AT03550C

30V N-Channel MOSFET

Features

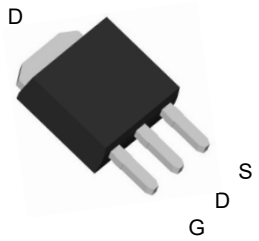
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

Product Summary

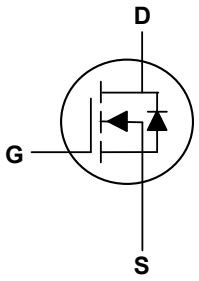
V_{DS}	30	V
I_D	55	A
$R_{DS(ON)}$ (at V_{GS}=10V)	8.5	mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	14	mΩ

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Power Tool Application



TO-251 Top View



Absolute Maximum Ratings(T_C=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_C=25℃	55	A
Continuous Drain Current, VGS @ 10V[1]	I_D@T_C=100℃	40	A
Continuous Drain Current, VGS @ 10V[1]	I_D@T_A=25℃	13	A
Continuous Drain Current, VGS @ 10V[1]	I_D@T_A=70℃	10.8	A
Pulsed Drain Current[2]	I_{DM}	110	A
Single Pulse Avalanche Energy[3]	EAS	58	mJ
Avalanche Current	I_{AS}	34	A
Total Power Dissipation[4]	P_D@T_C=25℃	41.6	W
Total Power Dissipation[4]	P_D@T_A=25℃	2.42	W
Storage Temperature Range	T_{STG}	-55 to 175	℃
Operating Junction Temperature Range	T_J	-55 to 175	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient[1](Steady State)	$R_{\theta JA}$	---	62	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	---	3.6	℃/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	---	0.027	---	V/℃
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=10V , I_D=20A	---	---	8.5	mΩ
		V_{GS}=4.5V , I_D=10A	---	---	14	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.0	---	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	-5.8	---	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=20A	---	17.5	---	S
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.2	4.4	Ω
Total Gate Charge	Q_g	V_{DS}=20V , V_{GS}=4.5V , I_D=12A	---	12.8	---	nC
Gate-Source Charge	Q_{gs}		---	3.3	---	
Gate-Drain Charge	Q_{gd}		---	6.5	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=12V , V_{GS}=10V , R_G=3.3Ω, I_D=5A	---	4.5	---	ns
Rise Time	T_r		---	10.8	---	
Turn-Off Delay Time	$T_{d(off)}$		---	25.5	---	
Fall Time	T_f		---	9.6	---	
Input Capacitance	C_{iss}	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1317	---	pF
Output Capacitance	C_{oss}		---	163	---	
Reverse Transfer Capacitance	C_{rss}		---	131	---	

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	---	---	55	A
Pulsed Source Current[2,5]	I_{SM}		---	---	110	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 EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH

4.The power dissipation is limited by 175℃ 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

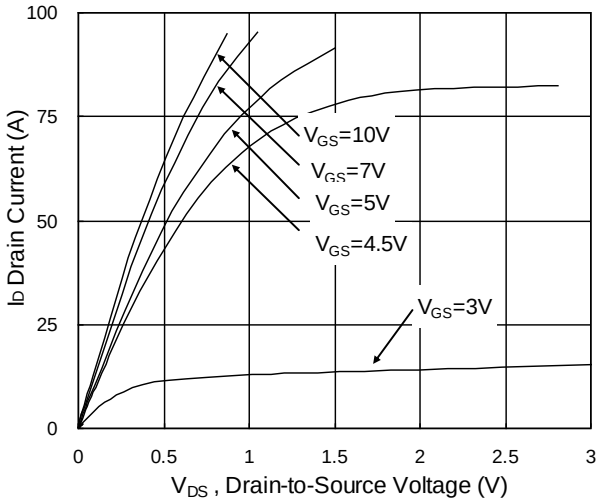


Fig.1 Typical Output Characteristics

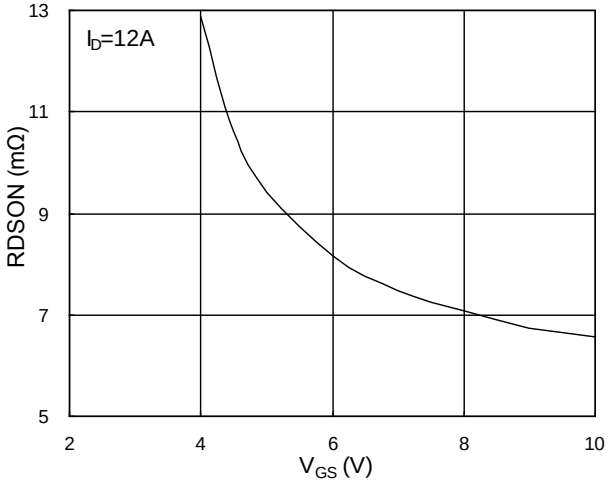


Fig.2 On-Resistance vs. G-S Voltage

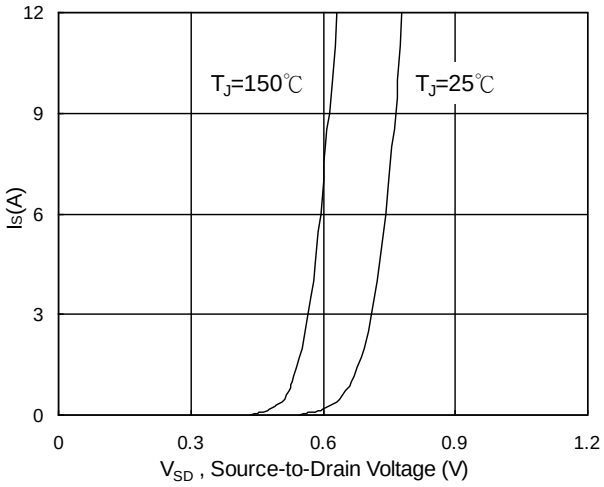


Fig.3 Forward Characteristics of Reverse

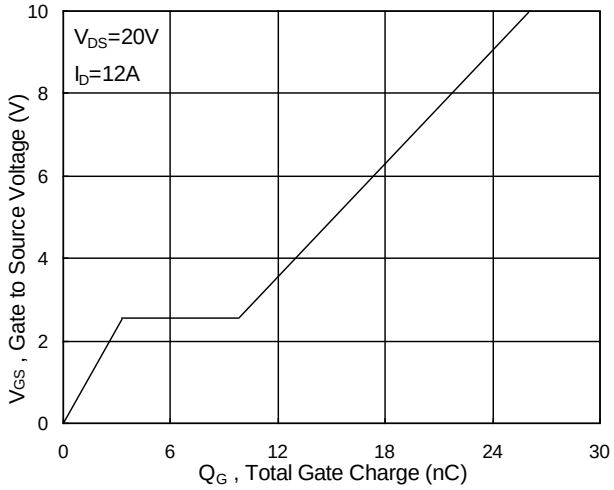


Fig.4 Gate-Charge Characteristics

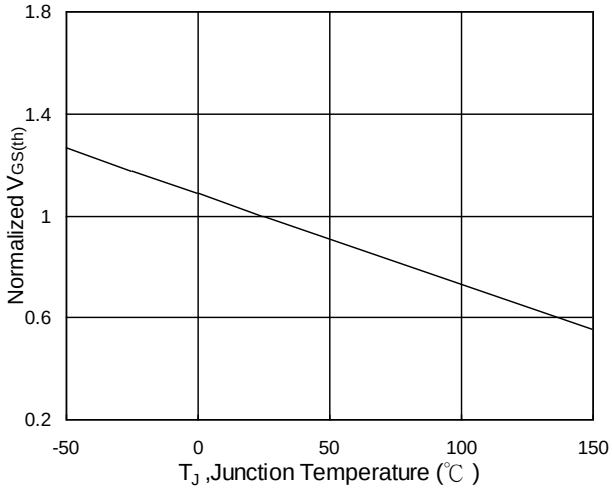


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

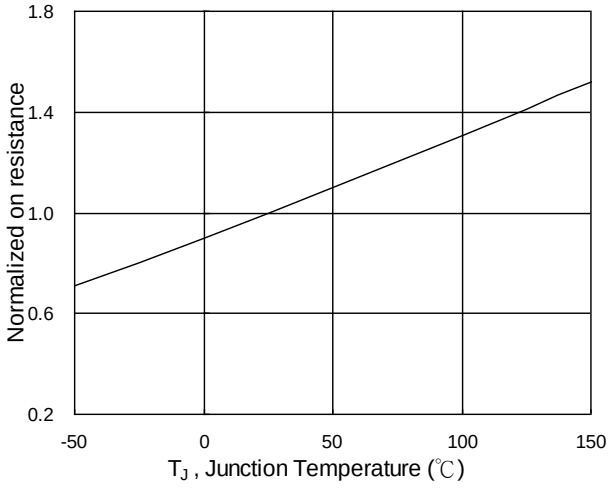


Fig.6 Normalized R_{DSON} vs. T_J

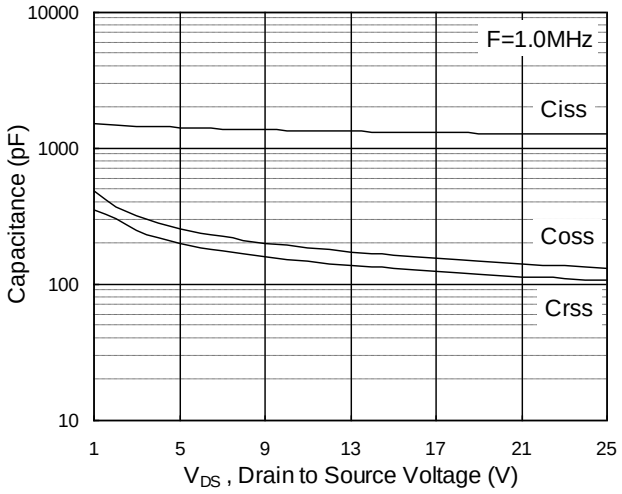


Fig.7 Capacitance

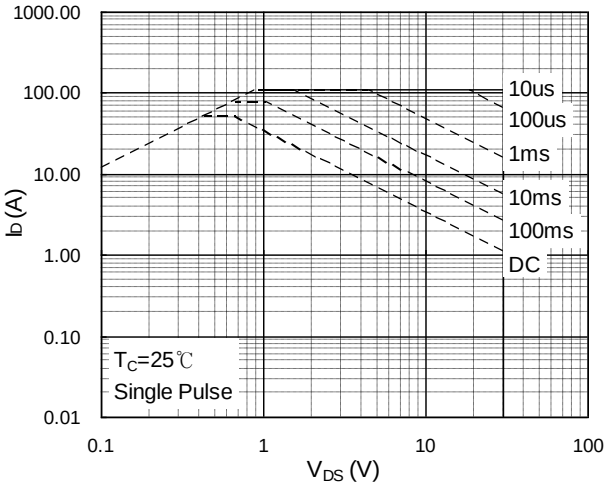


Fig.8 Safe Operating Area

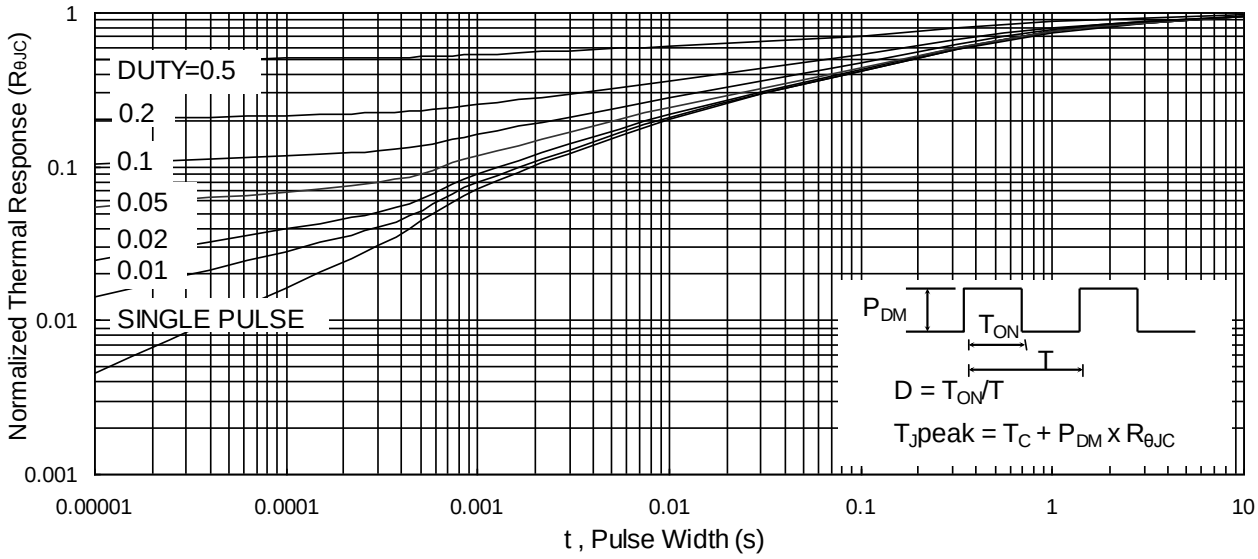


Fig.9 Normalized Maximum Transient Thermal Impedance

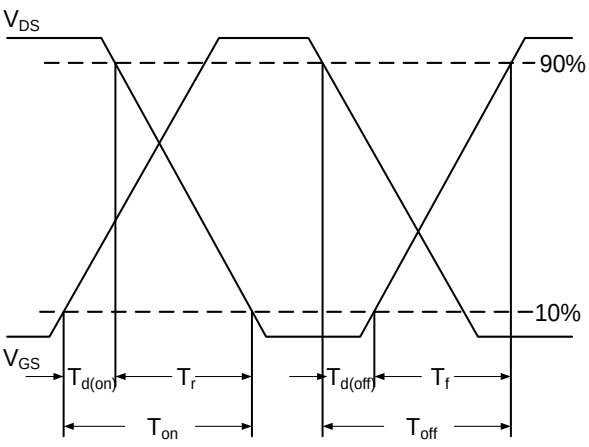


Fig.10 Switching Time Waveform

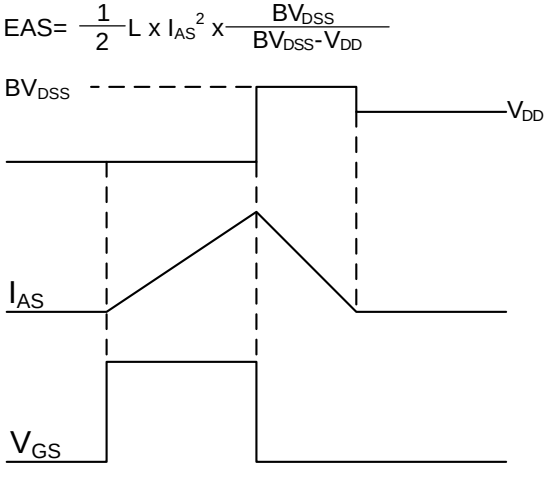
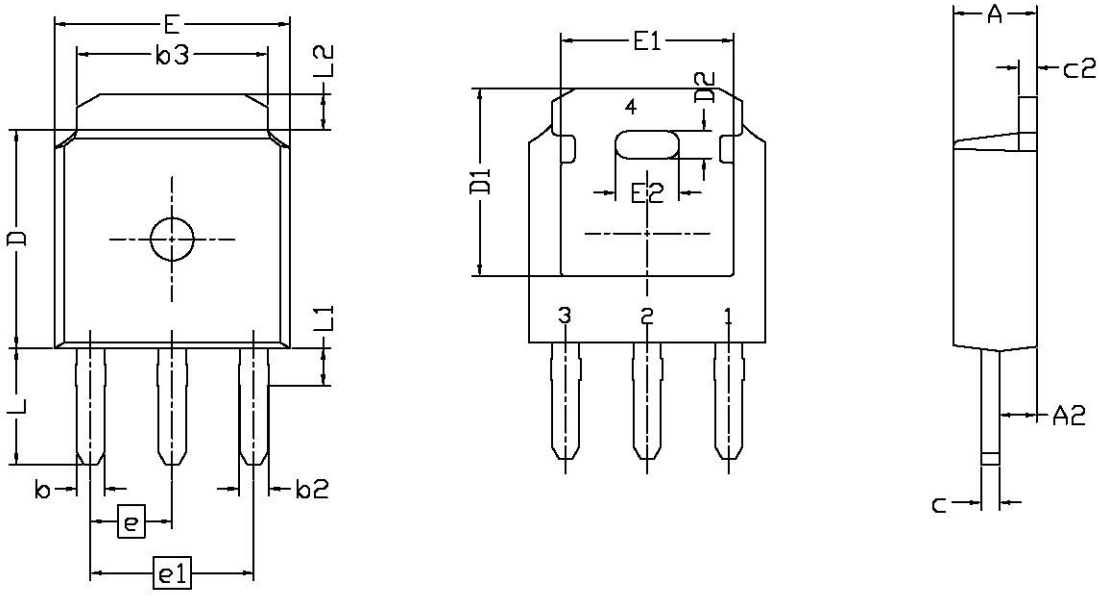


Fig.11 Unclamped Inductive Switching Waveform

TO-251 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	2.20	2.30	2.39	**A2**	0.90	1.00	1.14
b	0.63	0.76	0.85	**b2**	0.76	0.85	1.05
b3	5.10	5.40	5.60	**C**	0.46	0.51	0.61
C2	0.46	0.51	0.61	**D**	5.90	6.10	6.30
D1	5.25 REF			**D2**	0.508 BSC		
E	6.35	6.55	6.70	**E1**	5.06 REF		
E2	1.524 BSC			**e**	2.29 BSC		
e1	4.57 BSC			**L**	3.70	4.00	4.40
L1	1.15 REF			**L2**	0.90	1.06	1.20