

General Description

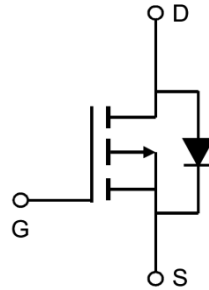
AP3419B combines advanced MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is most suitable to load-switch or PWM applications.

Applications

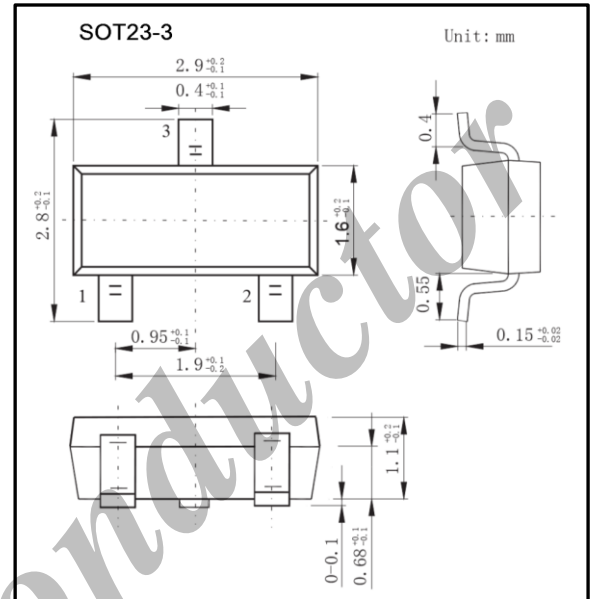
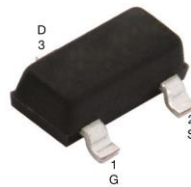
- DC/DC converter for portable devices
- Load switch

Product Summary

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



Top View



Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current $T_A = 25^\circ\text{C}$	I_D	-3.5	A
$T_A = 70^\circ\text{C}$		-2.8	
Pulsed Drain Current *	I_{DM}	-15	
Power Dissipation $T_A = 25^\circ\text{C}$	P_D	1.4	W
$T_A = 70^\circ\text{C}$		0.9	
Thermal Resistance. Junction-to-Ambient $t \leq 10s$	$R_{\theta JA}$	90	$^\circ\text{C/W}$
Thermal Resistance. Junction-to-Ambient (Stead-state)		125	
Thermal Resistance. Junction-to-Case (Stead-state)		60	
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	

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

Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DS}	$I_D = -250\mu A$, $V_{GS} = 0V$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16V$, $V_{GS} = 0V$			-0.5	μA
		$V_{DS} = -16V$, $V_{GS} = 0V$, $T_J = 55^\circ C$			-2.5	
Gate-Body leakage current	I_{GSS}	$V_{DS} = 0V$, $V_{GS} = \pm 10V$			± 1	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\mu A$	-0.7	-0.9	-1.4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V$, $I_D = -3.5A$		59	75	m Ω
		$V_{GS} = -10V$, $I_D = -3.5A$, $T_J = 125^\circ C$		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	$t_{D(on)}$	$V_{GS} = -10V$, $V_{DS} = -10V$, $R_L = 2.8\Omega$, $R_{GEN} = 3\Omega$		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}	$I_F = -3.5A$, $d_i/d_t = 100A/\mu s$		9.8	12	nC
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = -3.5A$, $d_i/d_t = 100A/\mu s$		2.7		
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
AP3419B	SOT23-3	3,000 pcs / reel

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- Typical Characteristics

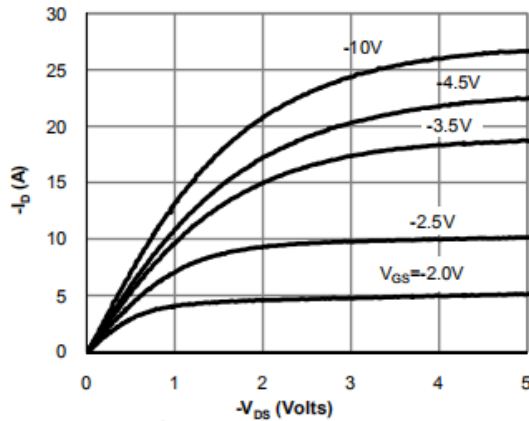


Fig 1: On-Region Characteristics

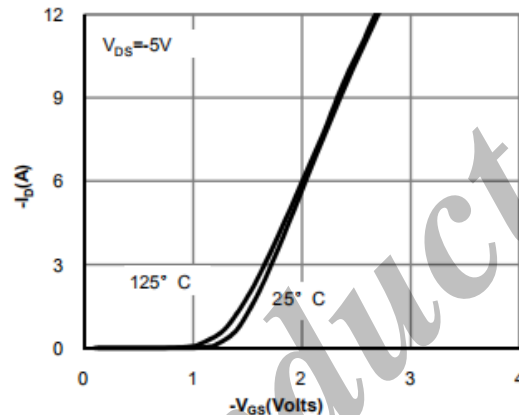


Figure 2: Transfer Characteristics

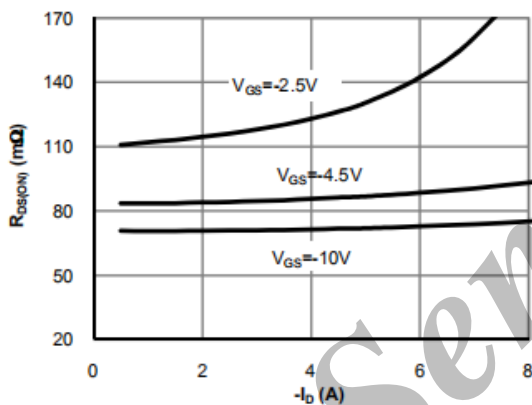


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

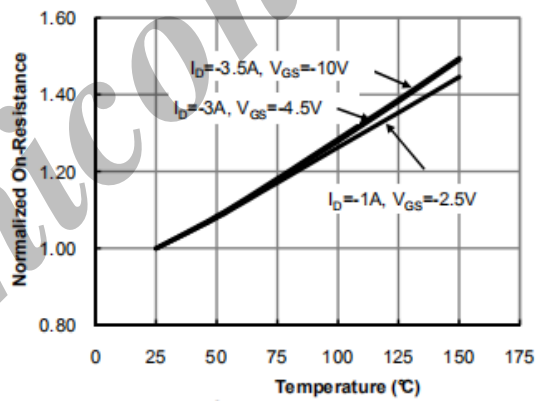


Figure 4: On-Resistance vs. Junction Temperature

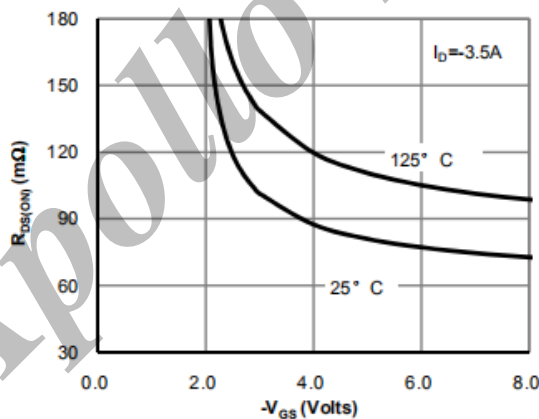


Figure 5: On-Resistance vs. Gate-Source Voltage

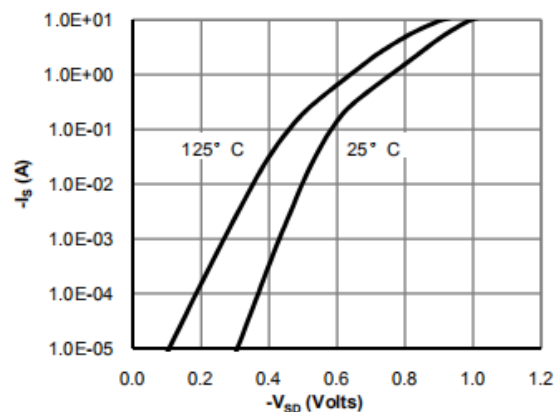


Figure 6: Body-Diode Characteristics

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

• **Typical Characteristics**

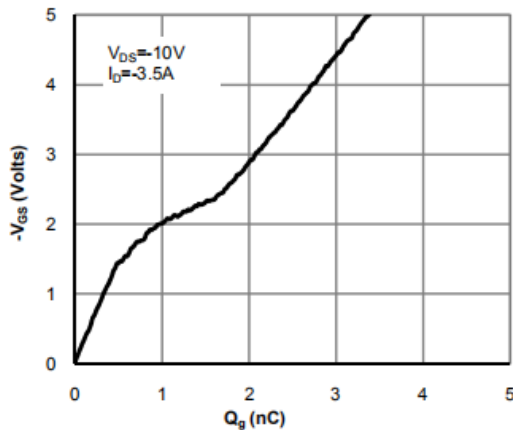


Figure 7: Gate-Charge Characteristics

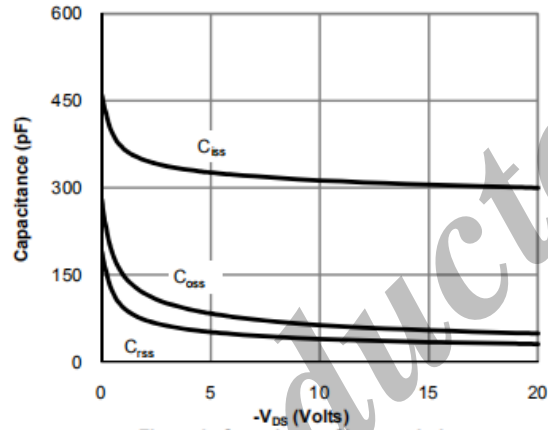


Figure 8: Capacitance Characteristics

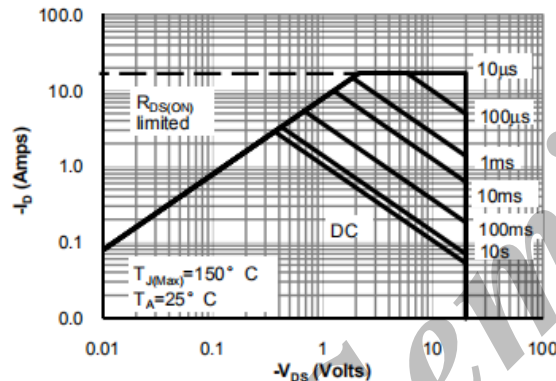


Figure 9: Maximum Forward Biased Safe Operating Area

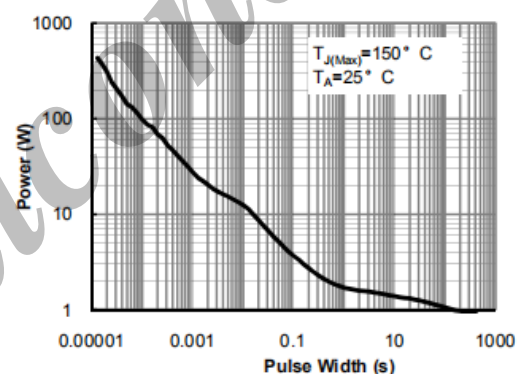


Figure 10: Single Pulse Power Rating Junction-to-Ambient

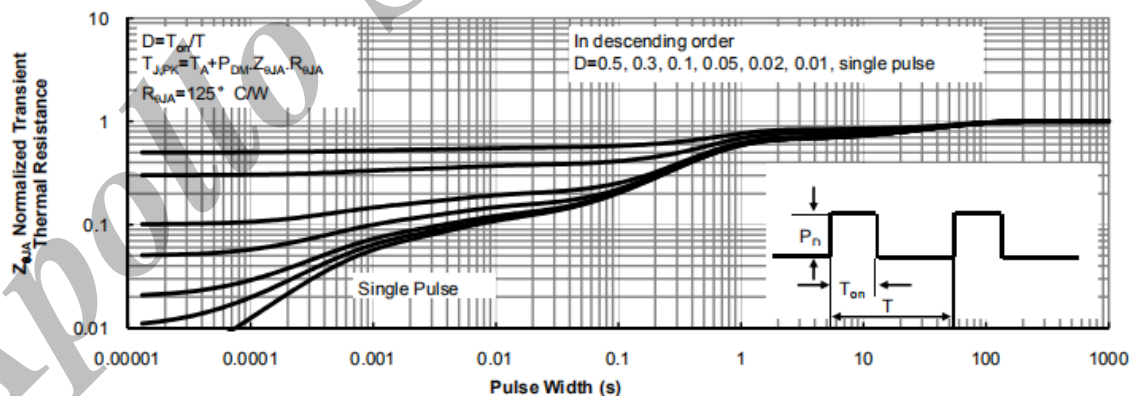


Figure 11: Normalized Maximum Transient Thermal Impedance

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 $T_{j(MAX)}=150^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

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