AT40N120LK

40V N-Channel MOSFET

Features

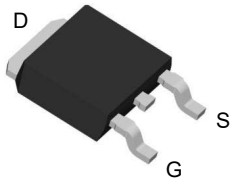
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

Product Summary

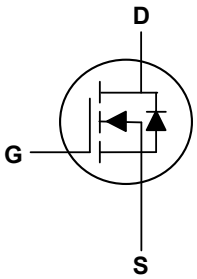
V_{DS}	40	V
I_D	120	A
$R_{DS(ON)}$ Typ (at V_{GS}=10V)	3.6	mΩ
$R_{DS(ON)}$ Typ(at V_{GS}=4.5V)	5.8	mΩ

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch,Uninterruptible power supply



TO-252 Top View



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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D@T_C=25℃	120	A
Continuous Drain Current	I_D@T_C=100℃	85	A
Pulsed Drain Current	I_{DM}	330	A
Single Pulse Avalanche Energy[3]	EAS	1080	mJ
Total Power Dissipation	P_D@T_C=25℃	120	W
Derating factor		0.8	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-Case[1]	$R_{\theta JC}$	---	1.25	℃/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	40	45	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V , I_D=20A	---	3.6	4	mΩ
		V_{GS}=4.5V , I_D=10A	---	5.8	7	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.2	1.8	2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=40V , V_{GS}=0V , T_J=25℃	---	---	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Forward Transconductance	gfs	V_{DS}=10V , I_D=20A	26	---	---	S
Total Gate Charge	Q_g	V_{DS}=20V , V_{GS}=10V , I_D=20A	---	75	---	nC
Gate-Source Charge	Q_{gs}		---	10.5	---	
Gate-Drain Charge	Q_{gd}		---	17	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=20V ,I_D=2A ,V_{GS}=10V , R_G=3Ω, R_L=1Ω	---	15	---	ns
Rise Time	T_r		---	18	---	
Turn-Off Delay Time	$T_{d(off)}$		---	52	---	
Fall Time	T_f		---	23	---	
Input Capacitance	C_{iss}	V_{DS}=20V , V_{GS}=0V , f=1MHz	---	5400	---	pF
Output Capacitance	C_{oss}		---	970	---	
Reverse Transfer Capacitance	C_{rss}		---	380	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current[1]	I_S		---	---	120	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=40A , T_J=25℃	---	---	1.2	V
Reverse Recovery Time	t_{rr}	I_F=40A ,di/dt=100A/μs, T_J=25℃	---	42	---	nS
Reverse Recovery Charge	Q_{rr}		---	45	---	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

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}=20V,V_{GS}=10V,L=1mH,R_G=25Ω

4.The power dissipation is limited by 175℃ junction temperature

Typical Characteristics

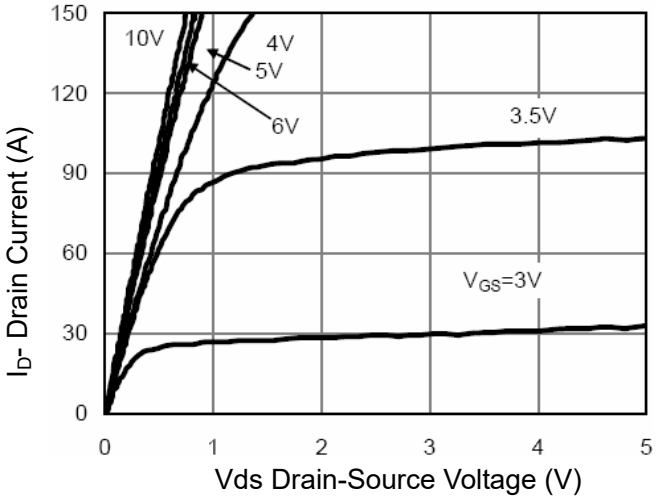


Figure 1 Output Characteristics

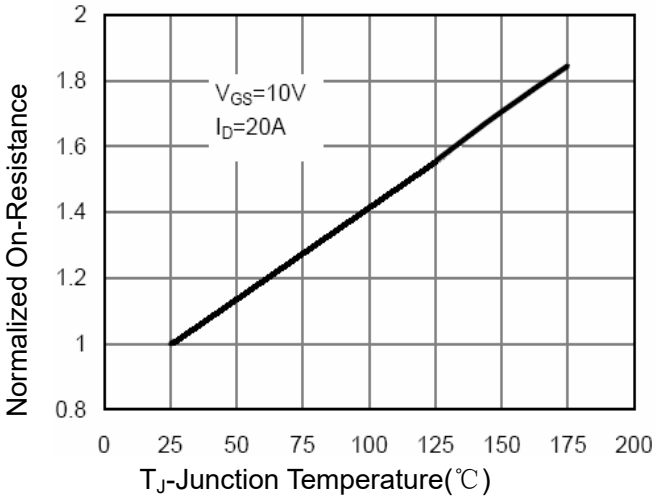


Figure 4 Rdson-JunctionTemperature

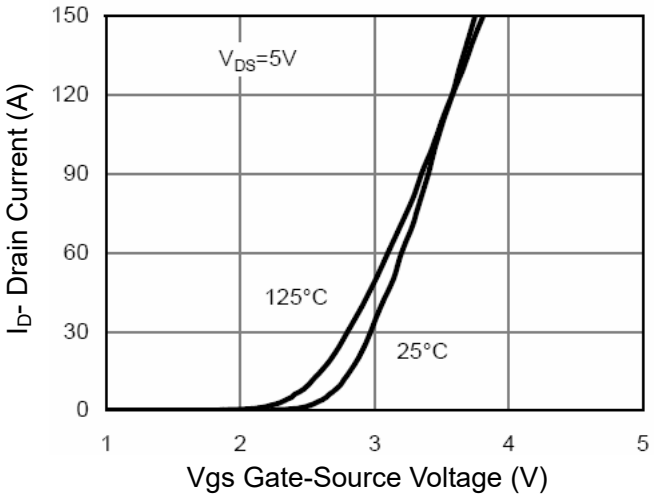


Figure 2 Transfer Characteristics

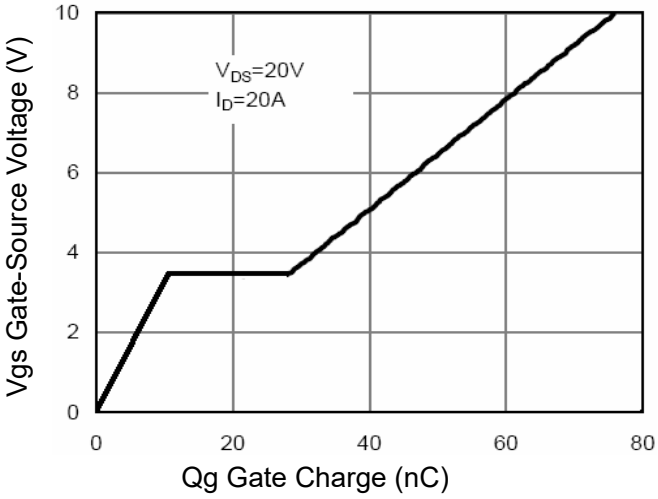


Figure 5 Gate Charge

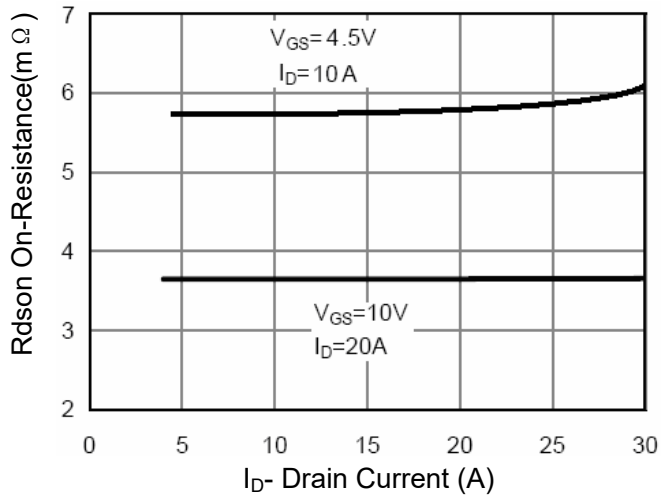


Figure 3 Rdson- Drain Current

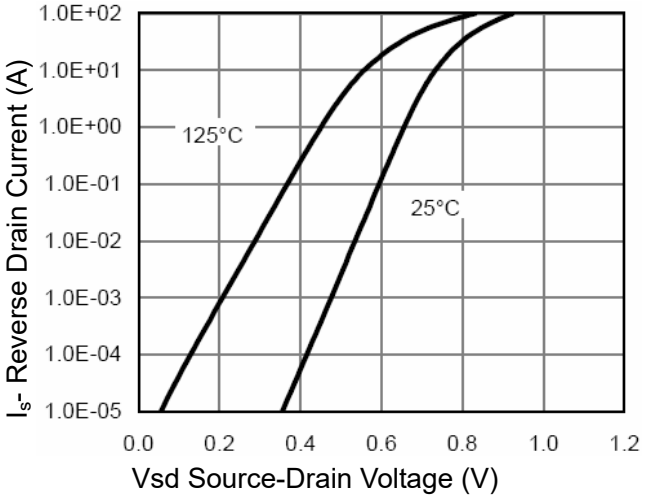


Figure 6 Source- Drain Diode Forward

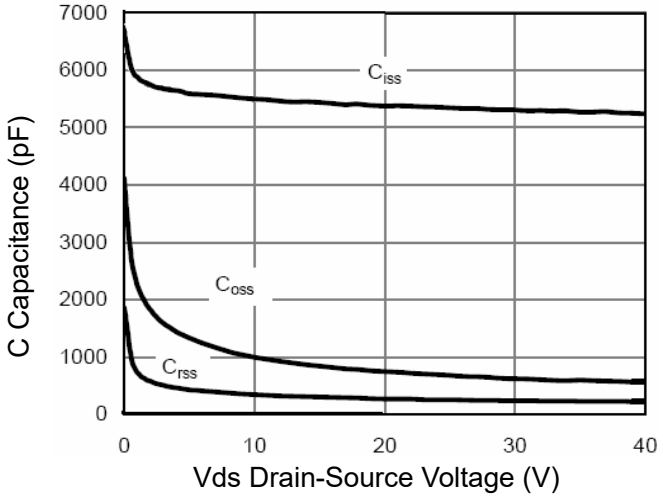


Figure 7 Capacitance vs Vds

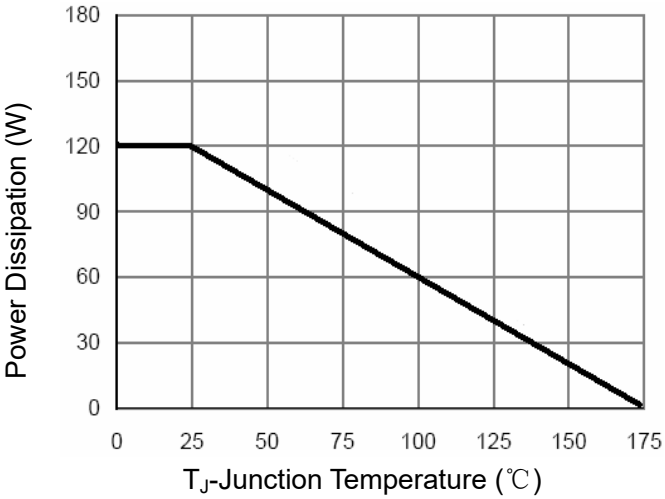


Figure 9 Power De-rating

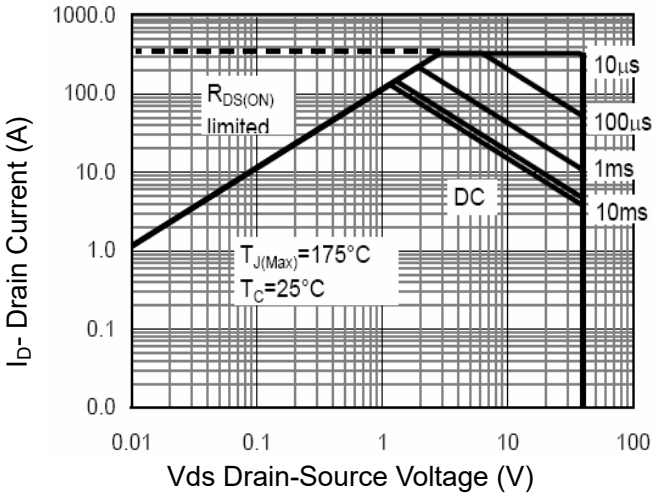


Figure 8 Safe Operation Area

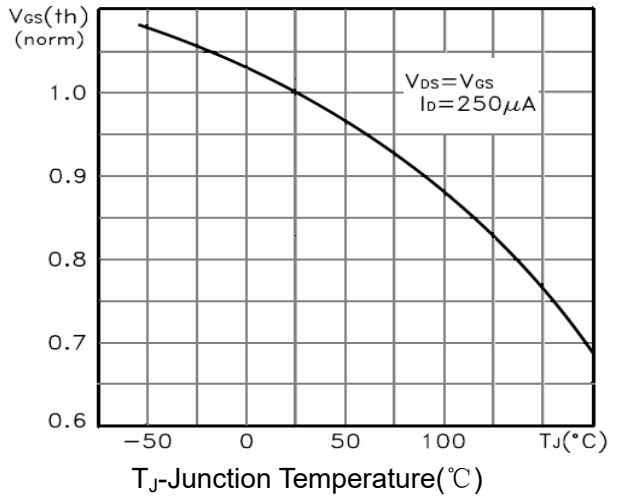


Figure 10 $V_{GS(th)}$ vs Junction Temperature

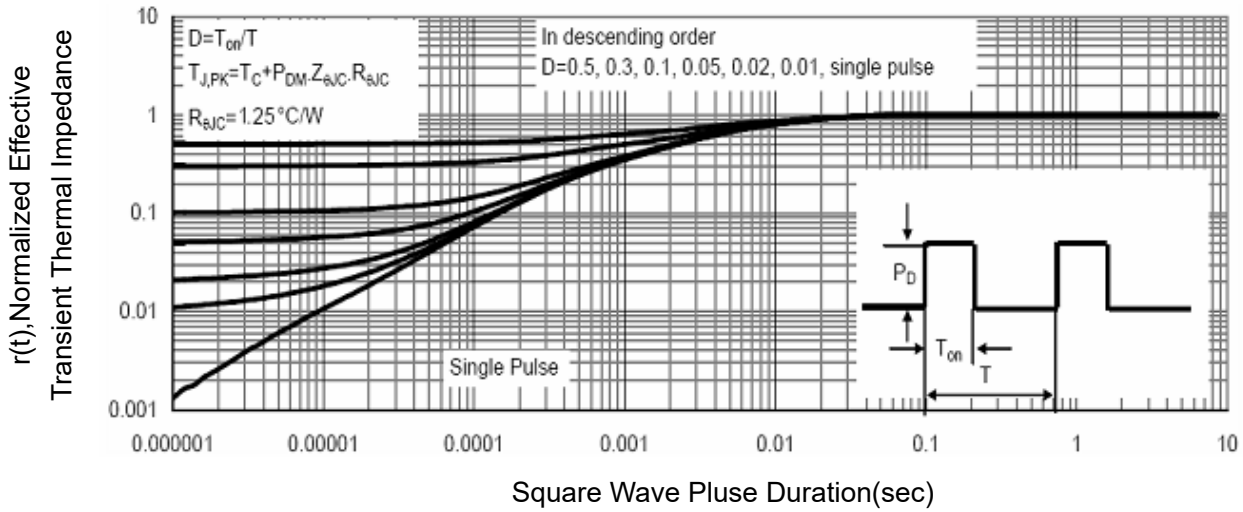
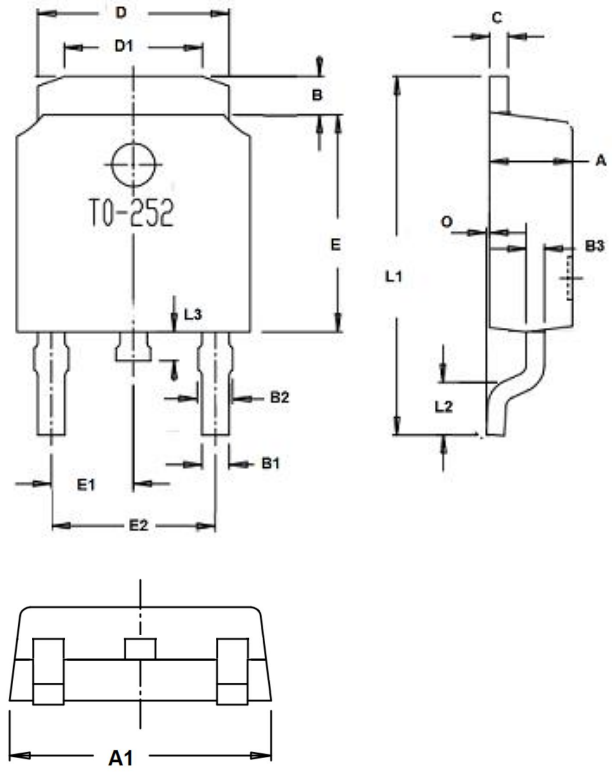


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252 Package Outline Dimensions



Dim.	Min.	Max.
A	2.1	2.5
A1	6.3	6.9
B	0.96	1.42
B1	0.74	0.86
B2	0.74	0.94
C	Typ0.5	
D	5.33	5.53
D1	3.65	4.05
E	6.0	6.2
E1	Typ2.29	
E2	Typ4.58	
O	0	0.15
L1	9.9	10.5
L2	Typ1.65	
L3	0.6	1.0
All Dimensions in millimeter		

Printing Information

XXXXXXX ====Material Code

XXYY ====XX Representative Year
YY Representative Weeks