AT4407

30V P-Channel MOSFET

Features

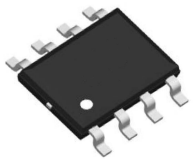
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

Product Summary

V_{DS}	-30	V
I_D	-11.5	A
$R_{DS(ON)}$ (at V_{GS}=-10V)	15	mΩ
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	25	mΩ

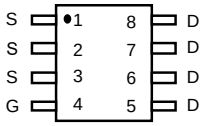
Applications

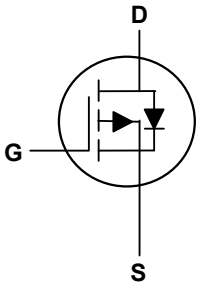
- High Frequency Point-of-Load,Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch



SOP-8 Top View

Top View





Absolute Maximum Ratings(T_A=25℃, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, VGS @ -10V[1]	I_D@T_A=25℃	-11.5	A
Continuous Drain Current, VGS @ -10V[1]	I_D@T_A=70℃	-9	A
Pulsed Drain Current[2]	I_{DM}	-46	A
Single Pulse Avalanche Energy[3]	EAS	125	mJ
Avalanche Current	I_{AS}	-50	A
Total Power Dissipation[4]	P_D@T_A=25℃	1.5	W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient[1](t≦10s)	$R_{\theta JA}$	---	40	℃/W
Thermal Resistance Junction-Ambient[1]		---	75	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	---	24	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=-250uA	-30	---	---	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25℃ , I_D=-1mA	---	-0.023	---	V/℃
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=-10V , I_D=-10A	---	11.5	15	mΩ
		V_{GS}=-4.5V , I_D=-10A	---	18	25	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =-250uA	-1.0	-1.7	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	4.6	---	mV/℃
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=55℃	---	---	-5	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Forward Transconductance	gfs	V_{DS}=-5V , I_D=-10A	---	24	---	S
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	9	---	Ω
Total Gate Charge (-4.5V)	Q_g	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-10A	---	20	---	nC
Gate-Source Charge	Q_{gs}		---	5.1	---	
Gate-Drain Charge	Q_{gd}		---	7.3	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=-15V , V_{GS}=-10V , R_G=3.3Ω, I_D=-1A	---	33.8	---	ns
Rise Time	T_r		---	35.8	---	
Turn-Off Delay Time	$T_{d(off)}$		---	72.8	---	
Fall Time	T_f		---	10.6	---	
Input Capacitance	C_{iss}	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	2215	---	pF
Output Capacitance	C_{oss}		---	310	---	
Reverse Transfer Capacitance	C_{rss}		---	237	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current[1,5]	I_S	V_G=V_D=0V , Force Current	---	---	-11.5	A
Pulsed Source Current[2,5]	I_{SM}		---	---	-46	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	V

Note:

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is V_{DD}=-25V,V_{GS}=-10V,L=0.1mH,I_{AS}=-50A

4.The power dissipation is limited by 150℃ junction temperature

5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

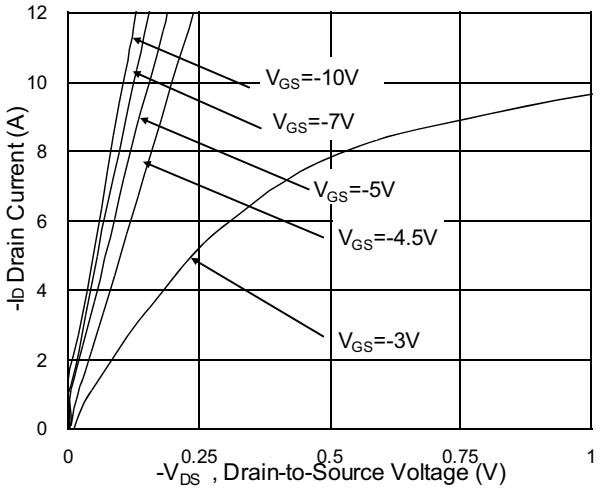


Fig.1 Typical Output Characteristics

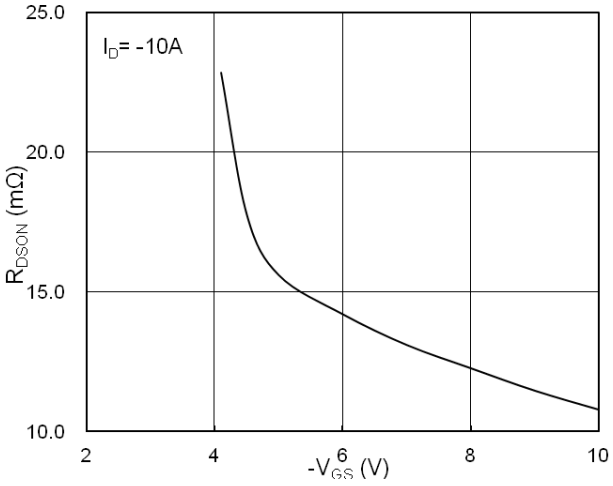


Fig.2 On-Resistance vs. G-S Voltage

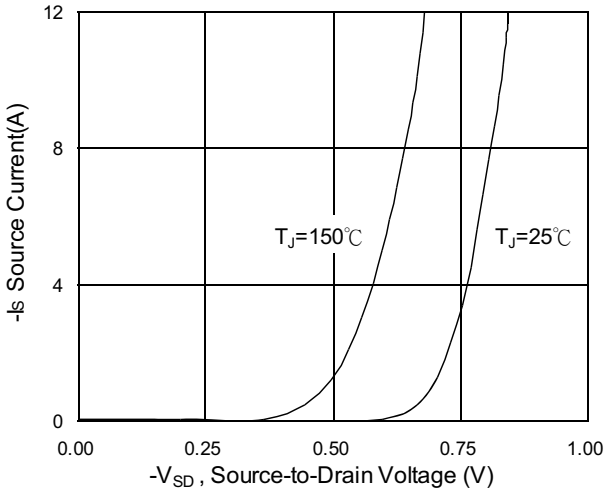


Fig.3 Forward Characteristics of Reverse

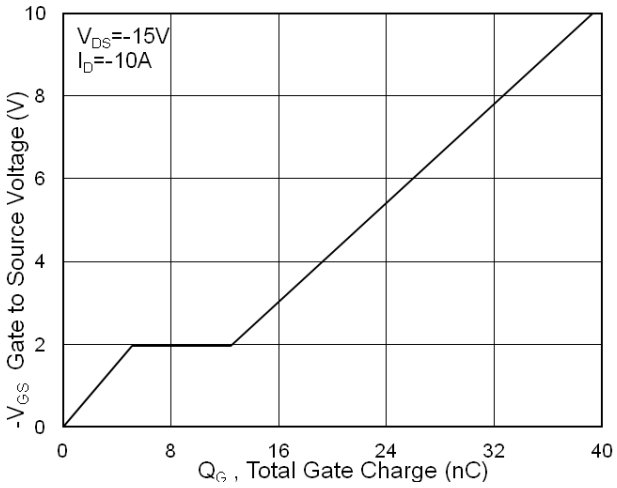


Fig.4 Gate-charge Characteristics

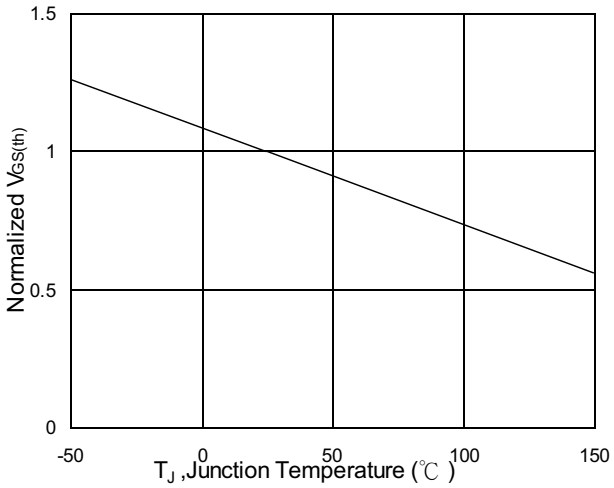


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

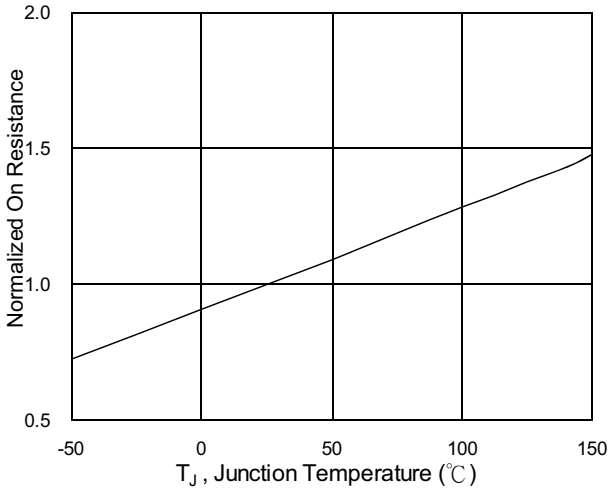


Fig.6 Normalized R_{DSON} vs. T_J

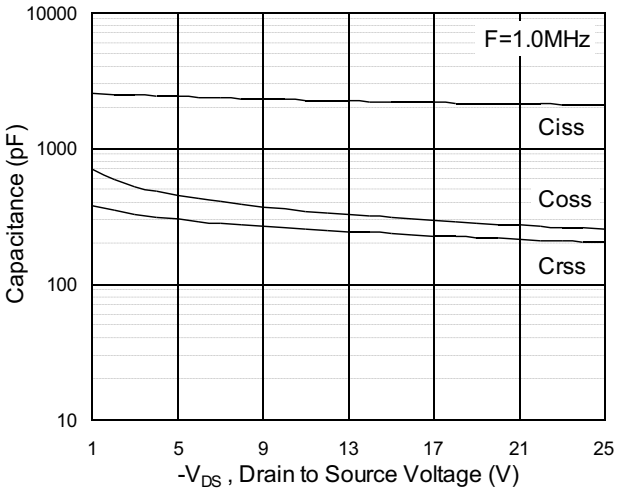


Fig.7 Capacitance

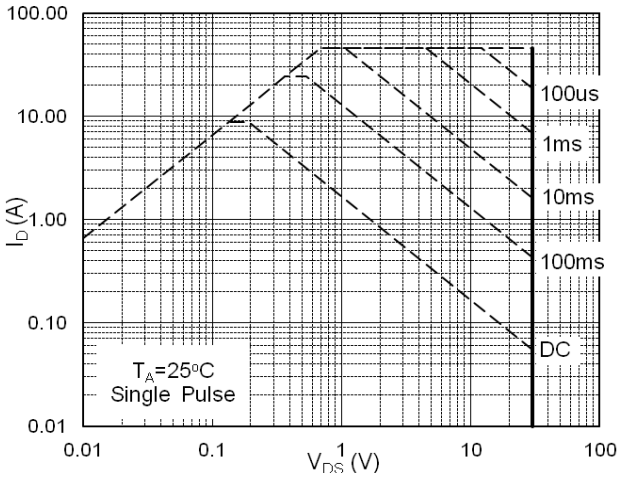


Fig.8 Safe Operating Area

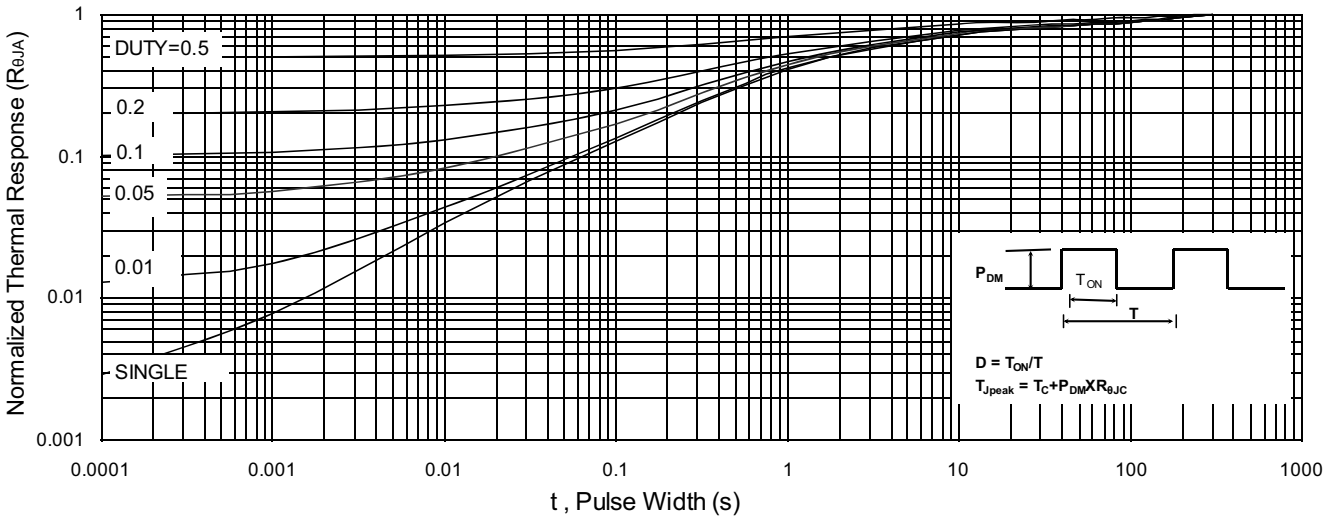


Fig.9 Normalized Maximum Transient Thermal Impedance

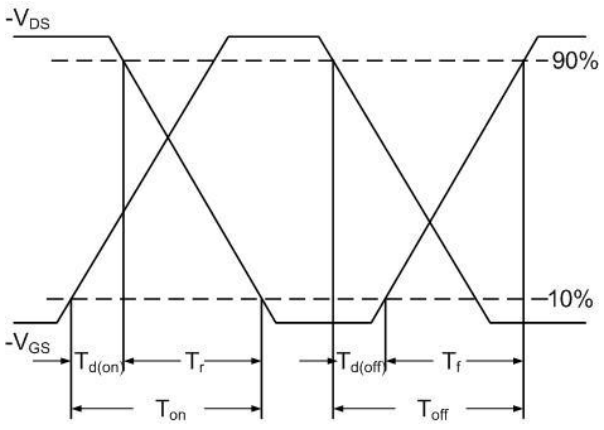


Fig.10 Switching Time Waveform

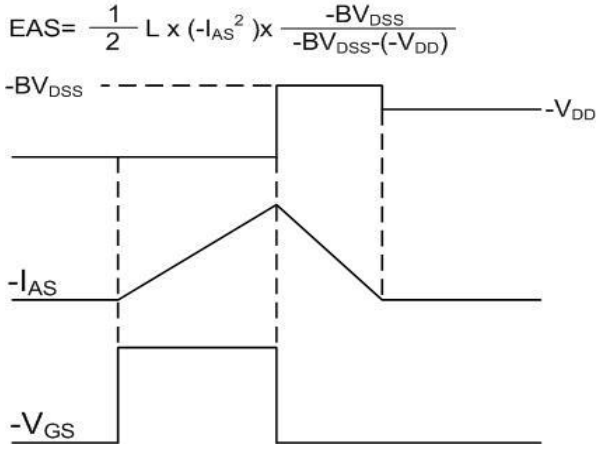
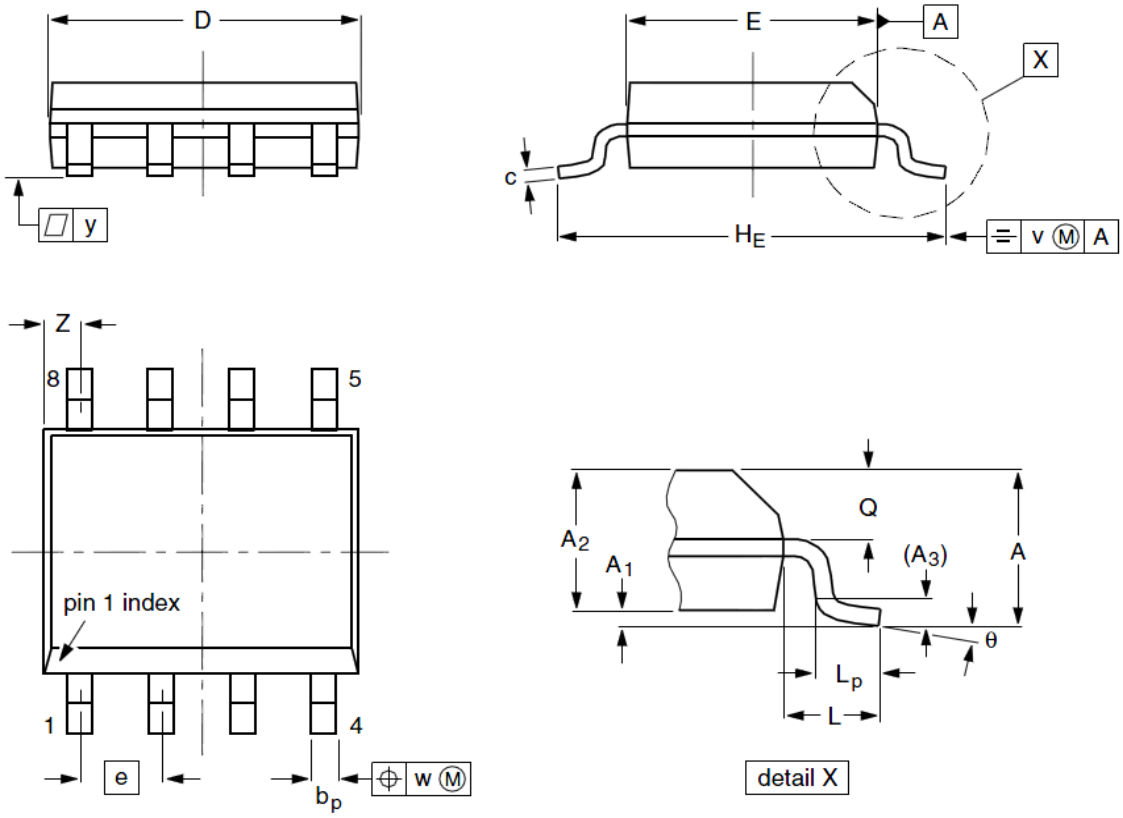


Fig.11 Unclamped Inductive Waveform

SOP-8 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	1.35	1.55	1.75	**A_1**	0.10	0.18	0.25
A_2	1.25	1.45	1.65	**A_3**	--	0.25	--
b_p	0.36	0.42	0.51	**c**	0.19	0.22	0.25
D	4.70	4.92	5.10	**E**	3.80	3.90	4.00
e	--	1.27	--	**H_E**	5.80	6.00	6.20
L	--	1.05	--	**L_P**	0.40	0.68	1.00
Q	0.60	0.65	0.73	**v**	--	0.25	--
w	--	0.25	--	**y**	--	0.10	--
Z	0.30	0.50	0.70	**θ**	0°		8°