

General Description

AP4410 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

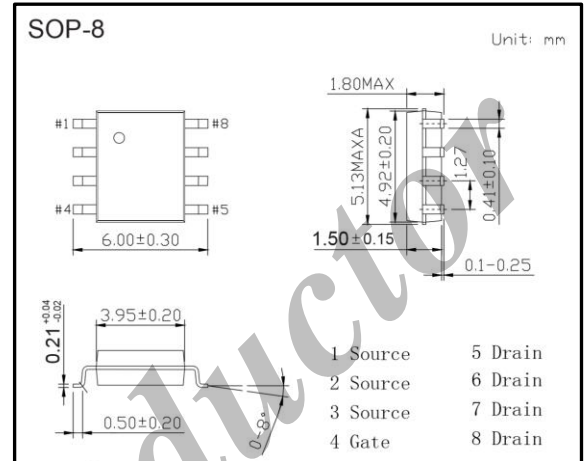
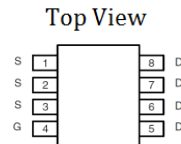
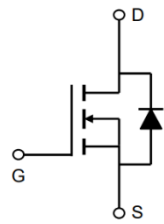
- DC-DC converter for portable devices
- Load switch

Product Summary

V_{DS}	30V
I_D (at $V_{GS} = 10V$)	18A
$R_{DS(ON)}$ (at $V_{GS} = 10V$)	< 5.5m Ω
$R_{DS(ON)}$ (at $V_{GS} = 4.5V$)	< 6.2m Ω

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current	$T_a = 25^\circ C$	I_D	18	A
	$T_a = 70^\circ C$		15	
Pulsed Drain Current		I_{DM}	80	
Power Dissipation	$T_a = 25^\circ C$	P_D	3.1	W
	$T_a = 70^\circ C$		2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$
Thermal Characteristics				
Thermal Resistance. Junction-to-Ambient	$t \leq 10s$	$R_{\theta JA}$	40	$^\circ C/W$
	Steady State		75	
Thermal Resistance. Junction-to-Lead	Steady State	$R_{\theta JL}$	24	



• Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	V_{DS}	$I_D=250\mu A, V_{GS}=0V$	30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$			1	μA
		$V_{DS}=30V, V_{GS}=0V, T_J=55^\circ C$			5	
Gate-Body Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.8		1.5	V
On-State Drain Current	$I_{D(on)}$	$V_{GS}=10V, V_{DS}=5V$	80			A
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=18A$			5.5	m Ω
		$V_{GS}=10V, I_D=18A, T_J=125^\circ C$			7.4	
		$V_{GS}=4.5V, I_D=15A$			6.2	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=18A$		102		S
Diode Forward Voltage	V_{SD}	$I_S=1A, V_{GS}=0V$			1	V
Maximum Body-Diode Continuous Current	I_S				4.5	A
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=10V, f=1MHz$		9130	10500	pF
Output Capacitance	C_{oss}			625		
Reverse Transfer Capacitance	C_{rss}			387		
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$		0.4	0.5	Ω
Switching Parameters						
Total Gate Charge (4.5V)	Q_g	$V_{GS}=10V, V_{DS}=15V, I_D=18A$		72.4	85	nC
Gate Source Charge	Q_{gs}			13.4		
Gate Drain Charge	Q_{gd}			16.8		
Turn-On Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=15V, R_L=0.83\Omega, R_{GEN}=3\Omega$		11	15	ns
Turn-On Rise Time	t_r			7	11	
Turn-Off Delay Time	$t_{D(off)}$			99	135	
Turn-Off Fall Time	t_f			13	19.5	
Body Diode Reverse Recovery Time	t_{rr}	$I_F=18A, d_i/d_t=100A/\mu s$		33	40	
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=18A, d_i/d_t=100A/\mu s$		22.2	30	nC

• Ordering Information

Ordering Part Number	Package	MOQ
AP4410	SOP-8	2,500 pcs / reel

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- Typical Electrical and Thermal Characteristics

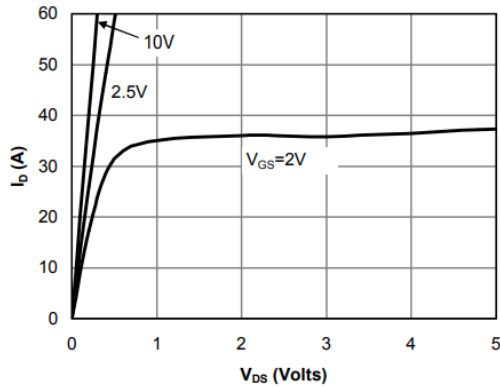


Fig 1: On-Region Characteristics

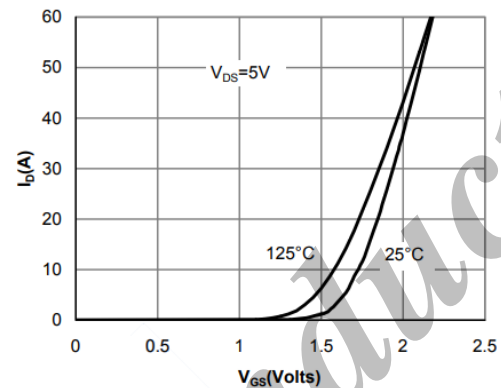


Figure 2: Transfer Characteristics

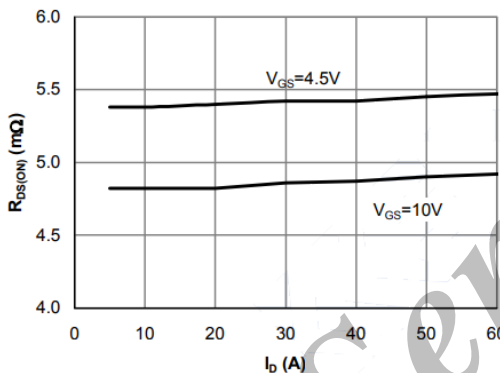


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

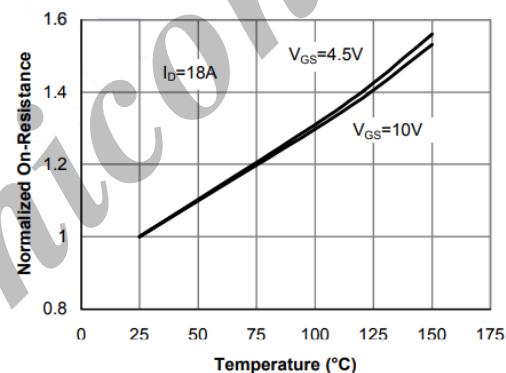


Figure 4: On-Resistance vs. Junction Temperature

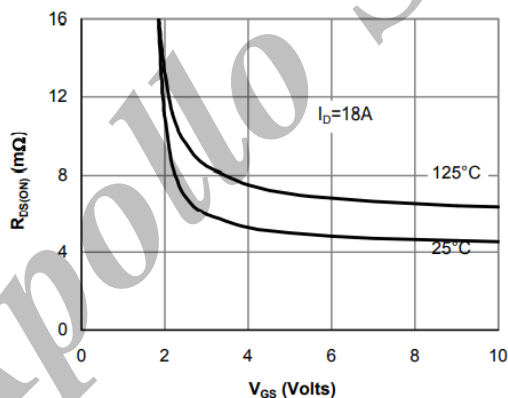


Figure 5: On-Resistance vs. Gate-Source Voltage

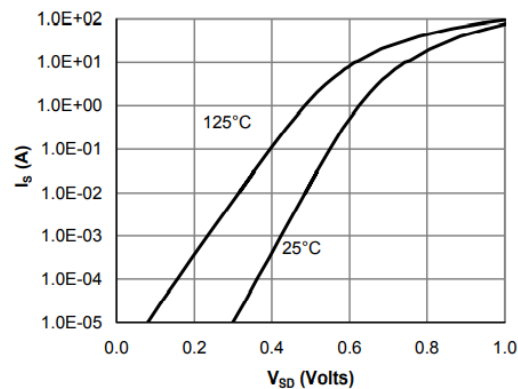


Figure 6: Body-Diode Characteristics

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

- Typical Electrical and Thermal Characteristics

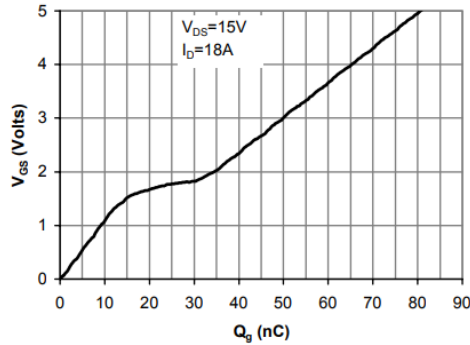


Figure 7: Gate-Charge Characteristics

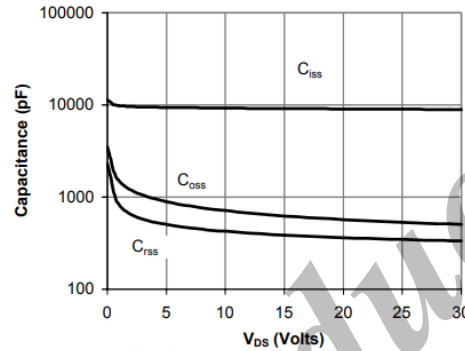


Figure 8: Capacitance Characteristics

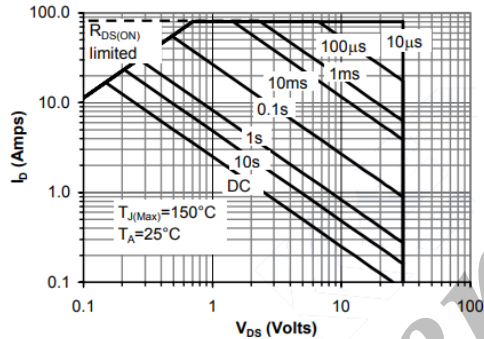


Figure 9: Maximum Forward Biased Safe Operating Area

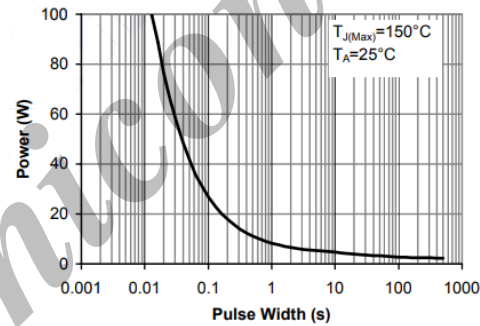


Figure 10: Single Pulse Power Rating Junction-to-Ambient

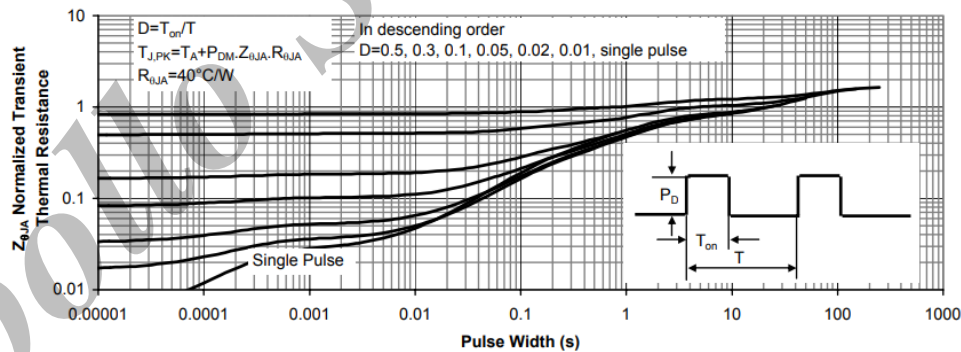


Figure 11: Normalized Maximum Transient Thermal Impedance

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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