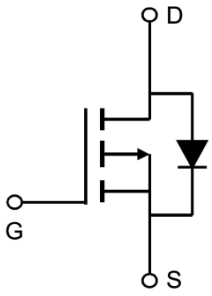
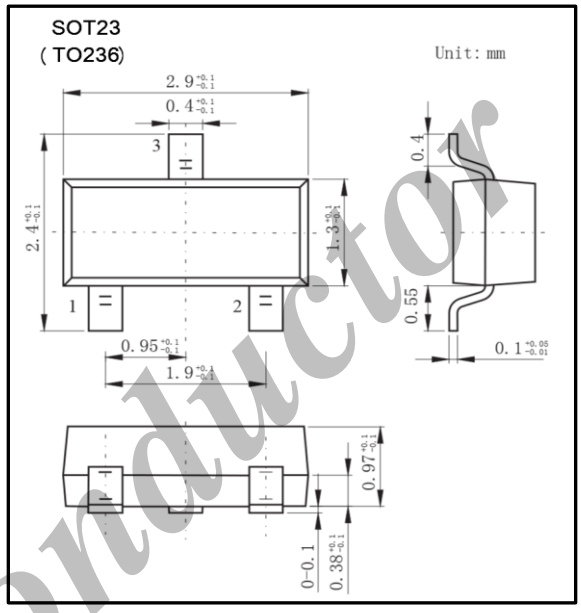
AP3409A
30V P-Channel Enhancement Mode MOSFET

- **General Description**

AP3409A 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.

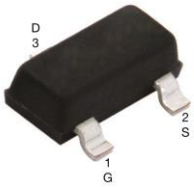




- **Applications**

- DC/DC converter for portable devices
- Load switch

Top View



- **Product Summary**

V_{DS}	-30V
I_D (at V_{GS} = -10V)	-2.6A
$R_{DS(ON)}$ (at V_{GS} = -10V)	< 130mΩ
$R_{DS(ON)}$ (at V_{GS} = -4.5V)	< 200mΩ

Pb-Free

RoHS COMPLIANT

- **Absolute Maximum Ratings Ta = 25℃**

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25℃	I_D	-2.6	A
	T_A=70℃		-2.2	
Pulsed Drain Current *		I_{DM}	-20	
Power Dissipation	T_A= 25℃	P_D	1.4	W
	T_A= 70℃		1	
Thermal Resistance. Junction-to-Ambient	t ≤ 10s	$R_{\theta JA}$	90	℃/W
Thermal Resistance. Junction-to-Ambient	(Stead-state)		125	
Thermal Resistance. Junction-to-Case	(Stead-state)	$R_{\theta JC}$	80	
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{STG}	-55 to 150	

* Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
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	μA
		V_{DS}=-30V, V_{GS}=0V, T_J=55°C			-5	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1	-1.9	-3	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-2.6A		97	130	mΩ
		V_{GS}=-10V, I_D=-2.6A T_J=125°C		135	150	
		V_{GS}=-4.5V, I_D=-2A		166	200	
On state drain current	$I_{D(ON)}$	V_{GS}=-4.5V, V_{DS}=-5V	-5			A
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-5A	3	3.8		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-15V, f=1MHz		302	370	pF
Output Capacitance	C_{oss}			50.3		
Reverse Transfer Capacitance	C_{rss}			37.8		
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		12	18	Ω
Total Gate Charge (10V)	Q_g	V_{GS}=-4.5V, V_{DS}=-15V, I_D=-2.6A		6.8	9	nC
Total Gate Charge (4.5V)				2.4		
Gate Source Charge	Q_{gs}			1.6		
Gate Drain Charge	Q_{gd}			0.95		
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=-10V, V_{DS}=-15V, R_L=5.8Ω, R_{GEN}=3Ω		7.5		ns
Turn-On Rise Time	t_r			3.2		
Turn-Off Delay Time	$t_{D(off)}$			17		
Turn-Off Fall Time	t_f			6.8		
Body Diode Reverse Recovery Time	t_{rr}	I_F=-2.6A, d_I/d_t=100A/ μs		16.8	22	
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=-2.6A, d_I/d_t=100A/ μs		10		nC
Maximum Body-Diode Continuous Current	I_S				-2	A
Diode Forward Voltage	V_{SD}	I_S=-1A, V_{GS}=0V		-0.82	-1	V

- **Ordering Information**

Ordering Part Number	Package	MOQ
AP3409A	SOT23 (TO236)	3,000 pcs / reel

- **Typical Characteristics**

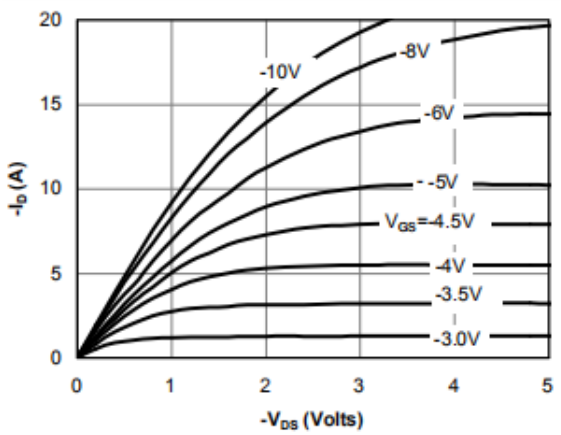


Fig 1: On-Region Characteristics

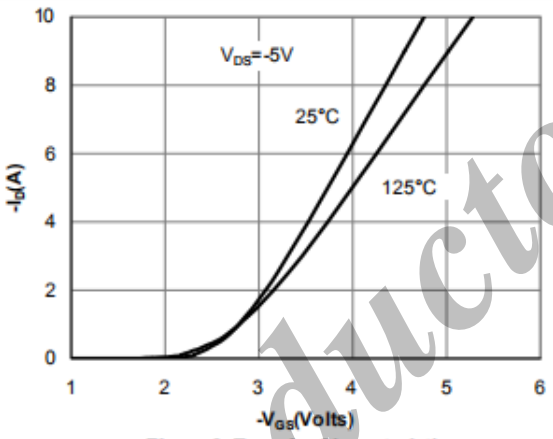


Figure 2: Transfer Characteristics

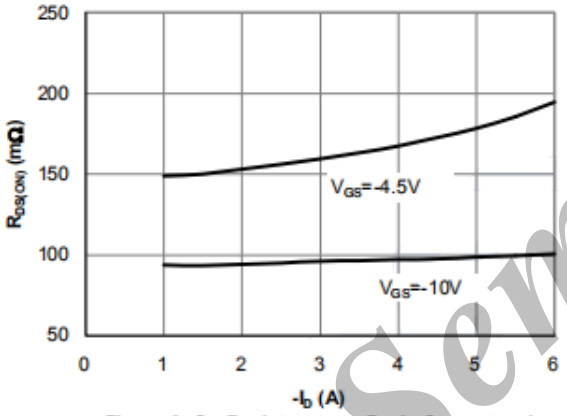


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

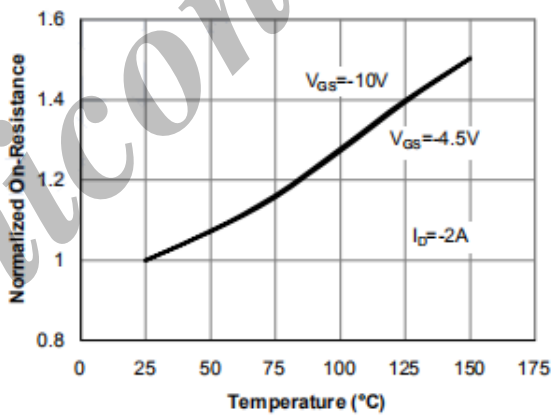


Figure 4: On-Resistance vs. Junction Temperature

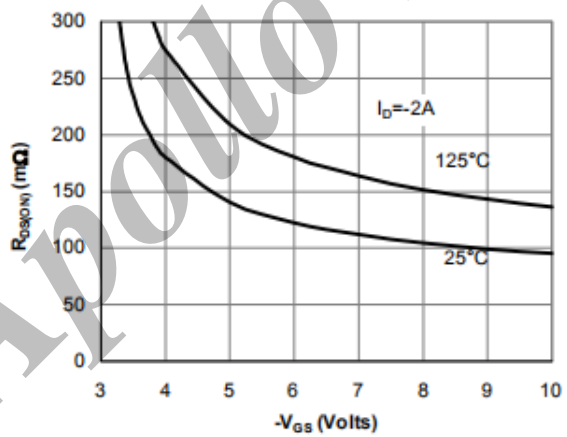


Figure 5: On-Resistance vs. Gate-Source Voltage

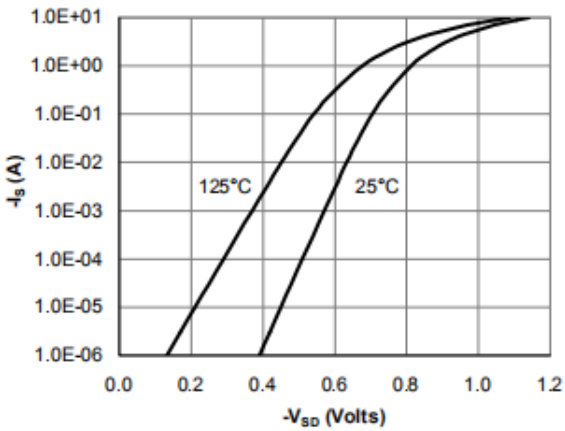


Figure 6: Body-Diode Characteristics

The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

- **Typical Characteristics**

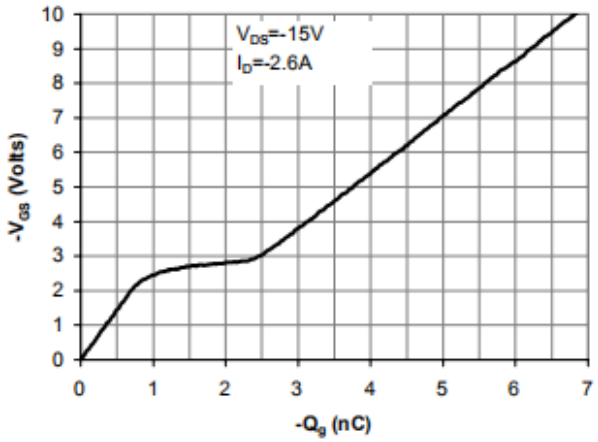


Figure 7: Gate-Charge Characteristics

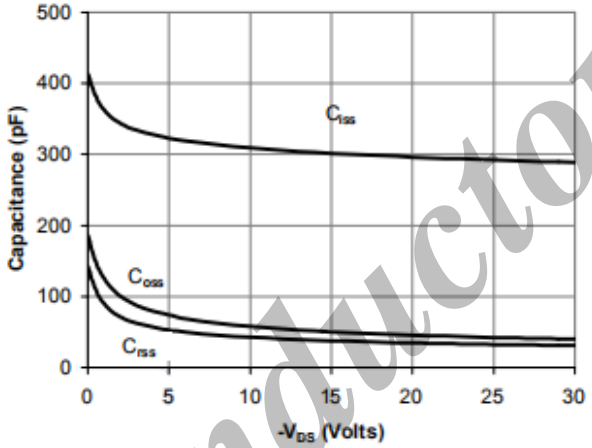


Figure 8: Capacitance Characteristics

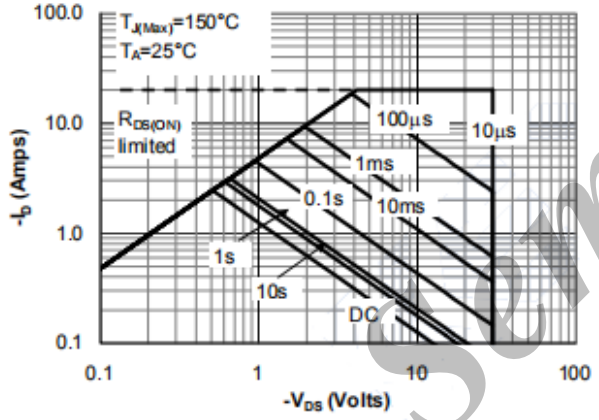


Figure 9: Maximum Forward Biased Safe Operating Area

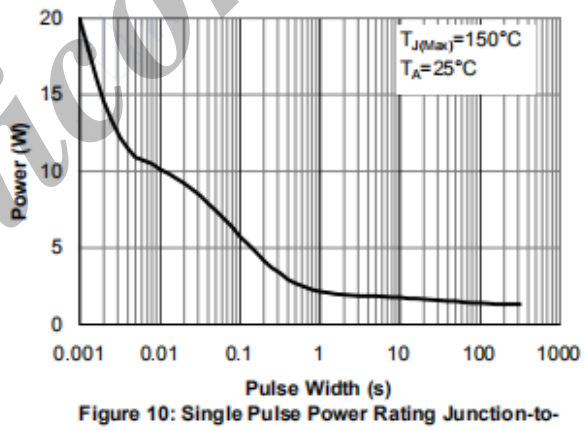


Figure 10: Single Pulse Power Rating Junction-to-Ambient

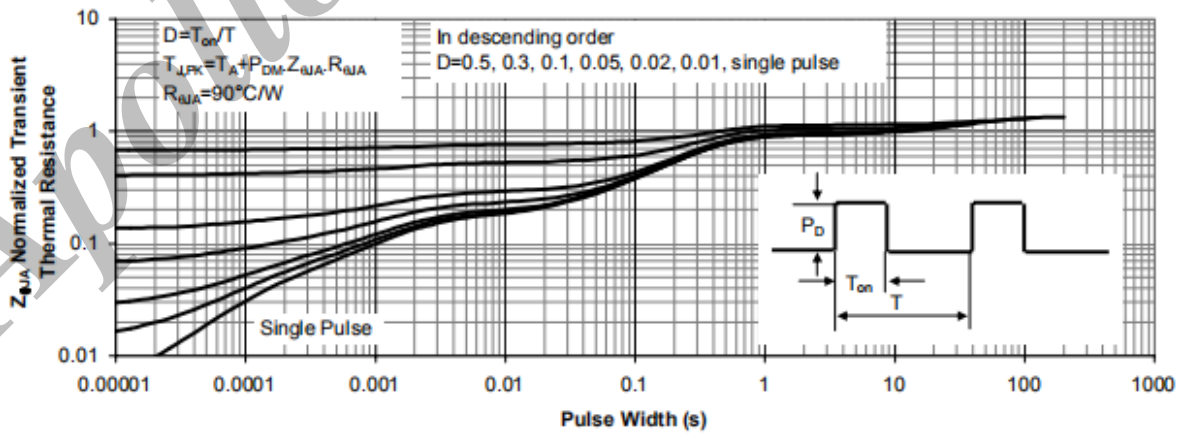


Figure 11: Normalized Maximum Transient Thermal Impedance

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