

### • General Description

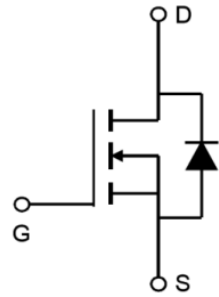
AP3402A combines advanced MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is most suitable to load-switch or PWM applications.

### • Applications

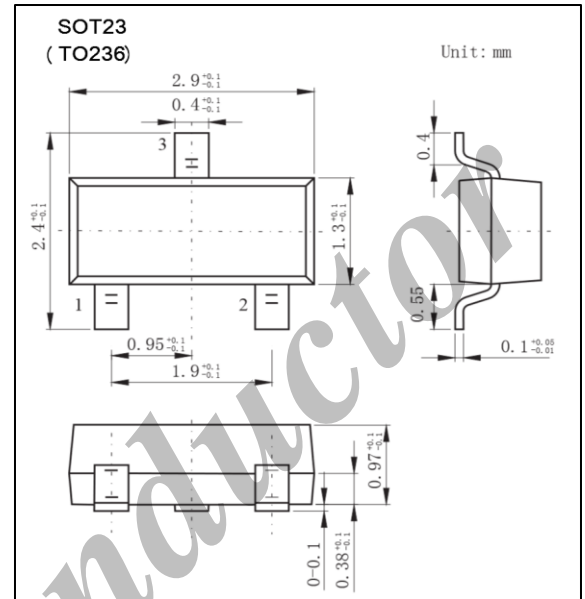
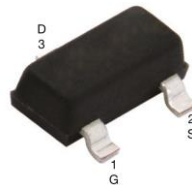
- DC/DC converter for portable devices
- Load switch

### • Product Summary

$V_{DS}$	30V
$I_D$ (at $V_{GS} = 10V$ )	4.0A
$R_{DS(ON)}$ (at $V_{GS} = 10V$ )	< 55m $\Omega$
$R_{DS(ON)}$ (at $V_{GS} = 4.5V$ )	< 70m $\Omega$
$R_{DS(ON)}$ (at $V_{GS} = 2.5V$ )	< 110m $\Omega$



Top View



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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current $T_A=25$ $T_A=70$	$I_D$	4.0	A
		3.4	
Pulsed Drain Current *	$I_{DM}$	15	
Power Dissipation $T_A=25$ $T_A=70$	$P_D$	1.4	W
		1	
Thermal Resistance, Junction- to-Ambient	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction- to-Case	$R_{\theta JC}$	80	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

\* 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	$V_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$			1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V, T_J=55^\circ C$			5	
Gate-Body leakage current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.6	1	1.4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=4A$		45	55	m $\Omega$
		$V_{GS}=10V, I_D=4A, T_J=125^\circ C$		66	80	
		$V_{GS}=4.5V, I_D=3A$		55	70	
		$V_{GS}=2.5V, I_D=2A$		83	110	
On state drain current	$I_{D(on)}$	$V_{GS}=4.5V, V_{DS}=5V$	10			A
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=4A$		8		S
Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=15V, f=1MHz$		390		pF
Output Capacitance	$C_{oss}$			54.5		pF
Reverse Transfer Capacitance	$C_{rss}$			41		pF
Gate resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, f=1MHz$		3		$\Omega$
Total Gate Charge	$Q_g$	$V_{GS}=4.5V, V_{DS}=15V, I_D=4A$		4.34		nC
Gate Source Charge	$Q_{gs}$			0.6		nC
Gate Drain Charge	$Q_{gd}$			1.38		nC
Turn-On Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=15V, R_L=3.75\Omega, R_{GEN}=6\Omega$		3.3		ns
Turn-On Rise Time	$t_r$			1		ns
Turn-Off Delay Time	$t_{D(off)}$			21.7		ns
Turn-Off Fall Time	$t_f$			2.1		ns
Body Diode Reverse Recovery Time	$t_{rr}$		$I_F=4A, d_i/d_t=100A/\mu s$		12	
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F=4A, d_i/d_t=100A/\mu s$		6.3		nC
Maximum Body-Diode Continuous Current	$I_S$				2.5	A
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V$		0.8	1	V

• **Ordering Information**

Ordering Part Number	Package	MOQ
AP3402A	SOT23 (T0236)	3,000 pcs / reel

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• Typical Characteristics

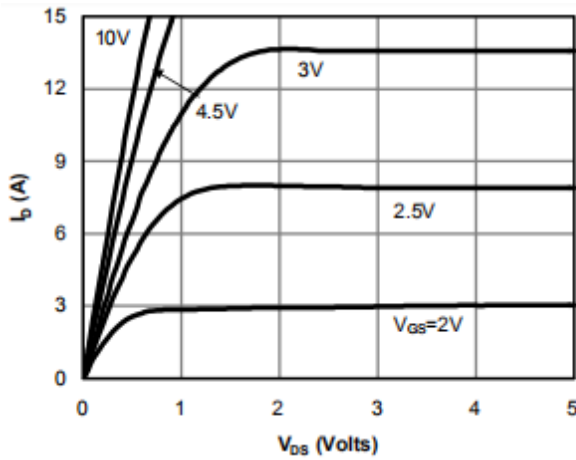


Fig 1: On-Region Characteristics

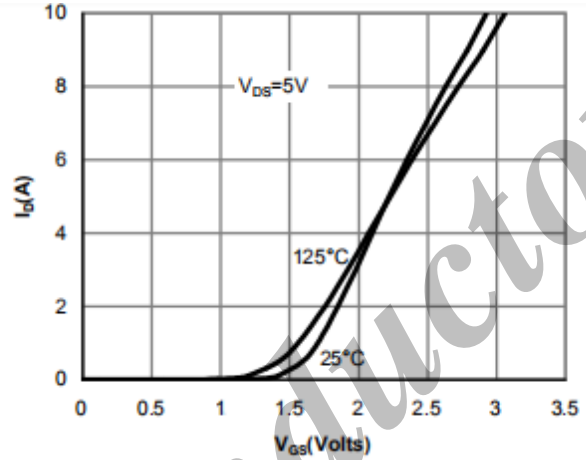


Figure 2: Transfer Characteristics

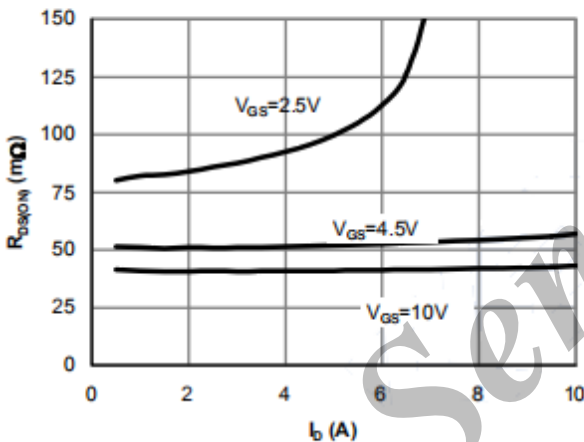


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

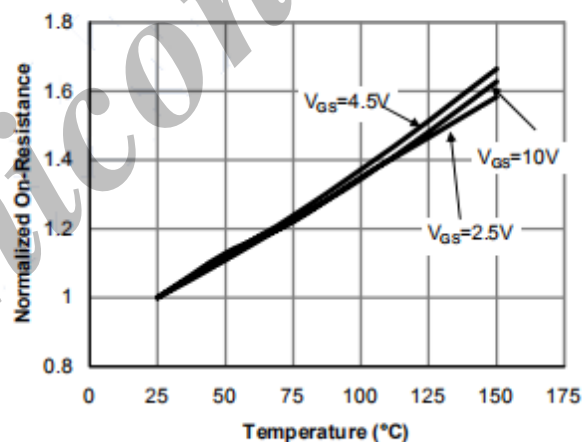


Figure 4: On-Resistance vs. Junction Temperature

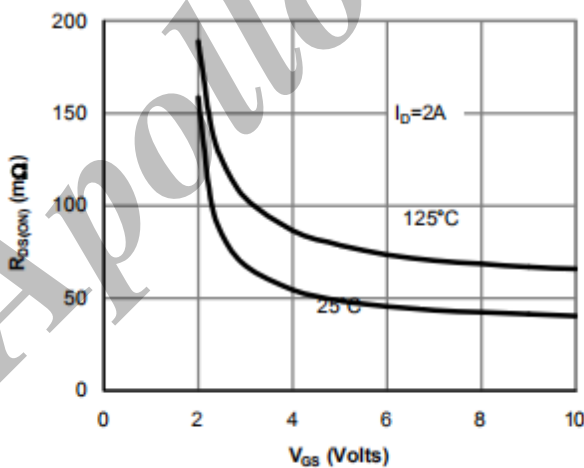


Figure 5: On-Resistance vs. Gate-Source Voltage

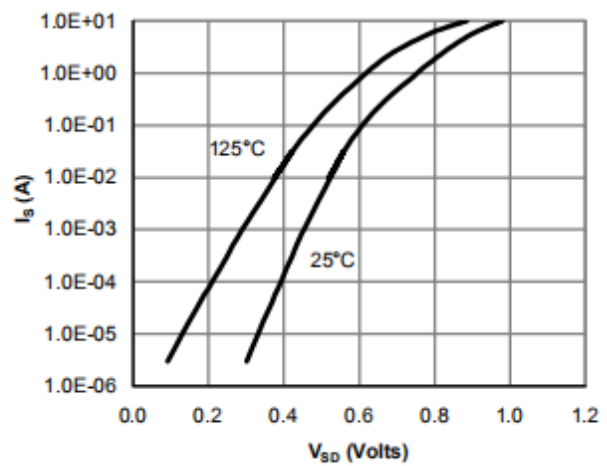


Figure 6: Body-Diode Characteristics

• Typical Characteristics

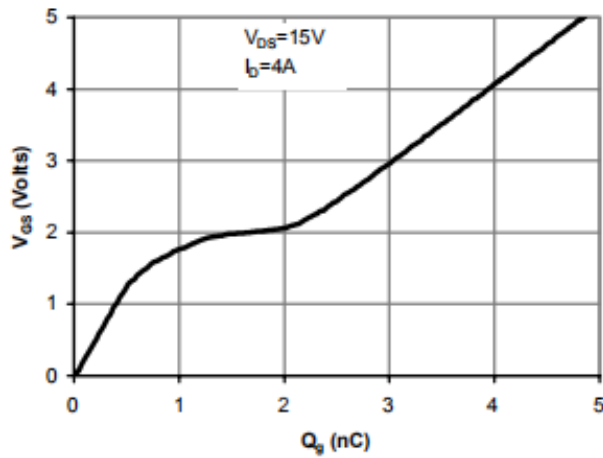


Figure 7: Gate-Charge Characteristics

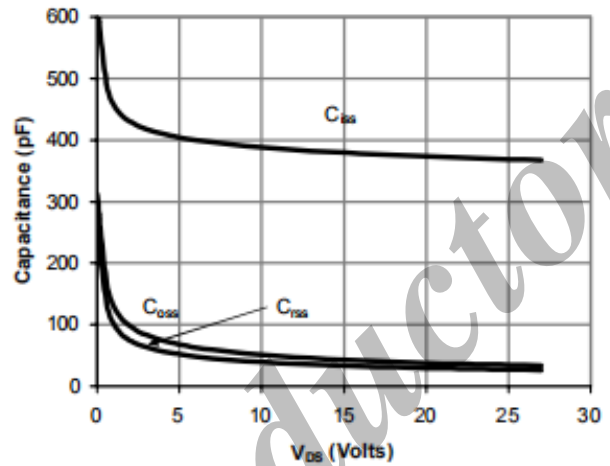


Figure 8: Capacitance Characteristics

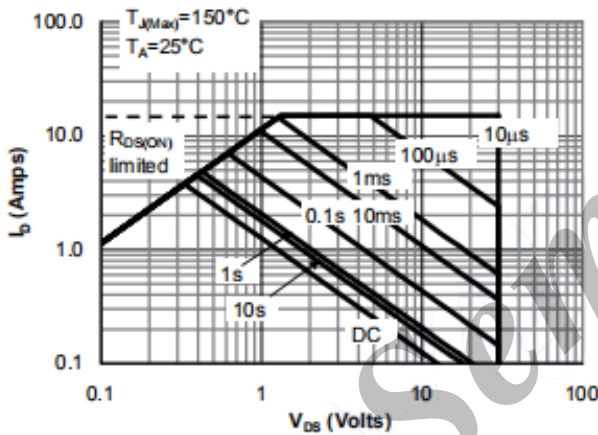


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

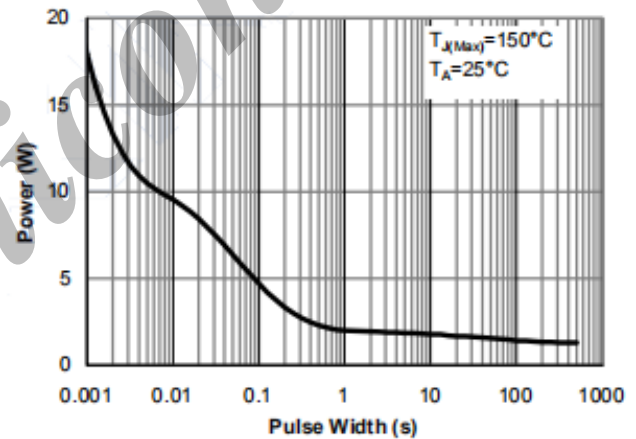


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

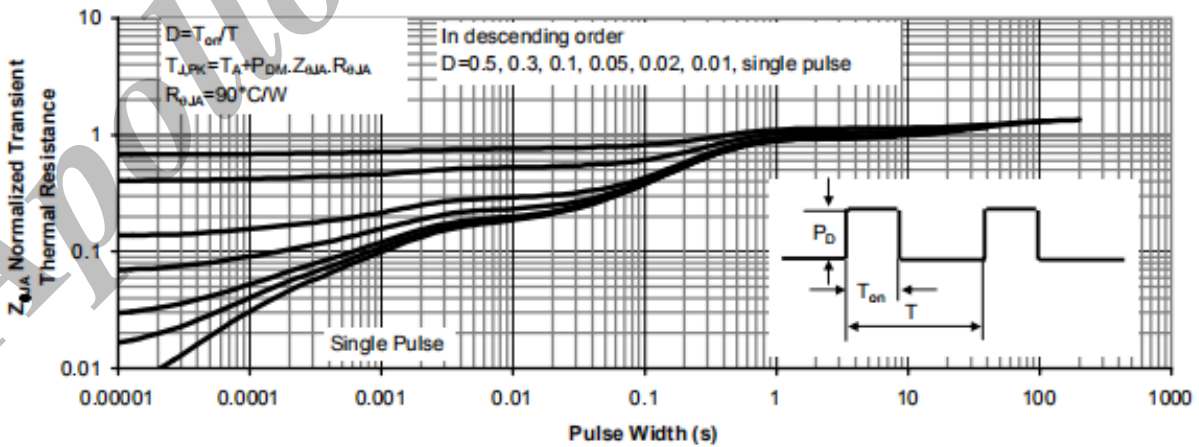


Figure 11: Normalized Maximum Transient Thermal Impedance

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