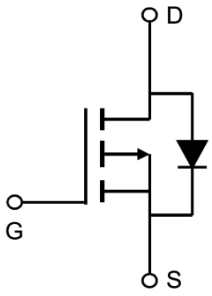
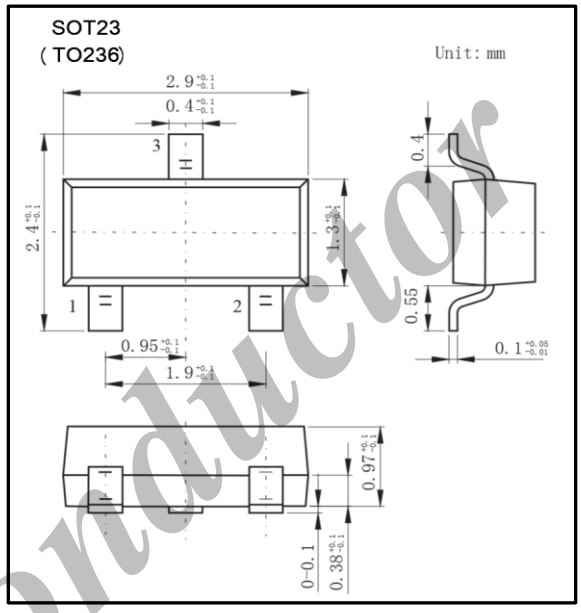
AP3419A
20V P-Channel Enhancement Mode MOSFET

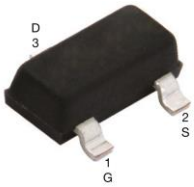
- **General Description**

AP3419A 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.





Top View



- **Applications**

- DC/DC converter for portable devices
- Load switch

- **Product Summary**

V_{DS}	-20V
I_D (at V_{GS} = -10V)	-3.5A
$R_{DS(ON)}$ (at V_{GS} = -10V)	< 75mΩ
$R_{DS(ON)}$ (at V_{GS} = -4.5V)	< 95mΩ
$R_{DS(ON)}$ (at V_{GS} = -2.5V)	< 145mΩ

Pb-Free

RoHS COMPLIANT

- **Absolute Maximum Ratings Ta = 25°C**

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_A=25°C	I_D	-3.5	A
	T_A=70°C		-2.8	
Pulsed Drain Current *		I_{DM}	-15	
Power Dissipation	T_A = 25°C	P_D	1.4	W
	T_A = 70°C		0.9	
Thermal Resistance. Junction-to-Ambient	t ≤ 10s	$R_{\theta JA}$	90	°C/W
Thermal Resistance. Junction-to-Ambient	(Stead-state)		125	
Thermal Resistance. Junction-to-Case	(Stead-state)	$R_{\theta JC}$	60	
Junction Temperature		T_J	150	°C
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℃**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=-250μA, V_{GS}=0V	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-16V, V_{GS}=0V			-0.5	μA
		V_{DS}=-16V, V_{GS}=0V, T_J=55°C			-2.5	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±10V			±1	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.7	-0.9	-1.4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-3.5A		59	75	mΩ
		V_{GS}=-10V, I_D=-3.5A T_J=125°C		83	105	
		V_{GS}=-4.5V, I_D=-3A		76	95	
		V_{GS}=-2.5V, I_D=-1A		111	145	
On state drain current	$I_{D(ON)}$	V_{GS}=-4.5V, V_{DS}=-5V	-15			A
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-3.5A		6.8		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-10V, f=1MHz		512	620	pF
Output Capacitance	C_{oss}			77		
Reverse Transfer Capacitance	C_{rss}			62		
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		9.2	13	Ω
Total Gate Charge	Q_g	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-3.5A		5.5	6.6	nC
Gate Source Charge	Q_{gs}			0.8		
Gate Drain Charge	Q_{gd}			1.9		
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=-10V, V_{DS}=-10V, R_L=2.8Ω, R_{GEN}=3Ω		5		ns
Turn-On Rise Time	t_r			6.7		
Turn-Off Delay Time	$t_{D(off)}$			28		
Turn-Off Fall Time	t_f			13.5		
Body Diode Reverse Recovery Time	t_{rr}	I_F=-3.5A, d_I/d_t=100A/ μs		9.8	12	
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=-3.5A, d_I/d_t=100A/ μs		2.7		nC
Maximum Body-Diode Continuous Current	I_S				-2	A
Diode Forward Voltage	V_{SD}	I_S=-1A, V_{GS}=0V	-0.65	-0.81	-0.95	V

- **Ordering Information**

Ordering Part Number	Package	MOQ
AP3419A	SOT23 (TO236)	3,000 pcs / reel

- **Typical Characteristics**

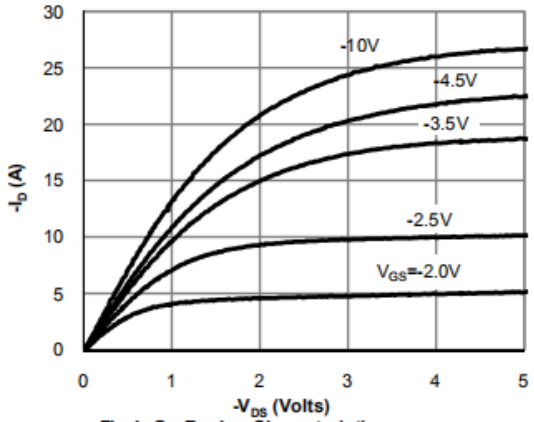


Fig 1: On-Region Characteristics

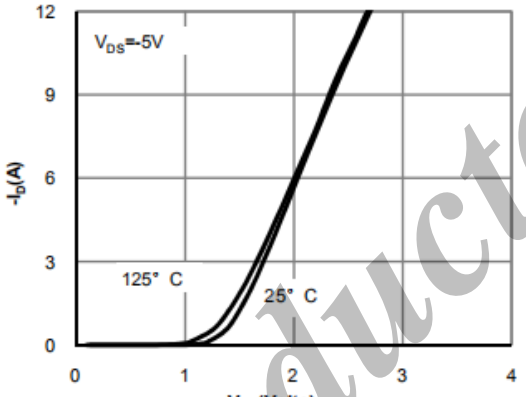


Figure 2: Transfer Characteristics

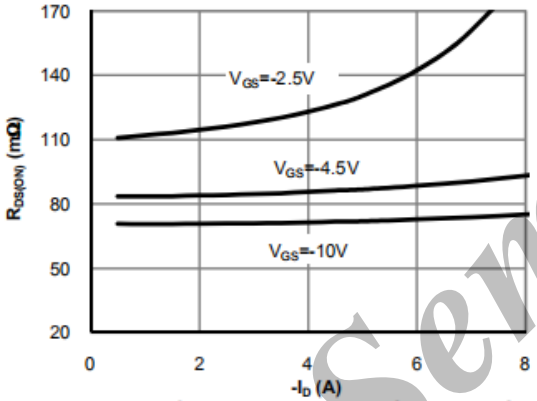


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

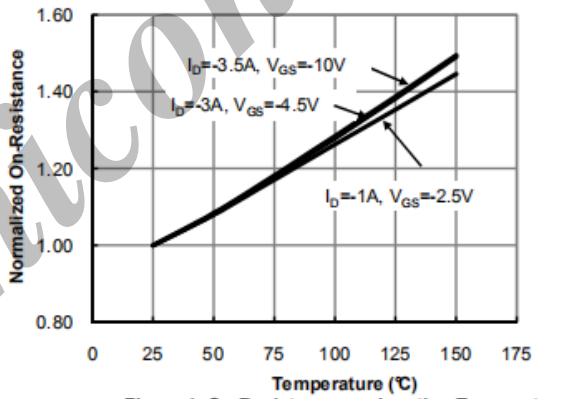


Figure 4: On-Resistance vs. Junction Temperature

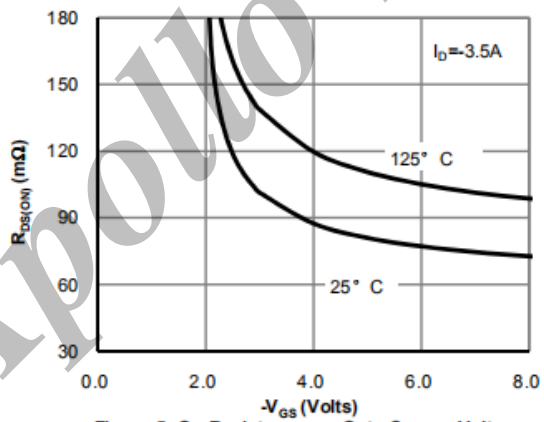


Figure 5: On-Resistance vs. Gate-Source Voltage

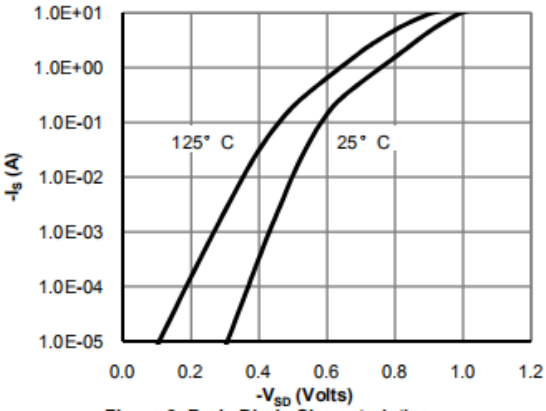


Figure 6: Body-Diode Characteristics

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

- **Typical Characteristics**

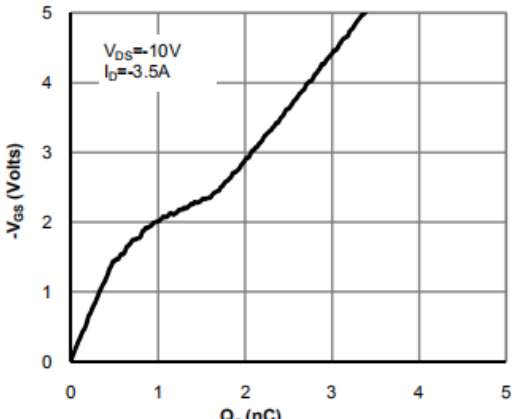


Figure 7: Gate-Charge Characteristics

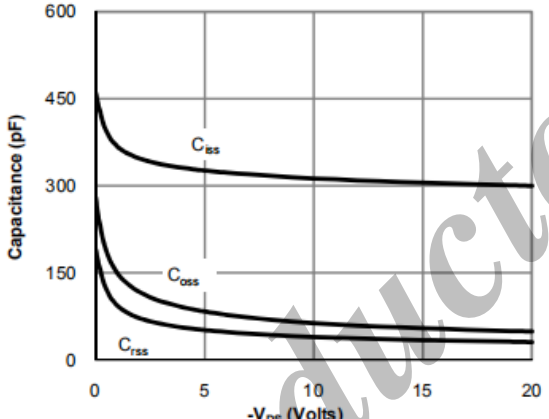


Figure 8: Capacitance Characteristics

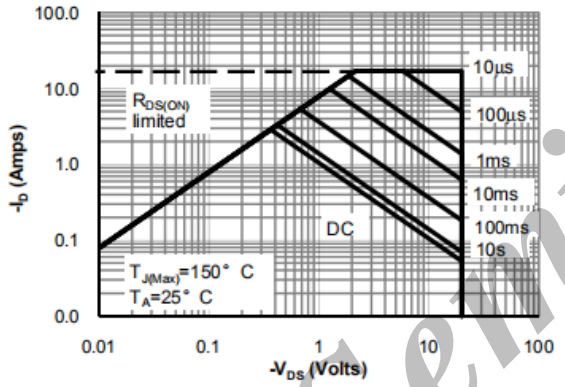


Figure 9: Maximum Forward Biased Safe Operating Area

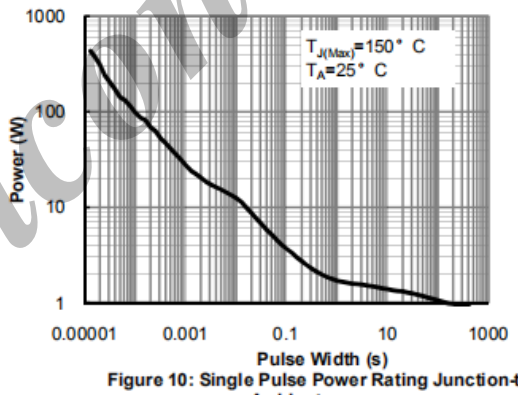


Figure 10: Single Pulse Power Rating Junction-to-Ambient

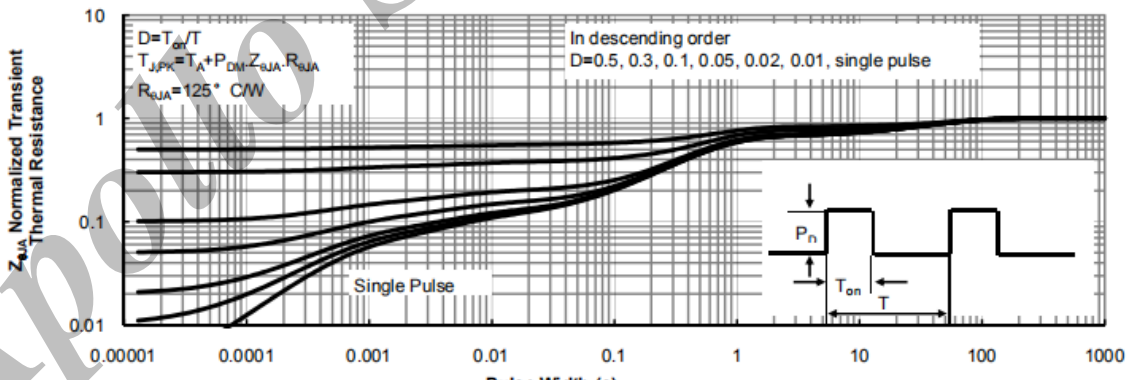


Figure 11: Normalized Maximum Transient Thermal Impedance

These curves in Figures 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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