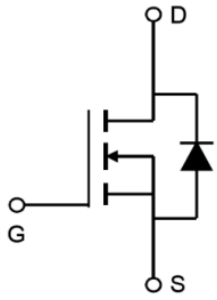
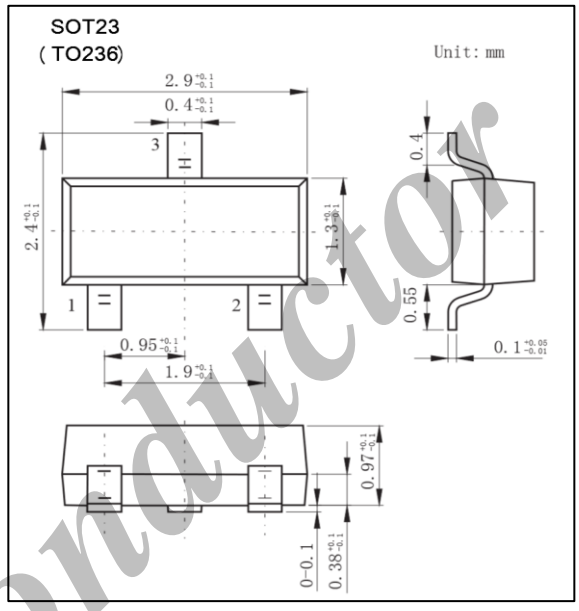
AP3414A
20V N-Channel Enhancement Mode MOSFET

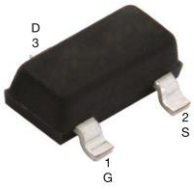
- **General Description**

AP3414A 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} = 4.5V)	4.2A
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 50mΩ
$R_{DS(ON)}$ (at V_{GS} = 2.5V)	< 63mΩ
$R_{DS(ON)}$ (at V_{GS} = 1.8V)	< 87mΩ

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current	T_A=25℃	I_D	4.2	A
	T_A=70℃		3.2	
Pulsed Drain Current *		I_{DM}	15	
Power Dissipation	T_A=25℃	P_D	1.4	W
	T_A=70℃		0.9	
Thermal Resistance. Junction- to-Ambient		$R_{\theta JA}$	125	℃/W
Thermal Resistance. Junction- to-Case		$R_{\theta JC}$	80	℃/W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

* Repetitive rating, pulse width limited by junction temperature.

- **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	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V			1	μA
		V_{DS}=16V, V_{GS}=0V, T_J=55°C			5	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.4	0.6	1	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4.2A		41	50	mΩ
		V_{GS}=4.5V, I_D=4.2A T_J=125°C		58	70	
		V_{GS}=2.5V, I_D=3.7A		52	63	mΩ
		V_{GS}=1.8V, I_D=3.2A		67	87	mΩ
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=4.2A		11		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=10V, f=1MHz		436		pF
Output Capacitance	C_{oss}			66		pF
Reverse Transfer Capacitance	C_{rss}			44		pF
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		3		Ω
Total Gate Charge	Q_g	V_{GS}=4.5V, V_{DS}=10V, I_D=4.2A		6.2		nC
Gate Source Charge	Q_{gs}			1.6		nC
Gate Drain Charge	Q_{gd}			0.5		nC
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=4.5V, V_{DS}=10V, R_L=2.7Ω, R_{GEN}=6Ω		5.5		ns
Turn-On Rise Time	t_r			6.3		ns
Turn-Off Delay Time	$t_{D(off)}$			40		ns
Turn-Off Fall Time	t_f			12.7		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F=4A, d_I/d_t=100A/ μs		12.3		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=4A, d_I/d_t=100A/ μs		3.5		nC
Maximum Body-Diode Continuous Current	I_S				2	A
Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V		0.76	1	V

- **Ordering Information**

Ordering Part Number	Package	MOQ
AP3414A	SOT23 (TO236)	3,000 pcs / reel

- **Typical Characteristics**

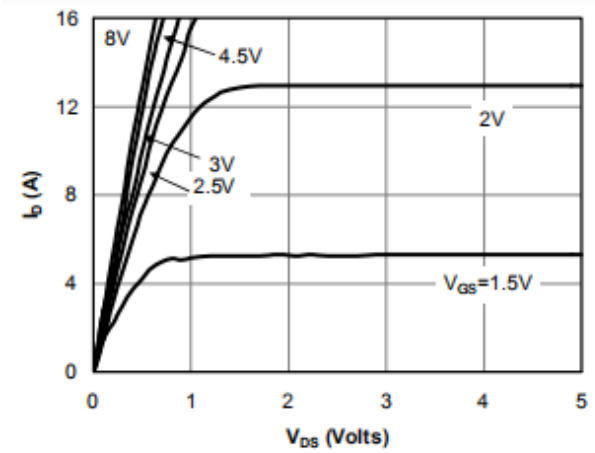


Fig 1: On-Region Characteristics

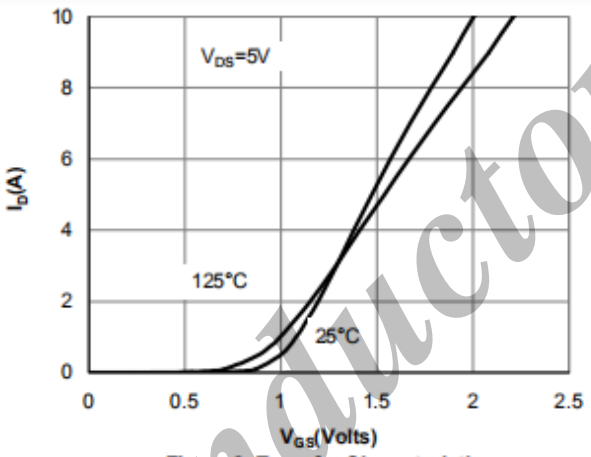


Figure 2: Transfer Characteristics

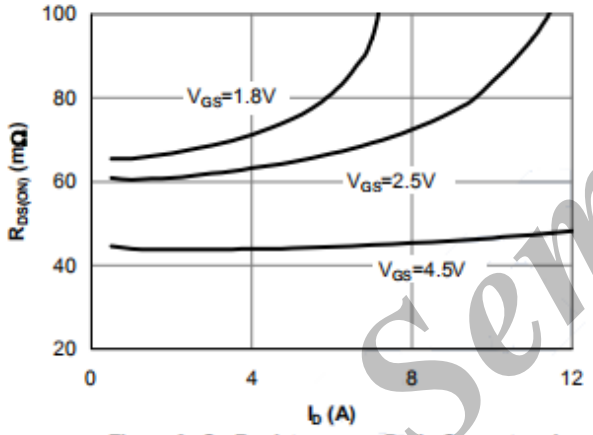


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

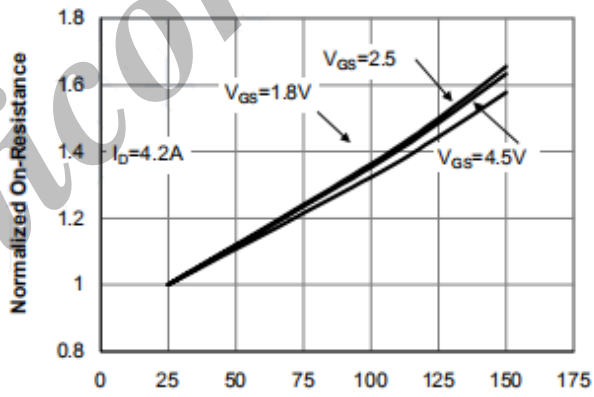


Figure 4: On-Resistance vs. Junction Temperature

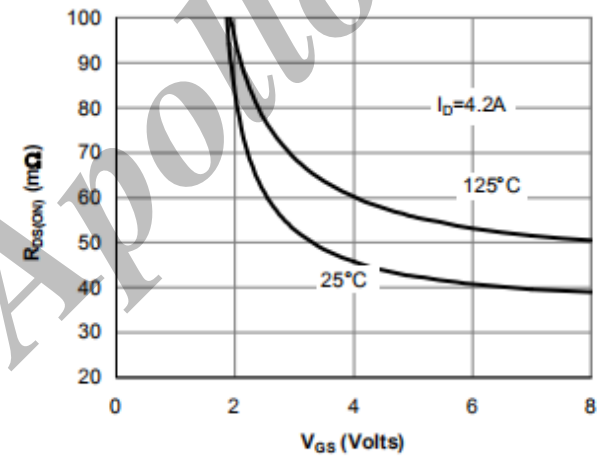


Figure 5: On-Resistance vs. Gate-Source Voltage

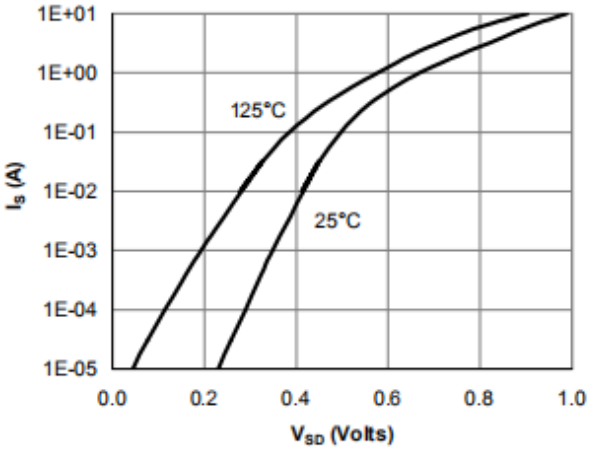


Figure 6: Body-Diode Characteristics

- **Typical Characteristics**

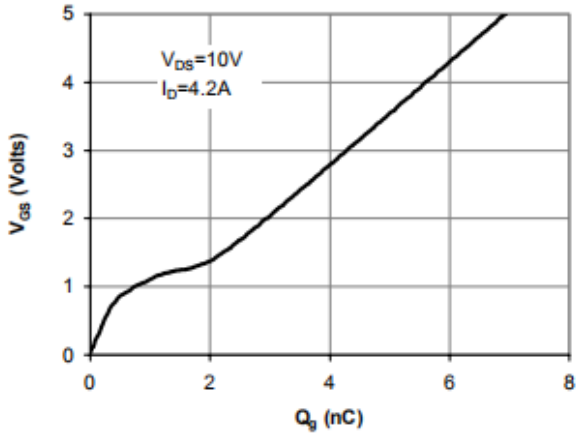


Figure 7: Gate-Charge Characteristics

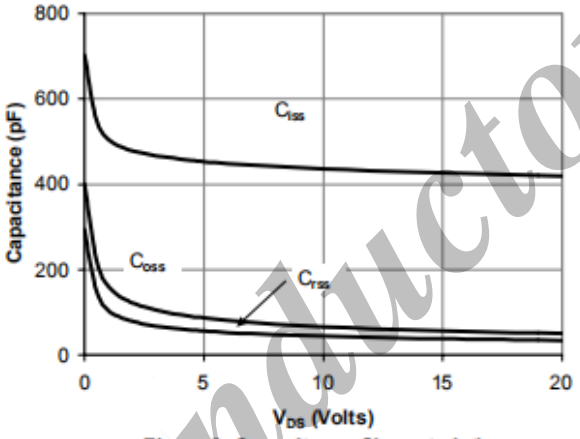


Figure 8: Capacitance Characteristics

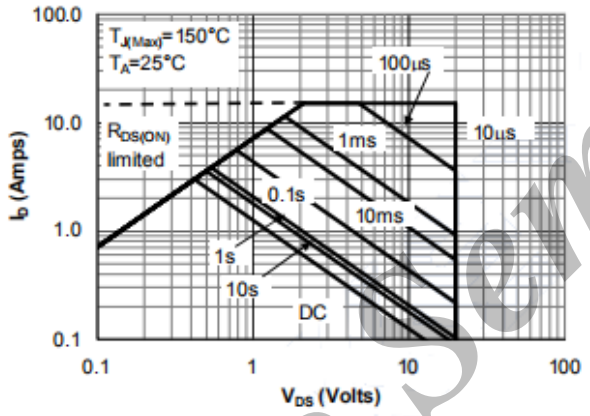


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

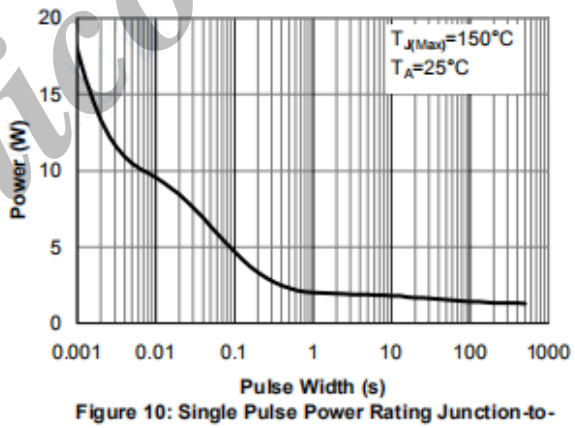


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

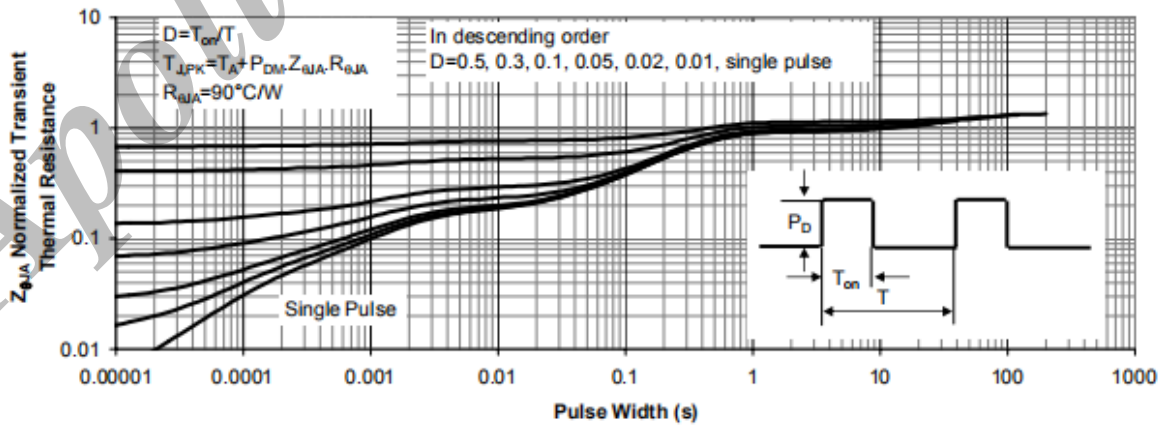


Figure 11: Normalized Maximum Transient Thermal Impedance

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