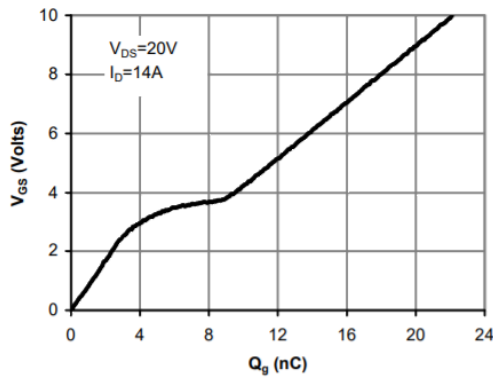


Figure 7: Gate-Charge Characteristics

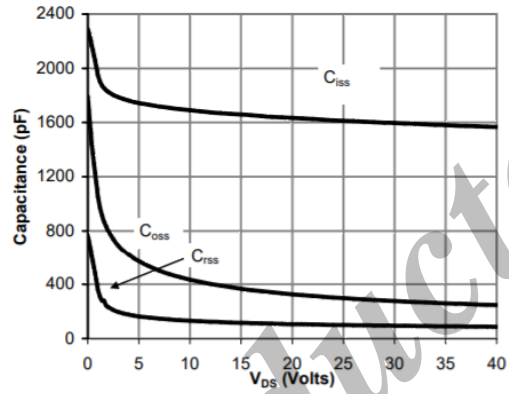


Figure 8: Capacitance Characteristics

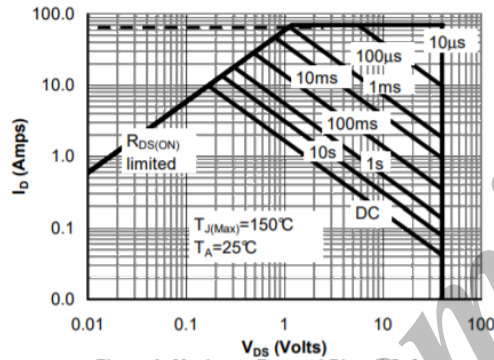


Figure 9: Maximum Forward Biased Safe Operating Area

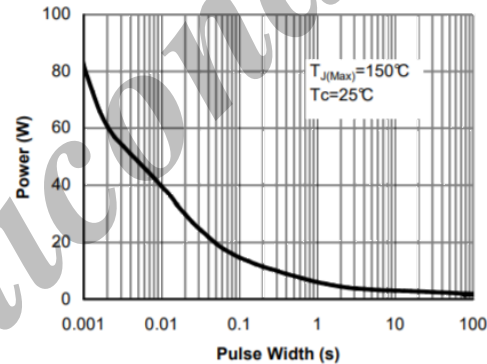


Figure 10: Single Pulse Power Rating Junction-to-Ambient

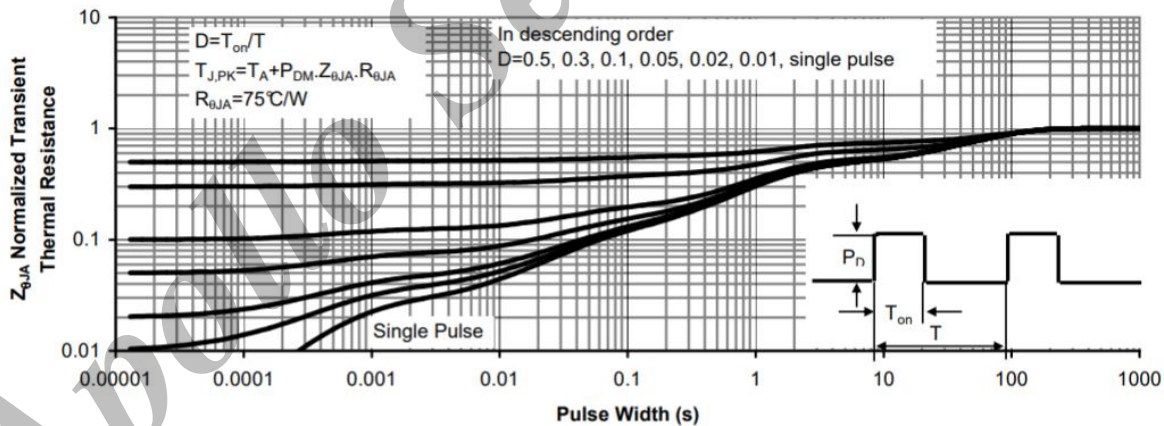


Figure 11: Normalized Maximum Transient Thermal Impedance

Note 2: The curves in Figure 9 to 11 are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. copper, assuming a maximum junction temperature of T_{J(MAX)}=150°C. The SOA curve provides a single pulse rating.

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