

ATM3407PSA

P-Channel Enhancement Mode Field Effect Transistor

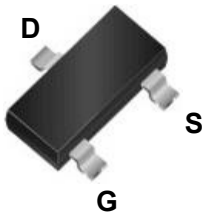
Description

The ATM3407PSA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -4.5V. This device is suitable for use as a load switch or in PWM applications. Standard Product ATM3407PSA is Pb-free.

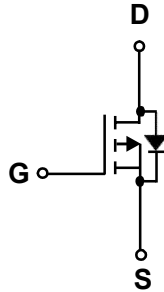
Feature

- ◆ V_{DS} (V) = -30V
- ◆ I_D = -3.7 A (V_{GS} = -10V)
- ◆ $R_{DS(ON)}$ < 60m Ω (V_{GS} = -10V)
- ◆ $R_{DS(ON)}$ < 80m Ω (V_{GS} = -4.5V)

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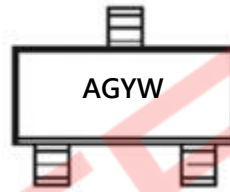


Top View



Schematic

Marking



AG : Device code
YW : Date code

Order Information

Device	Package	Shipping
ATM3407PSA	SOT-23	3000/Tape&Reel

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{NOET 1}	I_D	$T_A=25^\circ\text{C}$	-3.7
		$T_A=70^\circ\text{C}$	-3.0
Pulsed Drain Current ^{NOET 2}	I_{DM}	-15	A
Power Dissipation ^{NOET 1}	P_D	$T_A=25^\circ\text{C}$	1.0
		$T_A=70^\circ\text{C}$	0.65
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^{NOET 1}	$R_{\theta JA}$	$t \leq 10\text{s}$	105	$^\circ\text{C/W}$
		Steady-State	122	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^{NOET 3}	$R_{\theta JL}$	65	80	$^\circ\text{C/W}$

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Electrical Characteristics (T _A =25°C unless otherwise noted)						
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =-250μA, V _{GS} =0V	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V			-1	μA
Gate-Body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.0	-1.5	-2.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-3.7A		40	50	mΩ
		V _{GS} =-4.5V, I _D =-3.0A		60	80	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5.0V, I _D =-3.7A		6.7		S
Diode Forward Voltage	V _{SD}	I _S =-1.0A, V _{GS} =0V		-0.8	-1.2	V
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-15V, f=1MHz		800		pF
Output Capacitance	C _{oss}			88		pF
Reverse Transfer Capacitance	C _{rss}			70		pF
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz		6.0		Ω
Switching Characteristics						
Total Gate Charge	Q _{gtot}	V _{GS} =-10V, V _{DS} =-10V, I _D =-3.7A		15.0		nC
Gate Source Charge	Q _{gs}			2.9		nC
Gate Drain Charge	Q _{gd}			1.7		nC
Turn-On Delay Time	t _{d(on)}	V _{GS} =-10V, V _{DS} =-15V, R _L =4Ω, R _{GEN} =6Ω		27		ns
Turn-On Rise Time	t _r			18		ns
Turn-Off Delay Time	t _{d(off)}			77		ns
Turn-Off Fall Time	t _f			13		ns

Note:

- The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.
- Repetitive rating, pulse width limited by junction temperature.
- The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.
- The static characteristics in Figures 1 to 6 are obtained using 80 μs pulses, duty cycle 0.5% max.
- These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulserating.

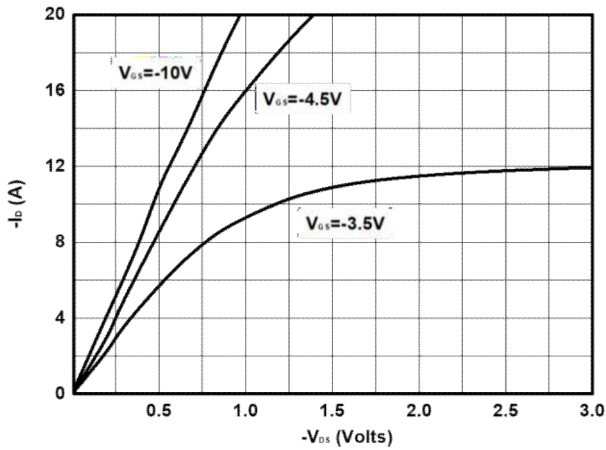


Fig 1: On-Region Characteristics

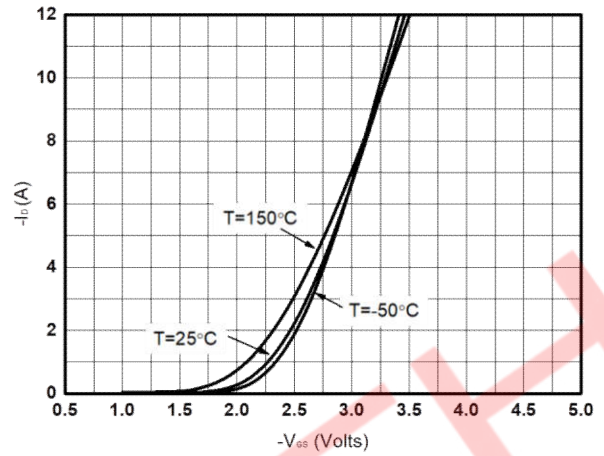


Figure 2: Transfer Characteristics

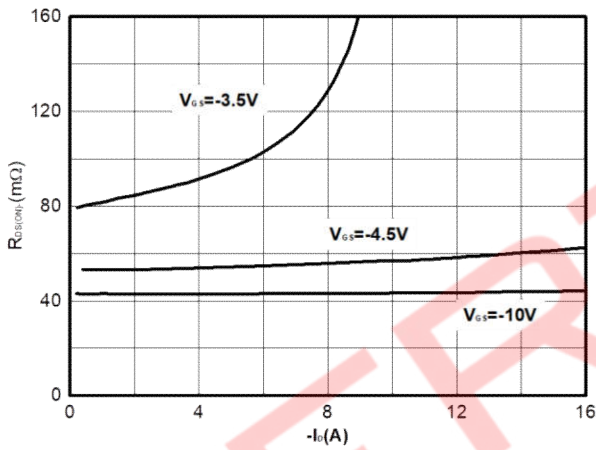


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

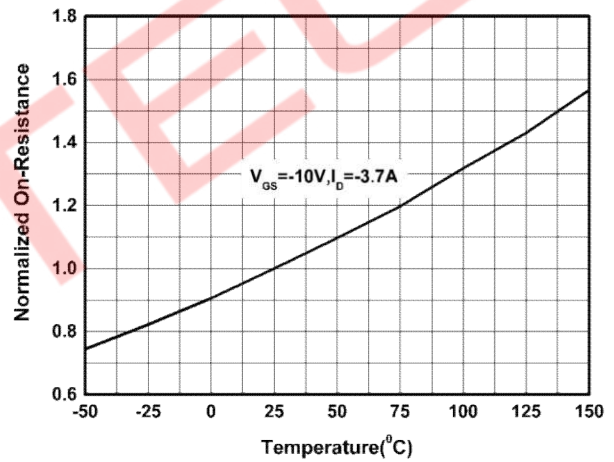


Figure 4: On-Resistance vs. Junction Temperature

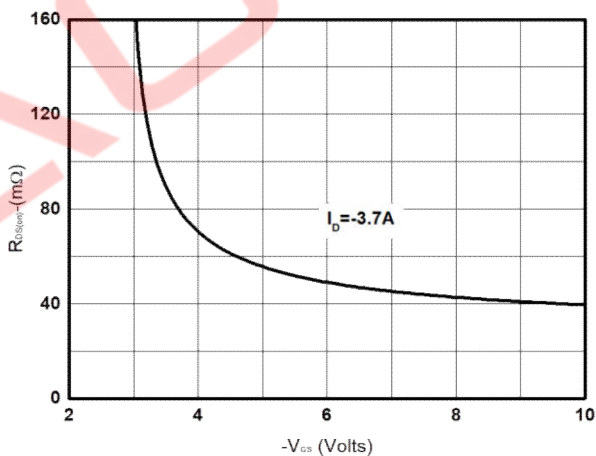


Figure 5: On-Resistance vs Gate-Source

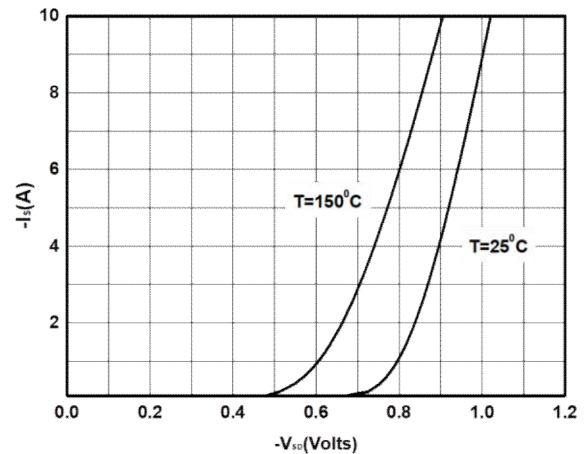


Figure 6: Body-Diode Characteristics

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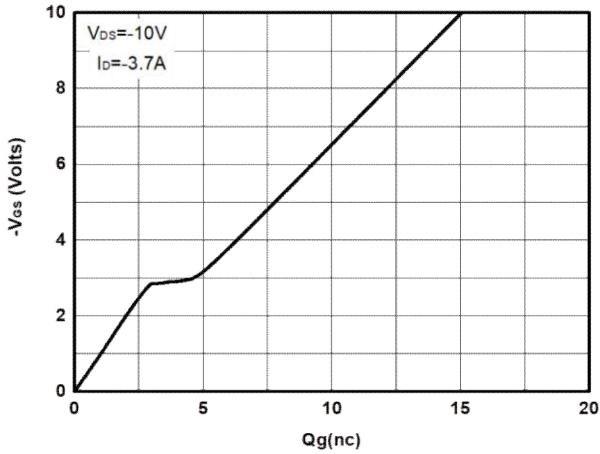


Figure 7: Gate-Charge Characteristics

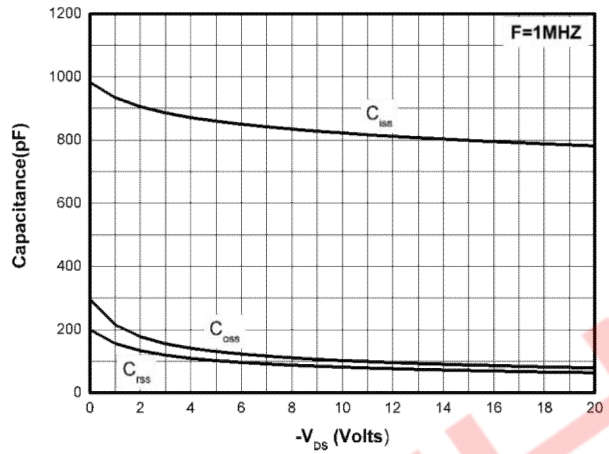


Figure 8: Capacitance Characteristics

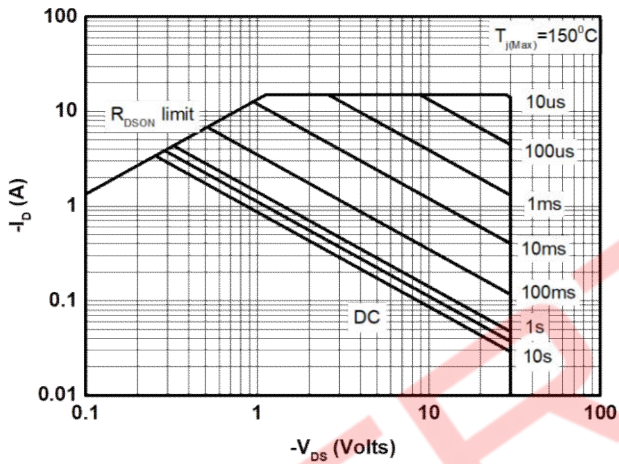


Figure 9: Maximum Forward Biased Safe Operating Area (Note 5)

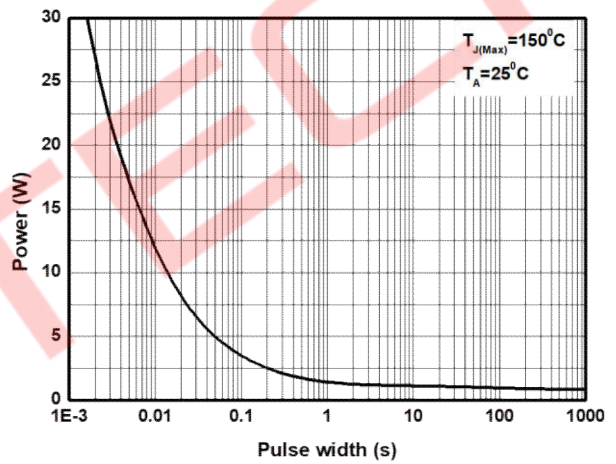


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note 5)

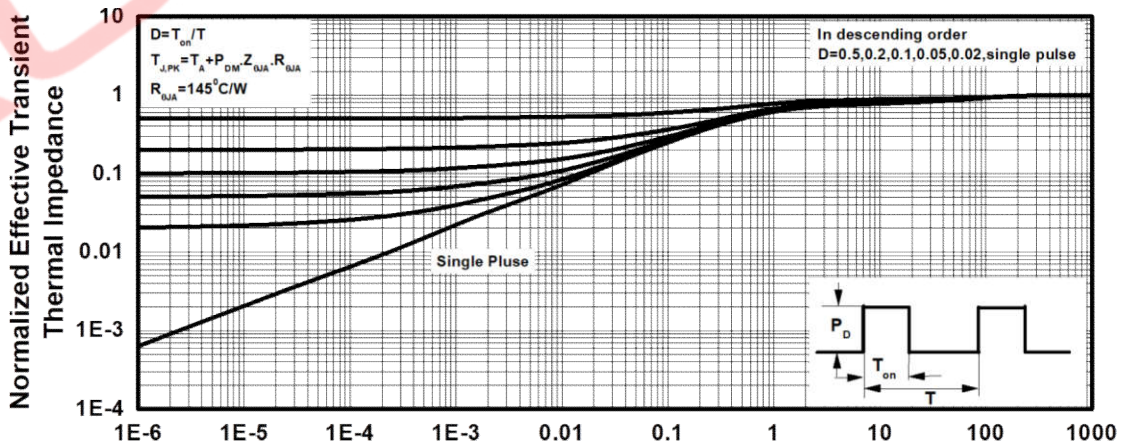


Figure 11: Normalized Maximum Transient Thermal Impedance

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Package Outline Dimension (Units: mm)

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