AT03050D

30V N-Channel MOSFET

Features

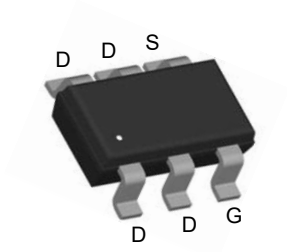
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

Product Summary

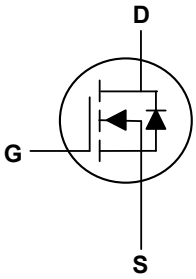
V_{DS}	30	V
I_D	5	A
$R_{DS(ON)}$ (at V_{GS}=10V)	28	mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	40	mΩ

Applications

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



TSOP6 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℃	5	A
Continuous Drain Current, VGS @ 10V[1]	I_D@T_A=70℃	4	A
Pulsed Drain Current[2]	I_{DM}	10	A
Total Power Dissipation[3]	P_D@T_A=25℃	1.1	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]	$R_{\theta JA}$	---	110	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	---	70	℃/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	---	0.02	---	V/℃
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=10V , I_D=5A	---	---	28	mΩ
		V_{GS}=4.5V , I_D=4A	---	---	40	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.0	---	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	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Forward Transconductance	gfs	V_{DS}=5V , I_D=5A	---	6.3	---	S
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.5	5	Ω
Total Gate Charge	Q_g	V_{DS}=20V , V_{GS}=4.5V , I_D=5A	---	7.2	---	nC
Gate-Source Charge	Q_{gs}		---	1.4	---	
Gate-Drain Charge	Q_{gd}		---	2.2	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=12V , V_{GS}=10V , R_G=3.3Ω, I_D=5A	---	4.1	---	ns
Rise Time	T_r		---	9.8	---	
Turn-Off Delay Time	$T_{d(off)}$		---	15.5	---	
Fall Time	T_f		---	6	---	
Input Capacitance	C_{iss}	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	572	---	pF
Output Capacitance	C_{oss}		---	81	---	
Reverse Transfer Capacitance	C_{rss}		---	65	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current[1,4]	I_S	V_G=V_D=0V , Force Current	---	---	5	A
Pulsed Source Current[2,4]	I_{SM}		---	---	10	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V

Note:

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

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

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

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

Typical Characteristics

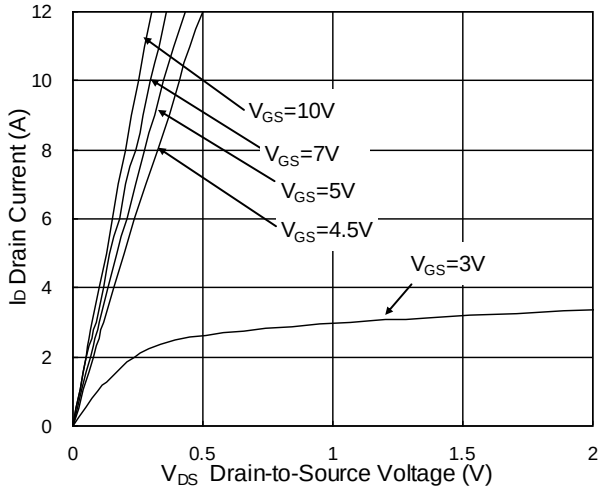


Fig.1 Typical Output Characteristics

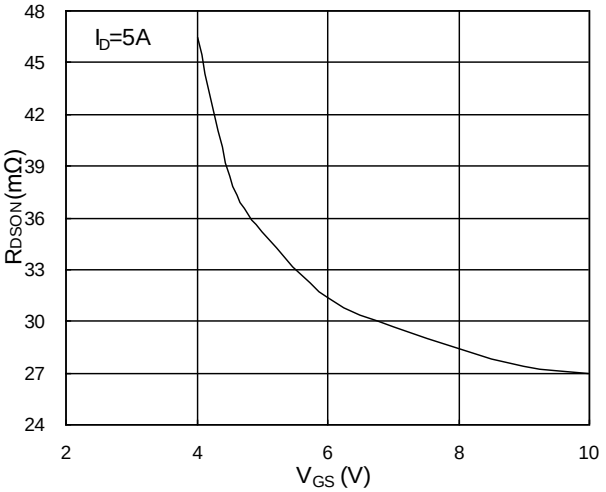


Fig.2 On-Resistance vs. Gate-Source

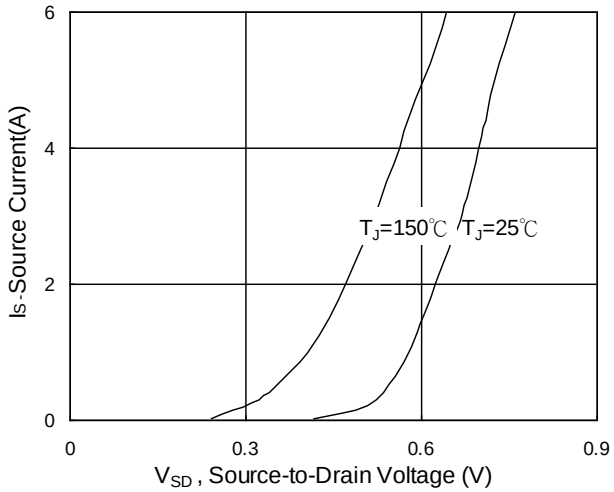


Fig.3 Forward Characteristics Of Reverse

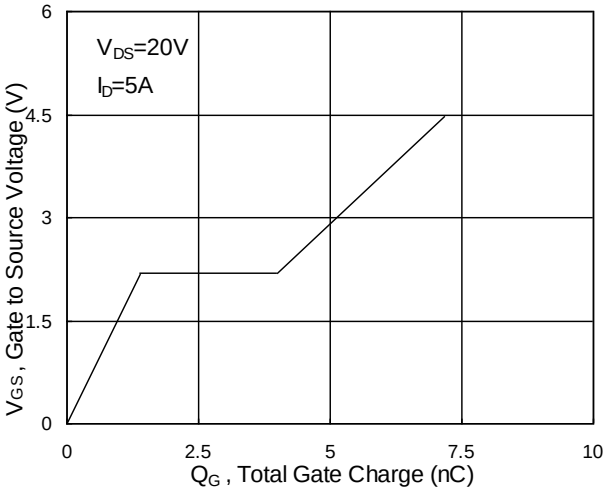


Fig.4 Gate-Charge Characteristics

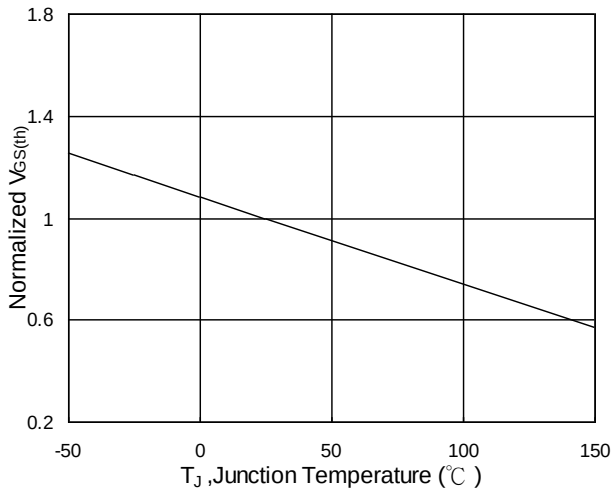


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

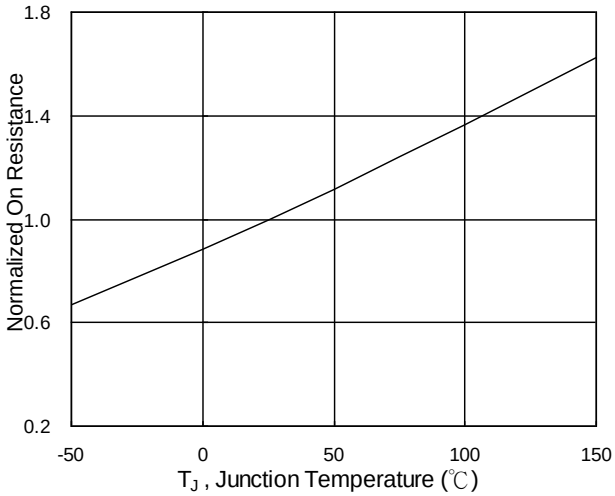


Fig.6 Normalized R_{DSON} vs. T_J

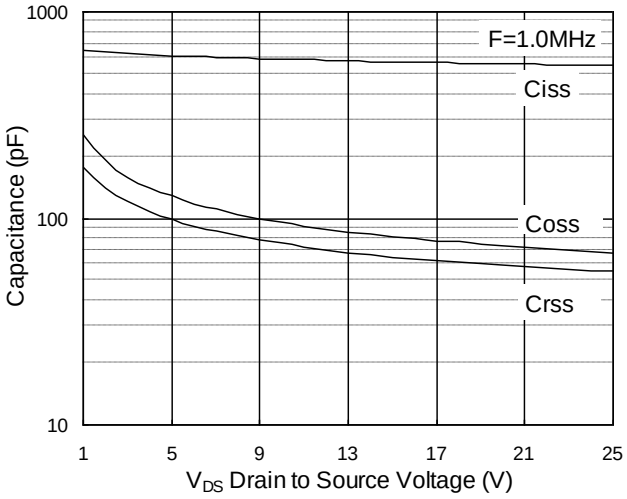


Fig.7 Capacitance

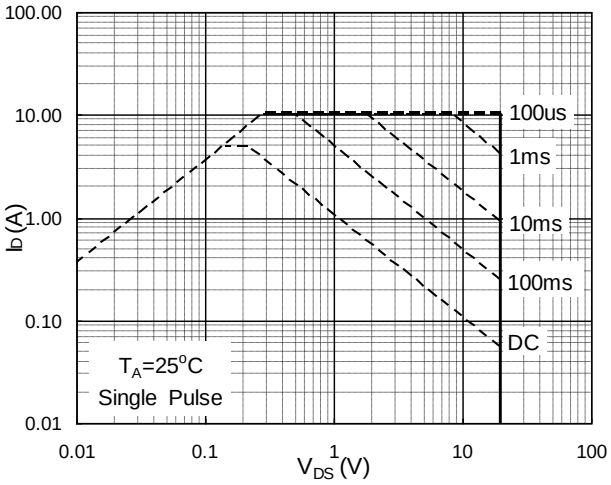


Fig.8 Safe Operating Area

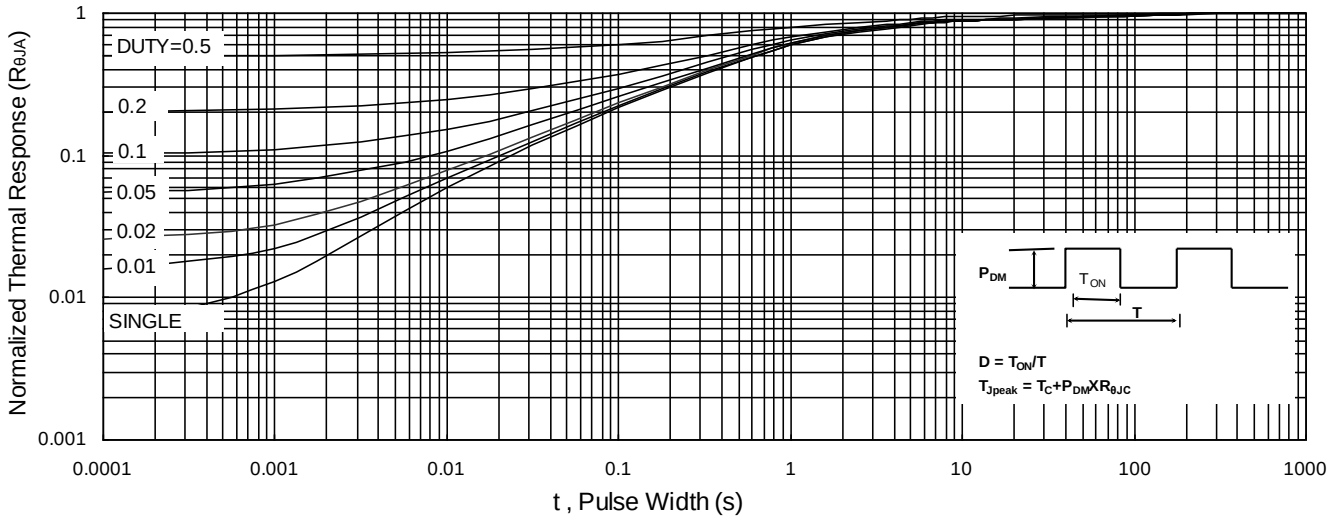


Fig.9 Normalized Maximum Transient Thermal Impedance

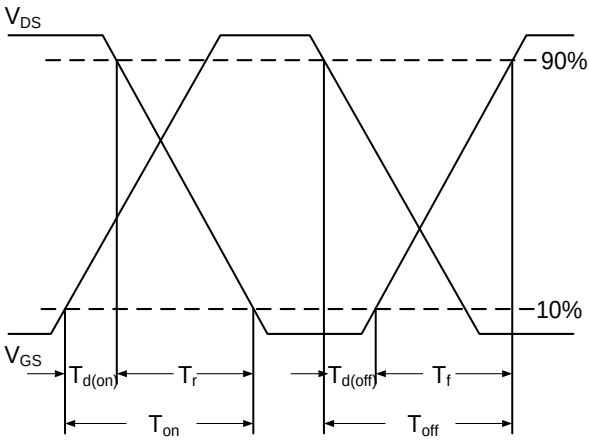


Fig.10 Switching Time Waveform

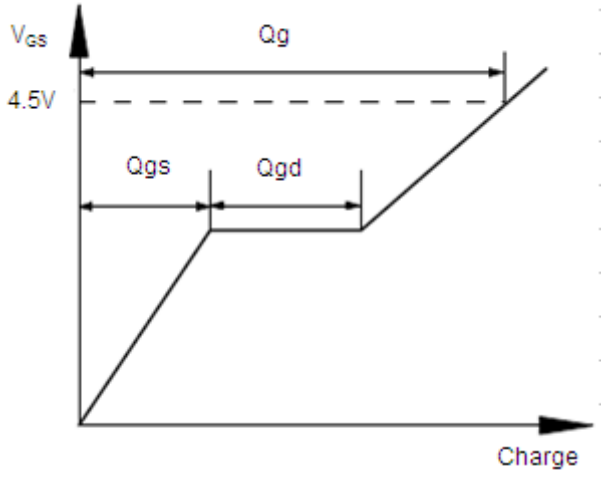
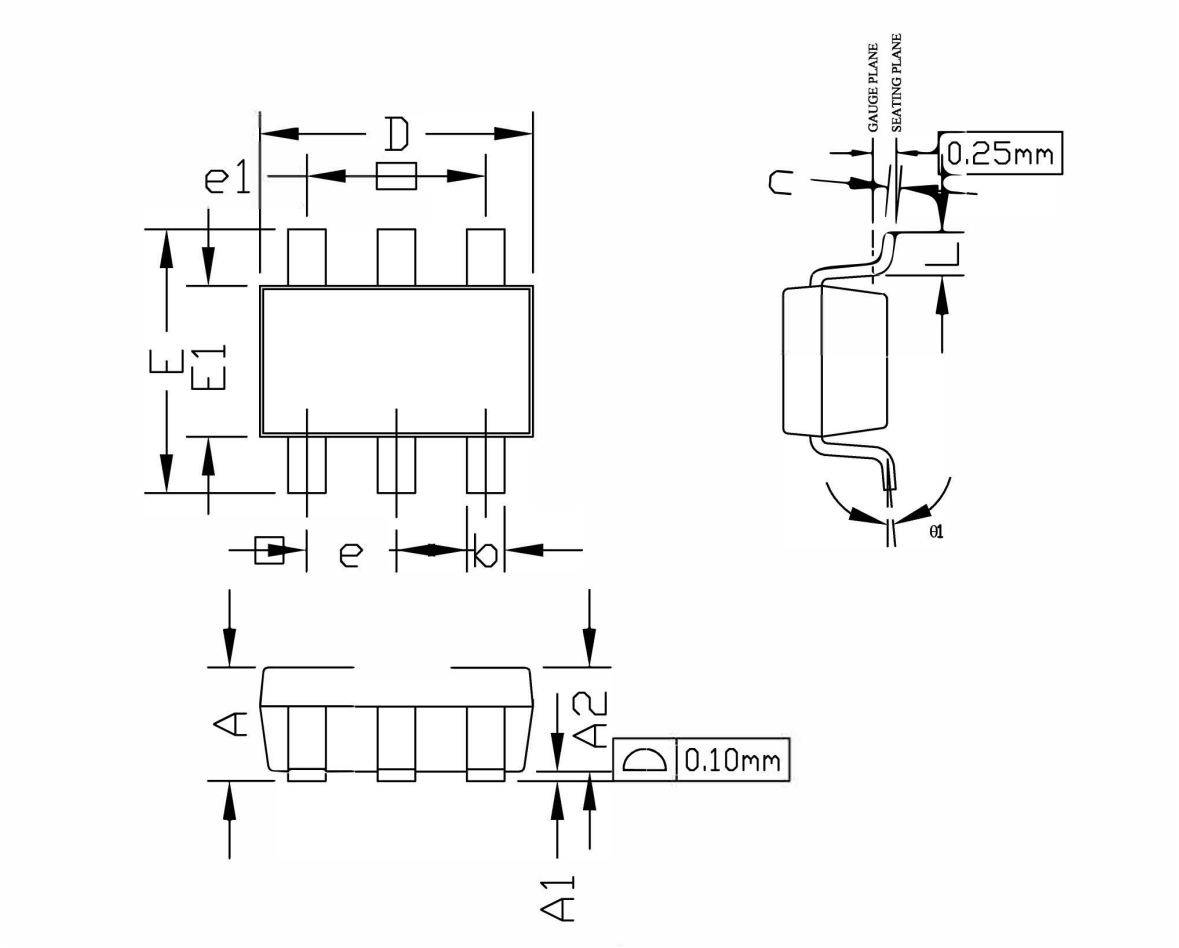


Fig.11 Gate Charge Waveform

TSOP6 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	0.80	1.00	1.25	**E**	2.50	2.80	3.10
A1	0.00	---	0.15	**E1**	1.50	1.60	1.70
A2	0.80	1.10	1.20	**e**	0.95 REF		
b	0.25	0.35	0.45	**e1**	1.90 REF		
c	0.08	0.13	0.20	**L**	0.30	0.45	0.60
D	2.70	2.90	3.10	**θ1**	0°		8°