

### • General Description

AP4421 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

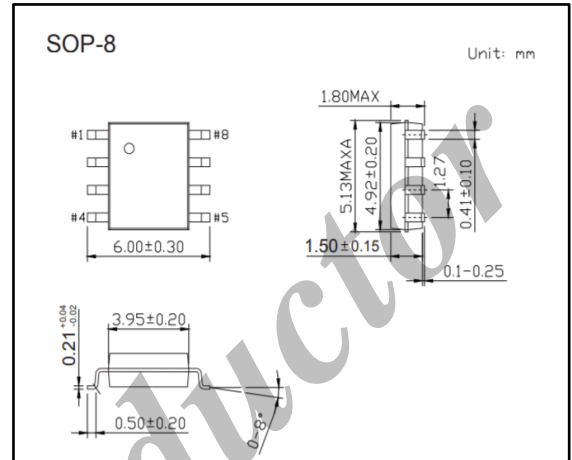
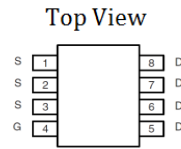
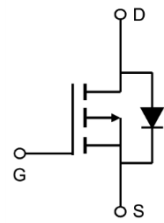
- DC-DC converter for portable devices
- Load switch

### • Product Summary

$V_{DS}$	.60V
$I_D$ (at $V_{GS} = -10V$ )	.6.2A
$R_{DS(ON)}$ (at $V_{GS} = -10V$ )	< 40m $\Omega$
$R_{DS(ON)}$ (at $V_{GS} = -4.5V$ )	< 50m $\Omega$

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		$V_{DS}$	-60	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$T_a = 25^\circ C$	$I_D$	-6.2	A
	$T_a = 70^\circ C$		-5.0	
Pulsed Drain Current		$I_{DM}$	-40	
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	$R_{\theta JL}$	30	



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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
<b>Static Parameters</b>							
Drain-Source Breakdown Voltage	$V_{DSS}$	$I_D = -250\mu A, V_{GS} = 0V$	-60			V	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -48V, V_{GS} = 0V$			-1	$\mu A$	
		$V_{DS} = -48V, V_{GS} = 0V, T_j = 55^\circ C$			-5		
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$			$\pm 100$	nA	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1		-3	V	
On-State Drain Current	$I_{D(ON)}$	$V_{GS} = -10V, V_{DS} = -5V$	-40			A	
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -6.2A$			40	m $\Omega$	
		$V_{GS} = -10V, I_D = -6.2A, T_j = 125^\circ C$			70		
		$V_{GS} = -4.5V, I_D = -5A$			50		
Forward Transconductance	$g_{FS}$	$V_{DS} = -5V, I_D = -6.2A$		18		S	
Diode Forward Voltage	$V_{SD}$	$I_S = -1A, V_{GS} = 0V$			-1	V	
Maximum Body-Diode Continuous Current	$I_S$				-4.2	A	
<b>Dynamic Parameters</b>							
Input Capacitance	$C_{iss}$			2417	2900	pF	
Output Capacitance	$C_{oss}$	$V_{GS} = 0V, V_{DS} = -30V, f = 1MHz$		179			
Reverse Transfer Capacitance	$C_{rss}$			120			
Gate Resistance	$R_g$	$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$		1.9	2.3	$\Omega$	
<b>Switching Parameters</b>							
Total Gate Charge (10V)	$Q_g$	$V_{GS} = -10V, V_{DS} = -30V, I_D = -6.2A$		46.5	55	nC	
Total Gate Charge (4.5V)				22.7			
Gate Source Charge			$Q_{gs}$		9.1		
Gate Drain Charge			$Q_{gd}$		9.2		
Turn-On Delay Time	$t_{D(on)}$	$V_{GS} = -10V, V_{DS} = -30V, R_L = 4.7\Omega, R_{GEN} = 3\Omega$		9.8		ns	
Turn-On Rise Time	$t_r$			6.1			
Turn-Off Delay Time	$t_{D(off)}$			44			
Turn-Off Fall Time	$t_f$			12.7			
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -6.2A, d_i/d_t = 100A/\mu s$		34	42		
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F = -6.2A, d_i/d_t = 100A/\mu s$		47		nC	

• **Ordering Information**

Ordering Part Number	Package	MOQ
AP4421	SOP-8	2,500 pcs / reel

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• **Typical Electrical and Thermal Characteristics**

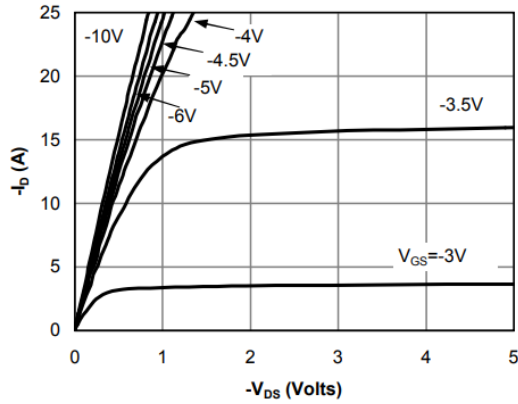


Fig 1: On-Region Characteristics

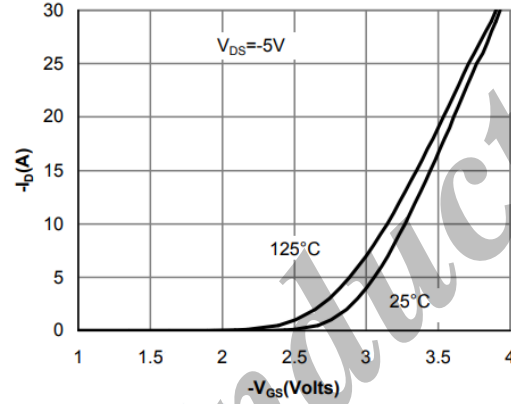


Figure 2: Transfer Characteristics

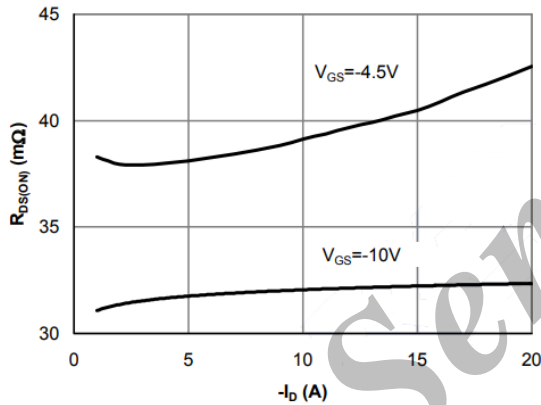


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

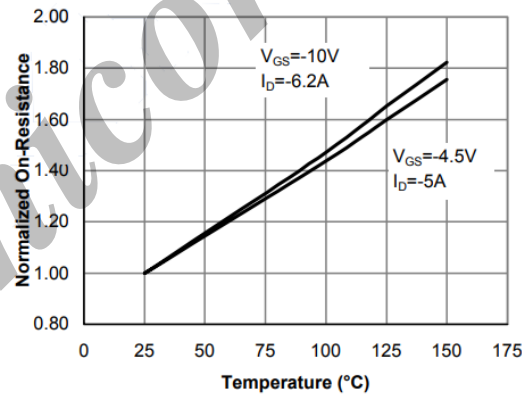


Figure 4: On-Resistance vs. Junction Temperature

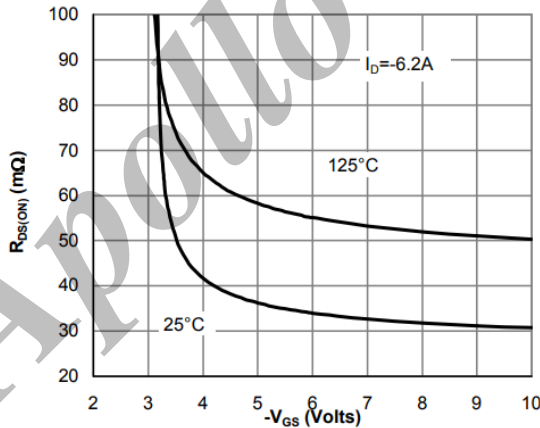


Figure 5: On-Resistance vs. Gate-Source Voltage

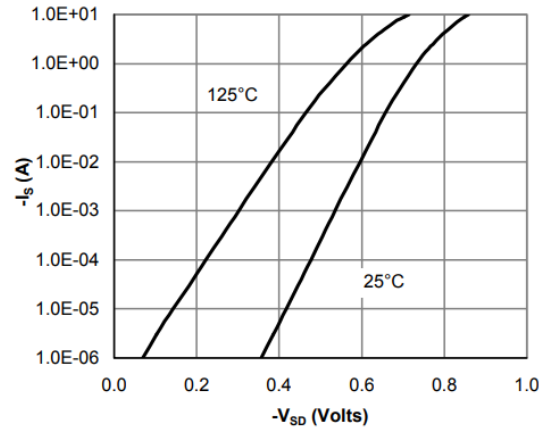


Figure 6: Body-Diode Characteristics

• Typical Electrical and Thermal Characteristics

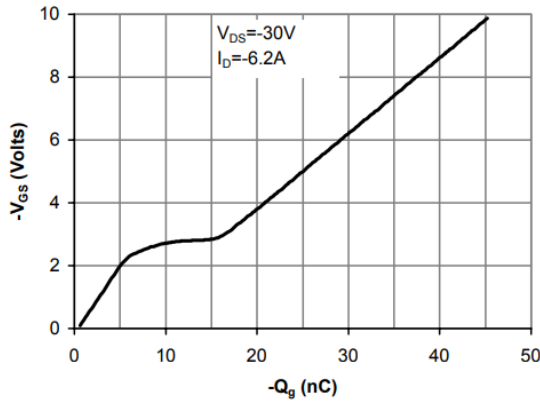


Figure 7: Gate-Charge Characteristics

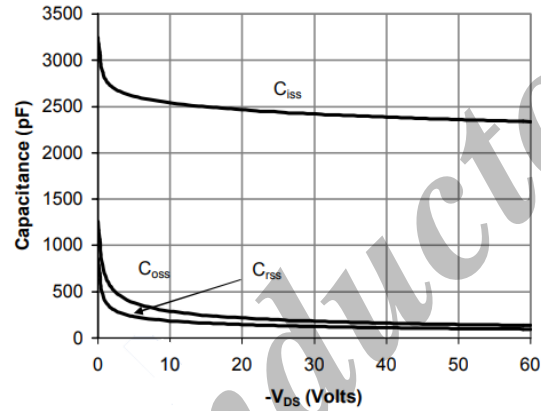


Figure 8: Capacitance Characteristics

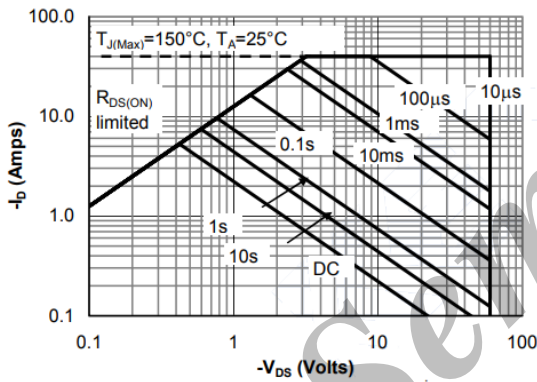


Figure 9: Maximum Forward Biased Safe Operating Area

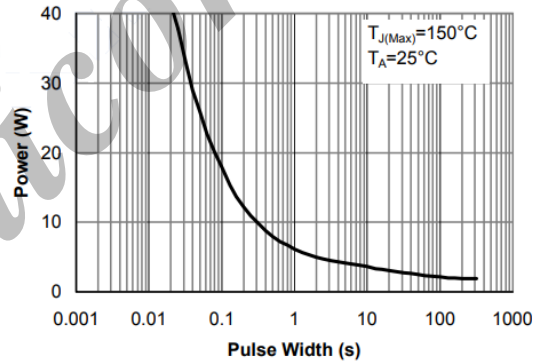


Figure 10: Single Pulse Power Rating Junction-to-Ambient

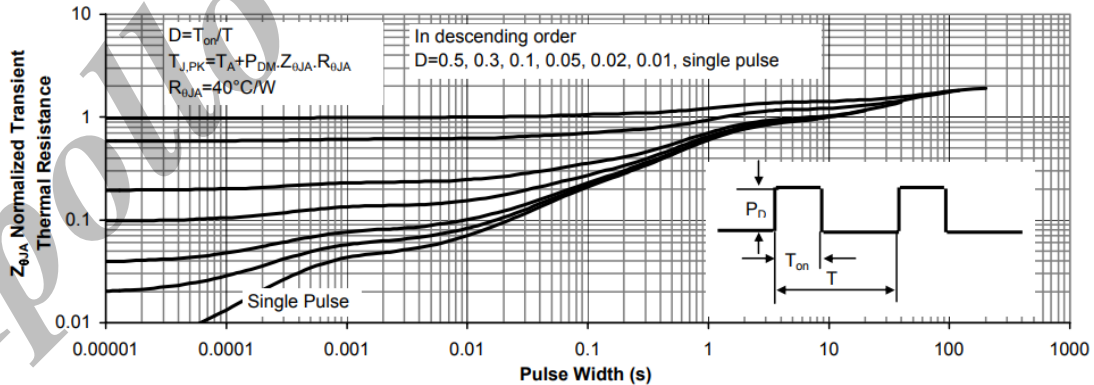


Figure 11: Normalized Maximum Transient Thermal Impedance

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