P-Ch 30V Fast Switching MOSFETs

❖ GENERAL DESCRIPTION

The AM3401 is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the small power switching and load switch applications.

The AM3401 meet the RoHS and Green Product requirement, with full function reliability approved.

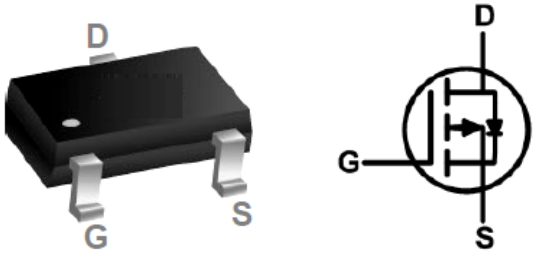
❖ FEATURES

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available
- RoHS and Halogen free compliance.

Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
-30V	52mΩ	-3.3A

SOT23-3L Pin configuration



❖ ORDER/MARKING INFORMATION

Order Information	Top Marking
AM3401 X X Package Type R: SOT23-3L Packing Blank : Bag A : Taping	B BY WX → ID code:internal WW:01~26 (A~Z) 27~52 (a~z) Year: 8=2018 9=2019 B=2020 C=2021 D=2022 : Z=2044 AM3401

❖ ABSOLUTE MAXIMUM RATINGS (at T_A = 25°C)

Characteristics	Symbol	Rating		Unit
		10s	Steady State	
Drain-Source Voltage	V_{DS}	-30		V
Gate-Source Voltage	V_{GS}	±20		V
Continuous Drain Current, V_{GS} @ -10V (Note1)	I_D@T_A=25°C	-3.8	-3.3	A
Continuous Drain Current, V_{GS} @ -10V (Note1)	I_D@T_A=70°C	-3.1	-2.7	A
Pulsed Drain Current (Note2)	I_{DM}	-17		A
Total Power Dissipation (Note3)	P_D@T_A=25°C	1.32	1	W
Total Power Dissipation (Note3)	P_D@T_A=70°C	0.84	0.64	W
Storage Temperature Range	T_{STG}	-55 to 150		°C
Operating Junction Temperature Range	T_J	-55 to 150		°C

Note 1: The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
Note 2: The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
Note 3: The power dissipation is limited by 150°C junction temperature

❖ Thermal Data

Characteristics	Symbol	Min	Typ	Max	Units
Thermal Resistance Junction-Ambient (Note1)	$R_{\theta JA}$	-	-	125	°C/W
Thermal Resistance Junction-Ambient (Note1) (t ≤10s)	$R_{\theta JA}$	-	-	95	°C/W
Thermal Resistance Junction-Case (Note1)	$R_{\theta JC}$	-	-	80	°C/W

Note 1: The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

❖ ELECTRICAL CHARACTERISTICS

(T_J=25°C, unless otherwise specified)

Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=-250uA	-30	-	-	V
BVDSS Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , I_D=-1mA	-	-0.023	-	V/°C
Static Drain-Source On-Resistance2	$R_{DS(ON)}$	V_{GS}=-10V , I_D=-3A	-	42	52	mΩ
		V_{GS}=-4.5V , I_D=-2A	-	75	90	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =-250uA	-1.2	-1.6	-2.5	V
VGS(th) Temperature Coefficient	$\Delta V_{GS(th)}$		-	4	-	mV/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24V , V_{GS}=0V , T_J=25°C	-	-	-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=55°C	-	-	-5	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	-	-	±100	nA
Forward Transconductance	gfs	V_{DS}=-5V , I_D=-3A	-	11	-	S
Total Gate Charge (-4.5V)	Qg	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-3A	-	6.4	9.0	nC
Gate-Source Charge	Qgs		-	2.3	3.2	
Gate-Drain Charge	Qgd		-	1.9	2.7	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=-15V , V_{GS}=-10V , R_G=3.3Ω, I_D=-3A	-	2.8	5.6	ns
Rise Time	T_r		-	8.4	15.1	
Turn-Off Delay Time	$T_{d(off)}$		-	39	78.0	
Fall Time	T_f		-	6	12.0	
Input Capacitance	C_{iss}	V_{DS}=-15V , V_{GS}=0V , f=1MHz	-	583	816	pF
Output Capacitance	C_{oss}		-	100	140	
Reverse Transfer Capacitance	C_{rss}		-	80	112	

❖ Diode Characteristics

Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Continuous Source Current (Note1,3)	I_S	V_G=V_D=0V , Force Current	-	-	-3.3	A
Pulsed Source Current (Note2,3)	I_{SM}		-	-	-17	A
Diode Forward Voltage(Note2)	V_{SD}	V_{GS}=0V , I_S=-1A , T_J=25°C	-	-	-1	V
Reverse Recovery Time	t_{rr}	I_F=-3A, dI/dt=100A/μs , T_J=25°C	-	7.8	-	nS
Reverse Recovery Charge	Q_{rr}		-	2.5	-	nC

Note 1: The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
Note 2: The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
Note 3: The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

❖ TYPICAL CHARACTERISTICS

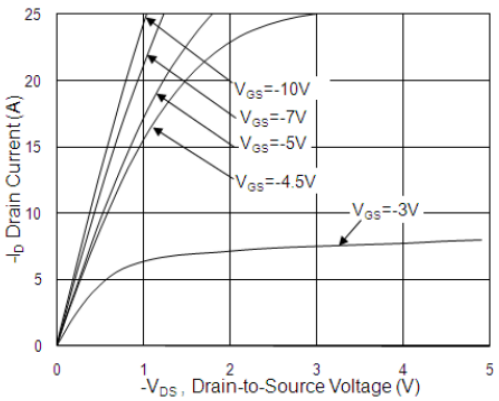


Fig.1 Typical Output Characteristics

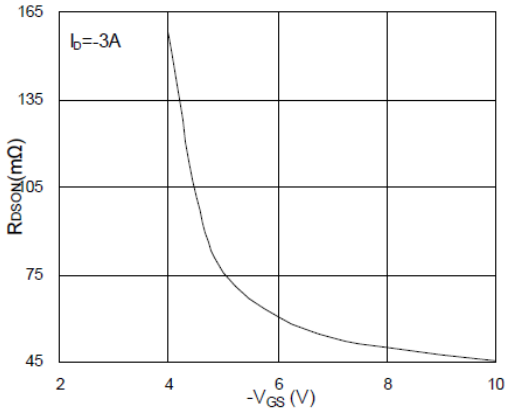


Fig.2 On-Resistance v.s Gate-Source

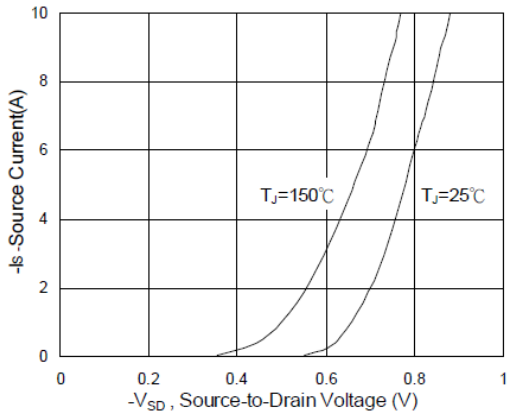


Fig.3 Forward Characteristics of Reverse

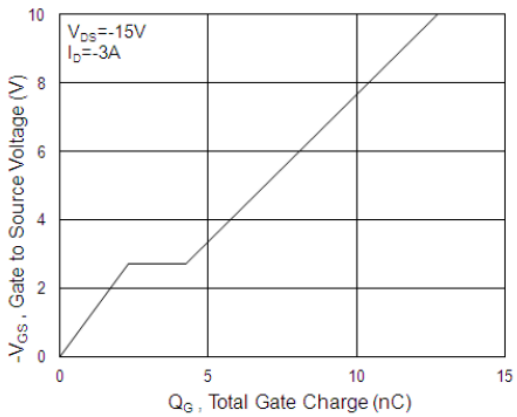


Fig.4 Gate-Charge Characteristics

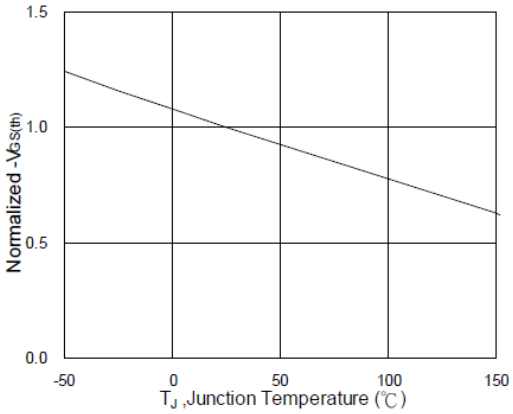


Fig.5 Normalized VGS(th) vs. TJ

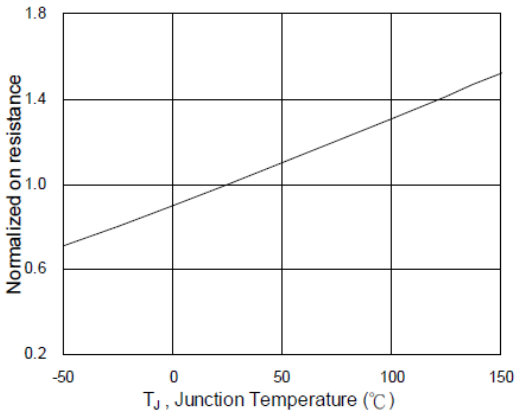


Fig.6 Normalized RDSON vs TJ

❖ TYPICAL CHARACTERISTICS (CONTINUOUS)

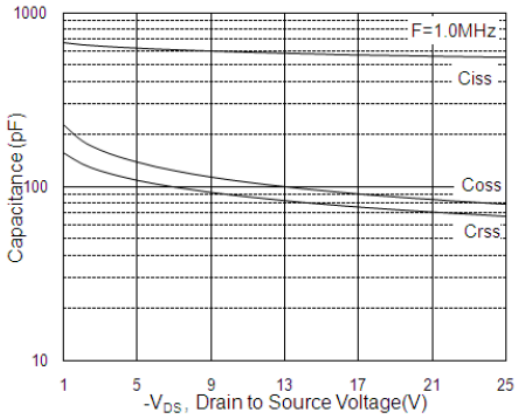


Fig.7 Capacitance

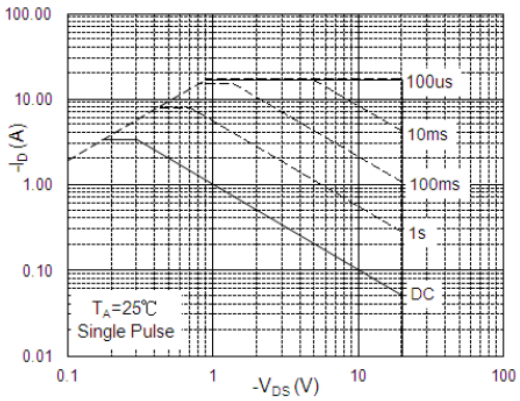


Fig.8 Safe Operating Area

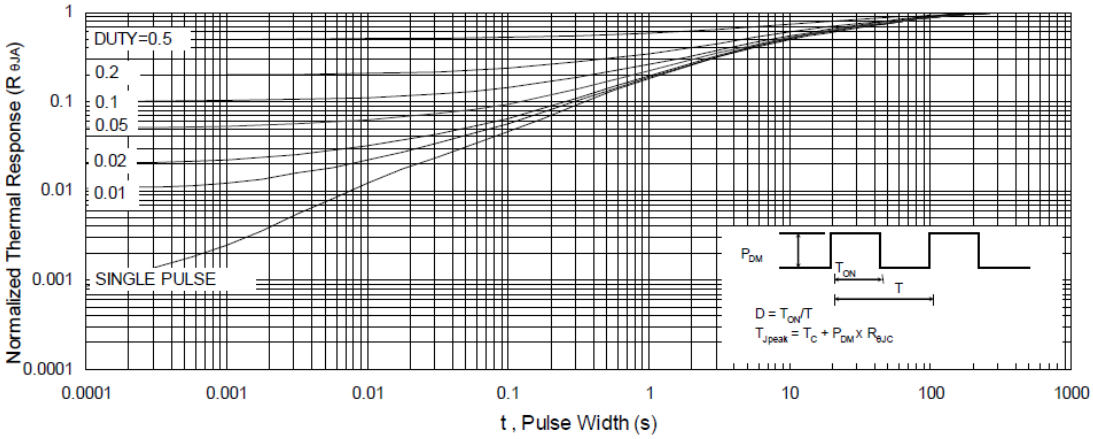


Fig.9 Normalized Maximum Transient Thermal Impedance

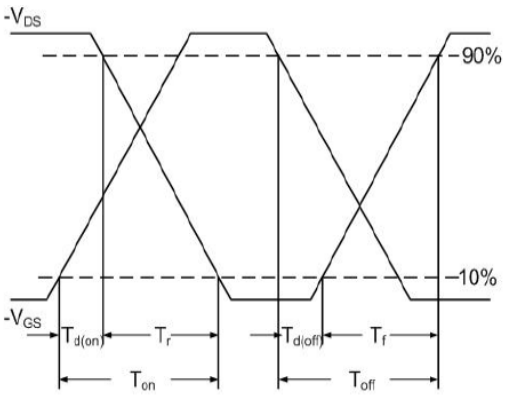


Fig.10 Switching Time Waveform

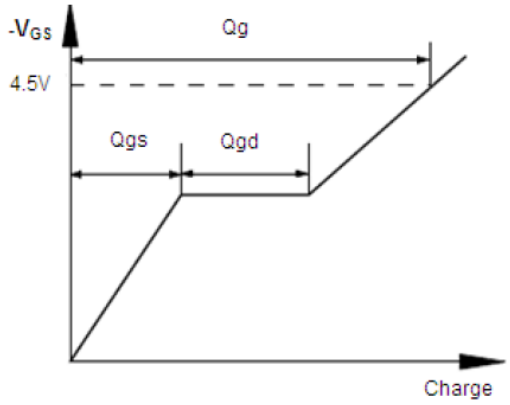
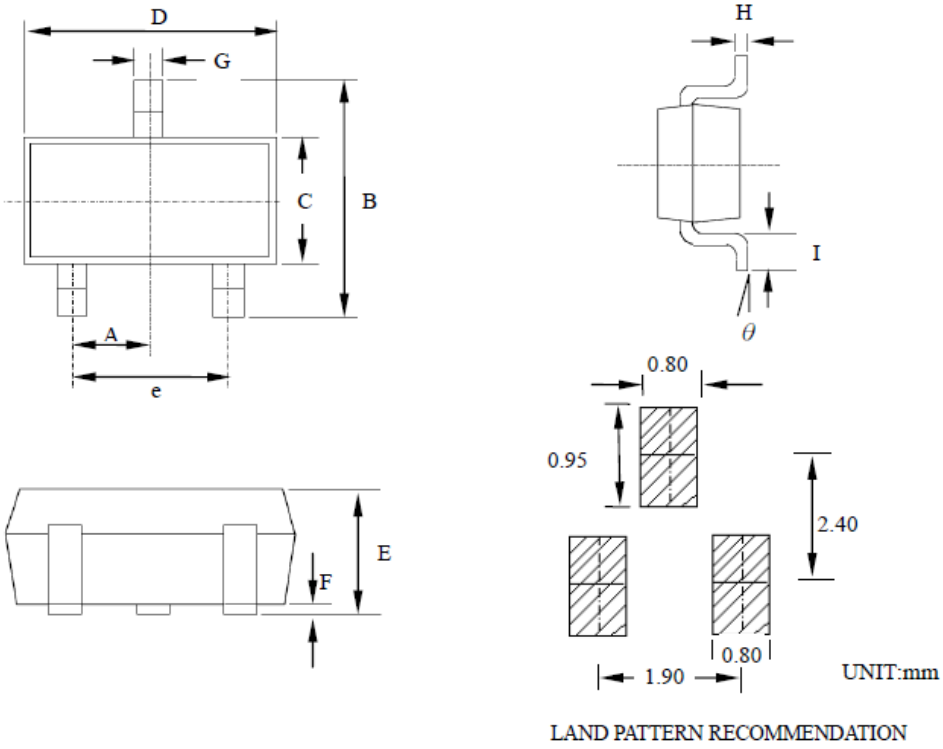


Fig.11 Gate Charge Waveform

❖ PACKAGE OUTLINES



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.90	0.95	1.00	0.035	0.037	0.039
B	2.60	2.80	3.00	0.102	0.110	0.118
C	1.40	1.55	1.70	0.055	0.061	0.067
D	2.80	2.95	3.10	0.110	0.116	0.122
E	0.85	-	1.20	0.033	-	0.047
F	0.00	-	0.10	0.000	-	0.004
G	0.30	0.40	0.50	0.012	0.016	0.020
H	0.10	-	0.20	0.004	-	0.008
I	0.30	0.45	0.60	0.012	0.018	0.024
θ	0°	4°	8°	0°	4°	8°
e	-	1.90	-	-	0.075	-

JEDEC outline: NA