

### General Description

AP3407A 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

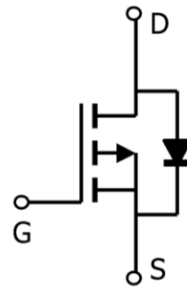
- DC/DC converter for portable devices
- Load switch

### Product Summary

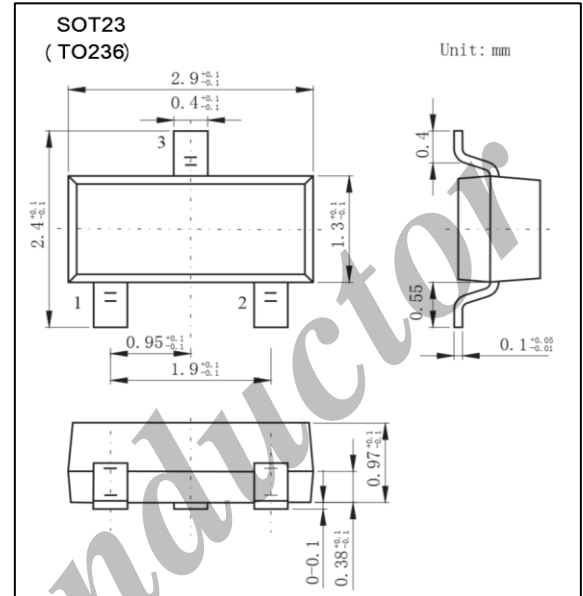
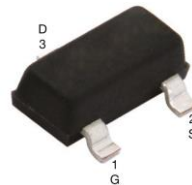
$V_{DS}$ (V)	-30V
$I_D$	-4.1A
$R_{DS(ON)}$ (at $V_{GS} = -10V$ )	< 52m $\Omega$
$R_{DS(ON)}$ (at $V_{GS} = -4.5V$ )	< 87m $\Omega$

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current $T_a = 25^\circ\text{C}$	$I_D$	-4.1	A
$T_a = 70^\circ\text{C}$		-3.5	
Pulsed Drain Current	$I_{DM}$	-20	A
Power Dissipation $T_a = 25^\circ\text{C}$	$P_D$	1.4	W
$T_a = 70^\circ\text{C}$		1	
Thermal Resistance.Junction- to-Ambient $t \leq 10s$	$R_{thJA}$	90	$^\circ\text{C/W}$
Steady State		125	
Thermal Resistance.Junction- to-Lead	$R_{thJL}$	60	$^\circ\text{C/W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to 150	$^\circ\text{C}$



Top View



- Electrical Characteristics (Ta = 25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>DSS</sub>	I <sub>D</sub> =-250 $\mu$ A, V <sub>GS</sub> =0V	-30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V			-1	$\mu$ A
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C			-5	$\mu$ A
Gate-Body leakage current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> = $\pm$ 20V			$\pm$ 100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-250 $\mu$ A	-1	-1.8	-3	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-4.1A		40.5	52	m $\Omega$
		V <sub>GS</sub> =-10V, I <sub>D</sub> =-4A T <sub>J</sub> =125°C		57	73	
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A		64	87	
On state drain current	I <sub>D(ON)</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-5V	-10			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-4A	5.5	8.2		S
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1MHz		700		pF
Output Capacitance	C <sub>oss</sub>			120		
Reverse Transfer Capacitance	C <sub>rss</sub>			75		
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		10		$\Omega$
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-4A		14.3		nC
Gate Source Charge	Q <sub>gs</sub>			7		
Gate Drain Charge	Q <sub>gd</sub>			3.1		
Turn-On DelayTime	t <sub>d(on)</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>L</sub> =3.6 $\Omega$ , R <sub>GEN</sub> =3 $\Omega$		8.6		ns
Turn-On Rise Time	t <sub>r</sub>			5		
Turn-Off DelayTime	t <sub>d(off)</sub>			28.2		
Turn-Off Fall Time	t <sub>f</sub>			13.5		
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =-4A, dI/dt=100A/ $\mu$ s		27		nC
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			15		
Maximum Body-Diode Continuous Current	I <sub>S</sub>				-2.2	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V		-0.77	-1	V

- Ordering Information

Ordering Part Number	Package	MOQ
AP3407A	SOT23 (T0236)	3,000 pcs / reel

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• Typical Characteristics

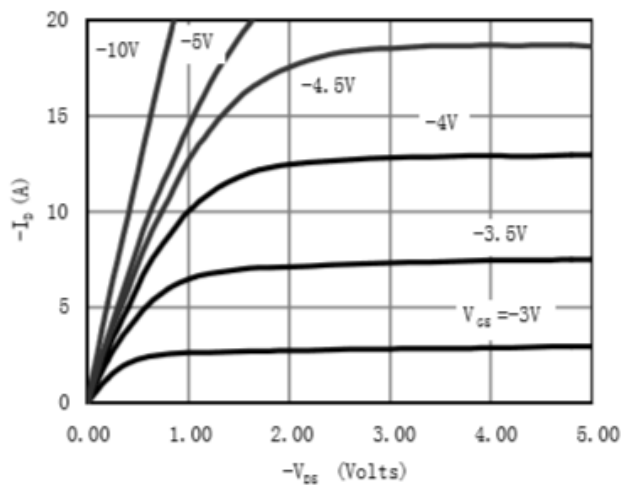


Figure 1: On-Region Characteristics

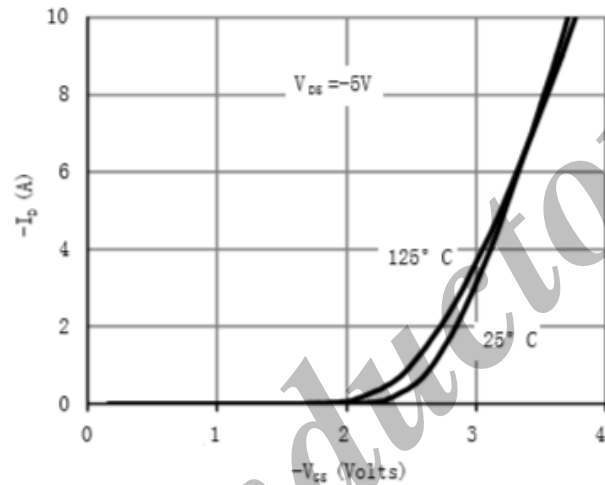


Figure 2: Transfer Characteristics

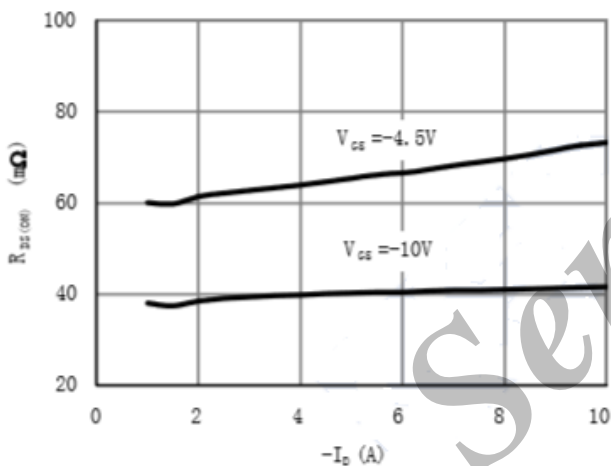


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

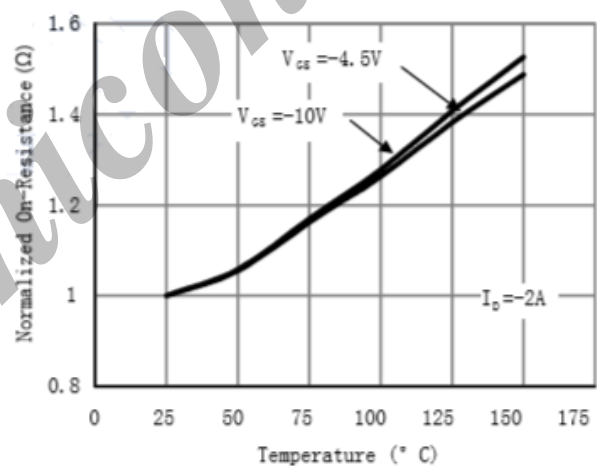


Figure 4: On-Resistance vs. Junction Temperature

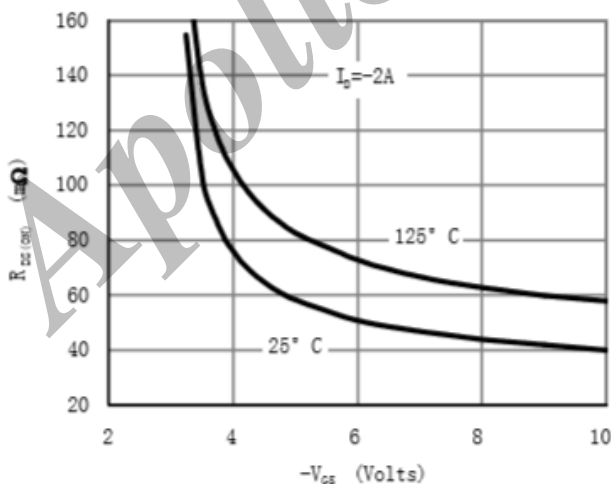


Figure 5: On-Resistance vs. Gate-Source Voltage

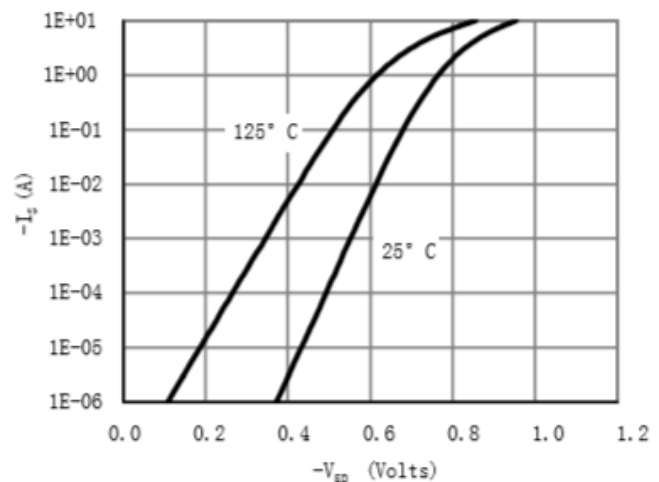


Figure 6: Body-Diode Characteristics

• **Typical Characteristics**

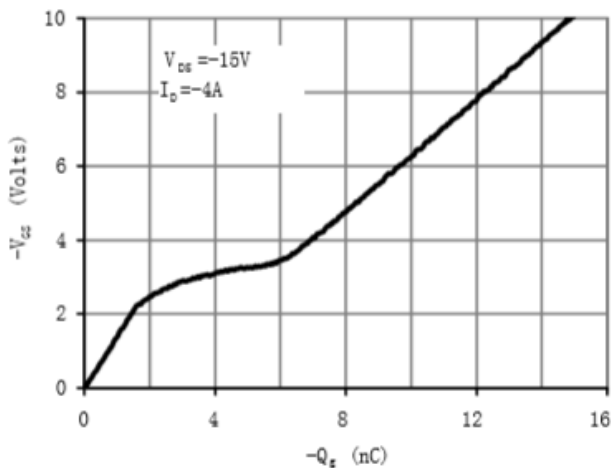


Figure 7: Gate-Charge Characteristics

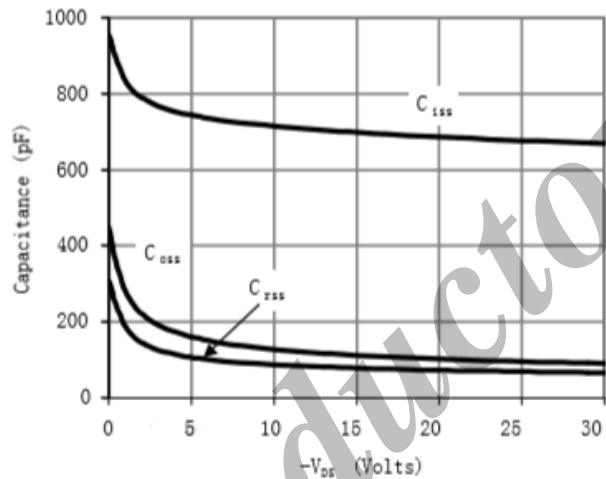


Figure 8: Capacitance Characteristics

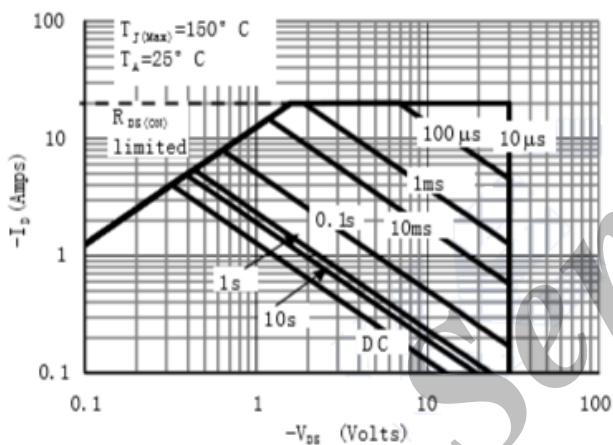


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

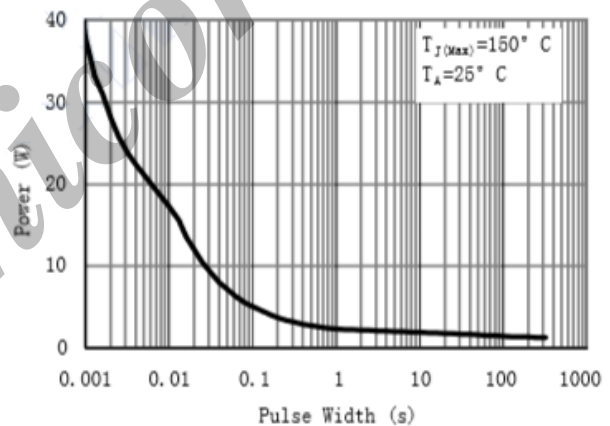


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

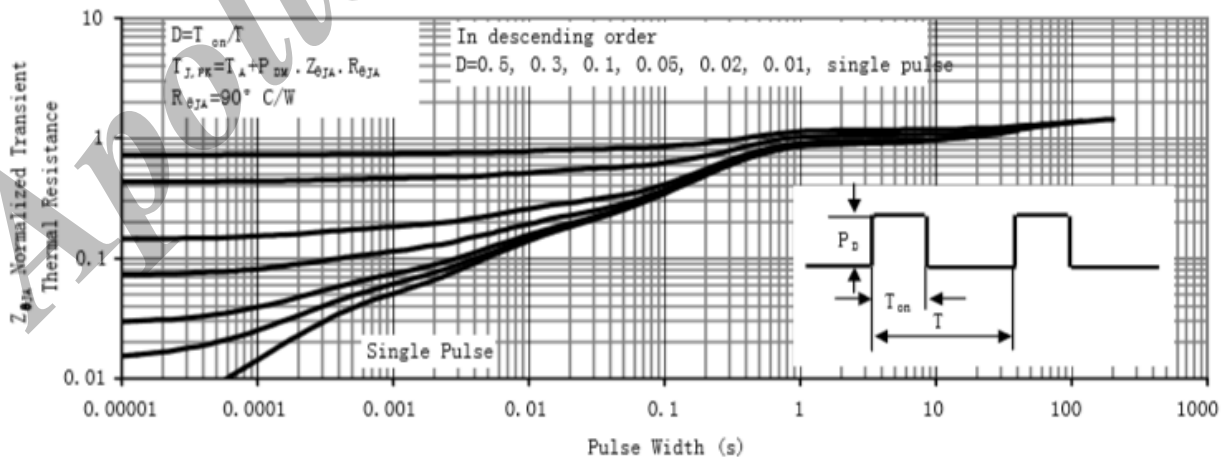


Figure 11: Normalized Maximum Transient Thermal Impedance

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