AT10640T

100V 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

Applications

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

Product Summary

V_{DS}	100	V
I_D	64	A
$R_{DS(ON)}$ (at V_{GS}=10V)	14	mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	17	mΩ

RoHS

DFN5X6-8L Top View

Top View

S	1 ●	8	D
S	2	7	D
S	3	6	D
G	4	5	D
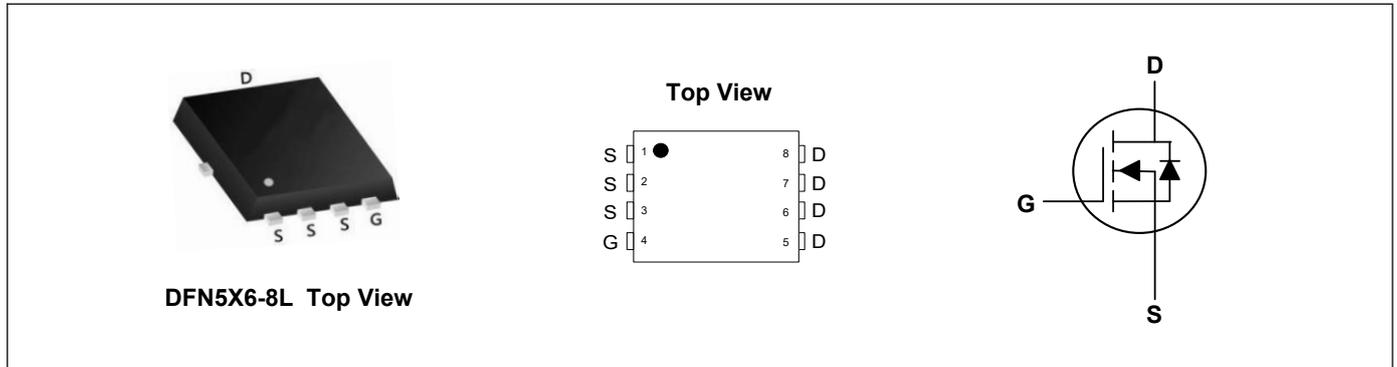
Absolute Maximum Ratings(T_A=25℃, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, VGS @ 10V[1]	I_D@T_C=25℃	64	A
Continuous Drain Current, VGS @ 10V[1]	I_D@T_C=100℃	40	A
Pulsed Drain Current[2]	I_{DM}	130	A
Single Pulse Avalanche Energy[3]	EAS	180	mJ
Avalanche Current	I_{AS}	60	A
Total Power Dissipation[4]	P_D@T_C=25℃	89	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]	$R_{\theta JA}$	---	62	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	---	1.4	℃/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	100	---	---	V
Static Drain-Source On-Resistance[2]	R$_{DS(ON)}$	V$_{GS}$=10V , I$_D$=10A	---	---	14	mΩ
		V$_{GS}$=4.5V , I$_D$=8A	---	---	17	mΩ
Gate Threshold Voltage	V$_{GS(th)}$	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	1.2	---	2.4	V
Drain-Source Leakage Current	I$_{DSS}$	V$_{DS}$=80V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=80V , 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	---	30	---	S
Gate Resistance	R$_g$	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	1.2	---	Ω
Total Gate Charge (10V)	Q$_g$	V$_{DS}$=80V , V$_{GS}$=10V , I$_D$=10A	---	75	---	nC
Gate-Source Charge	Q$_{gs}$		---	15.5	---	
Gate-Drain Charge	Q$_{gd}$		---	20.3	---	
Turn-On Delay Time	T$_{d(on)}$	V$_{DD}$=40V , V$_{GS}$=10V , R$_G$=3.3Ω, I$_D$=10A	---	18.5	---	ns
Rise Time	T$_r$		---	8.8	---	
Turn-Off Delay Time	T$_{d(off)}$		---	58.8	---	
Fall Time	T$_f$		---	15.8	---	
Input Capacitance	C$_{iss}$	V$_{DS}$=25V , V$_{GS}$=0V , f=1MHz	---	4708	---	pF
Output Capacitance	C$_{oss}$		---	326	---	
Reverse Transfer Capacitance	C$_{rss}$		---	247	---	

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	---	---	64	A
Pulsed Source Current[2,5]	I$_{SM}$		---	---	130	A
Diode Forward Voltage[2]	V$_{SD}$	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	1.2	V
Reverse Recovery Time	t$_{rr}$	I$_F$=10A , di/dt=100A/μs，T$_J$=25℃	---	24	---	nS
Reverse Recovery Charge	Q$_{rr}$		---	28	---	nC

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=1mH,I$_{AS}$=60A

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
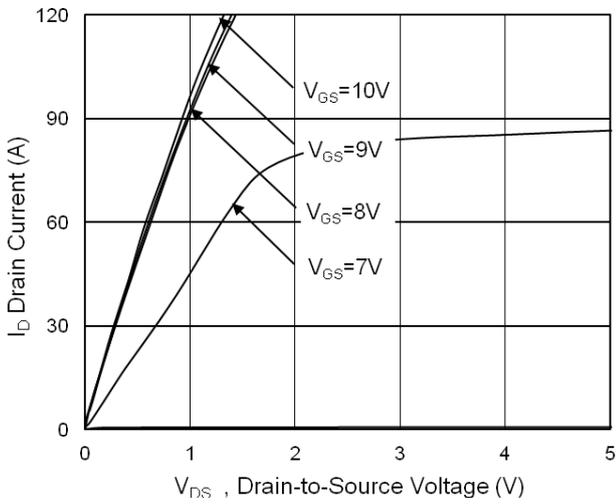

Fig.1 Typical Output Characteristics
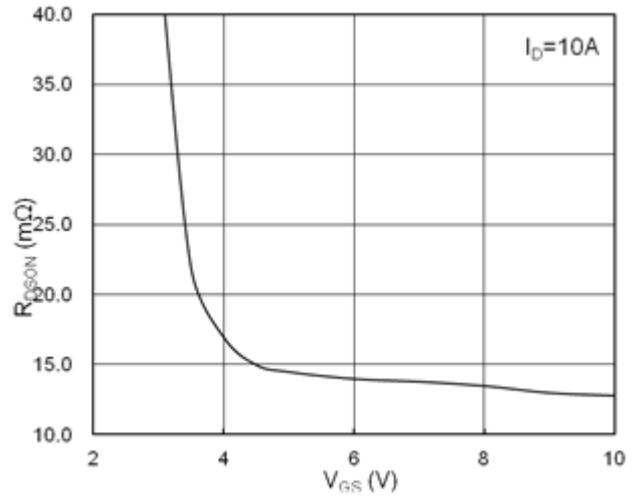

Fig.2 On-Resistance v.s Gate-Source
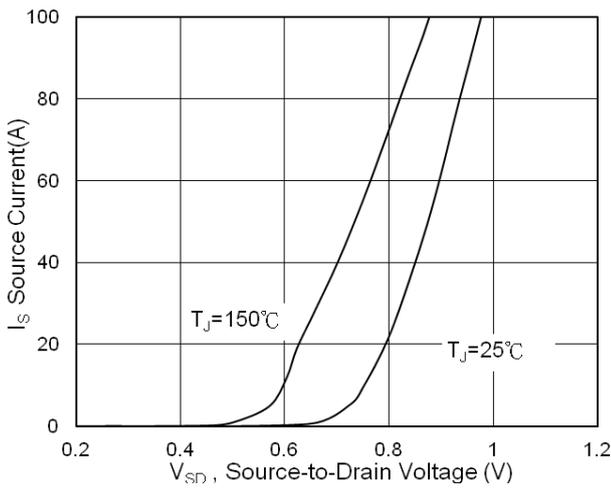
Fig.3 Forward Characteristics of Reverse
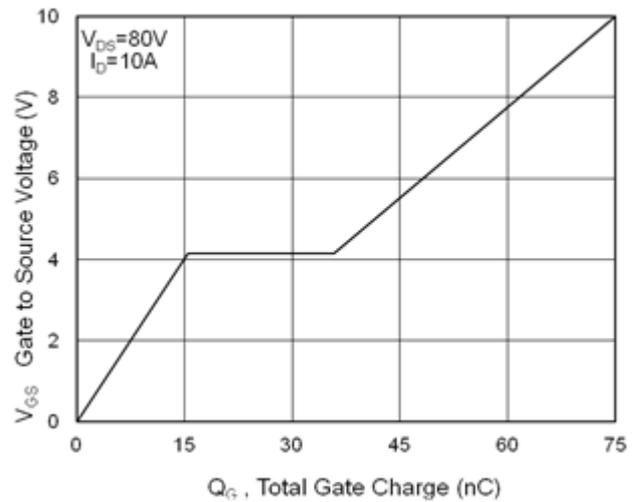

**Fig.4 Gate-Charge Characteristics**
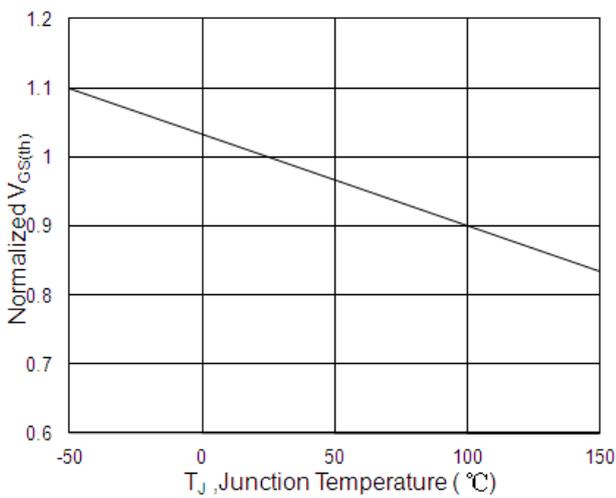

Fig.5 Normalized $V_{GS(th)}$ vs. T_J
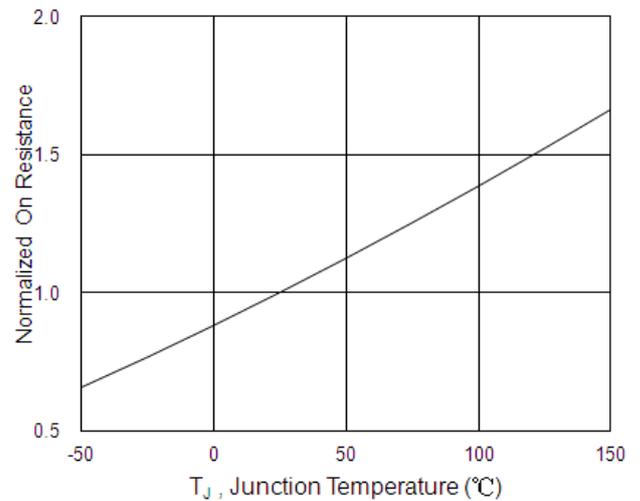
Fig.6 Normalized R_{DSON} vs. T_J
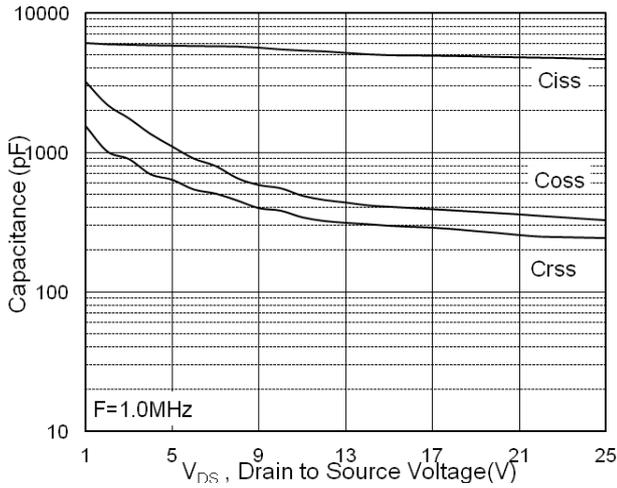
Fig.7 Capacitance
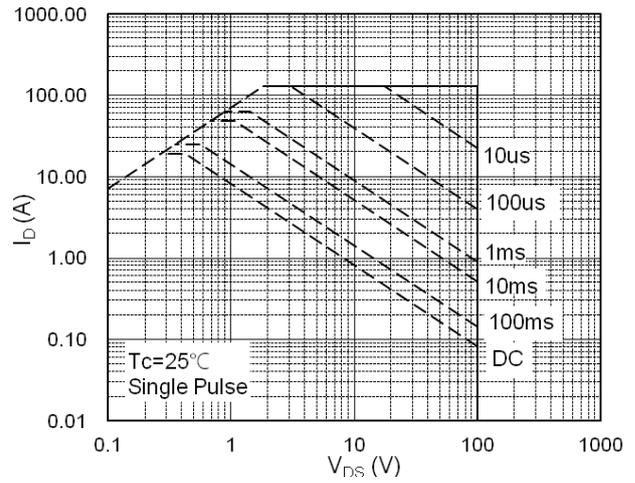
Fig.8 Safe Operating Area

$$D = T_{ON}/T$$
$$T_{Jpeak} = T_C + P_{DM} X R_{\theta JC}$$
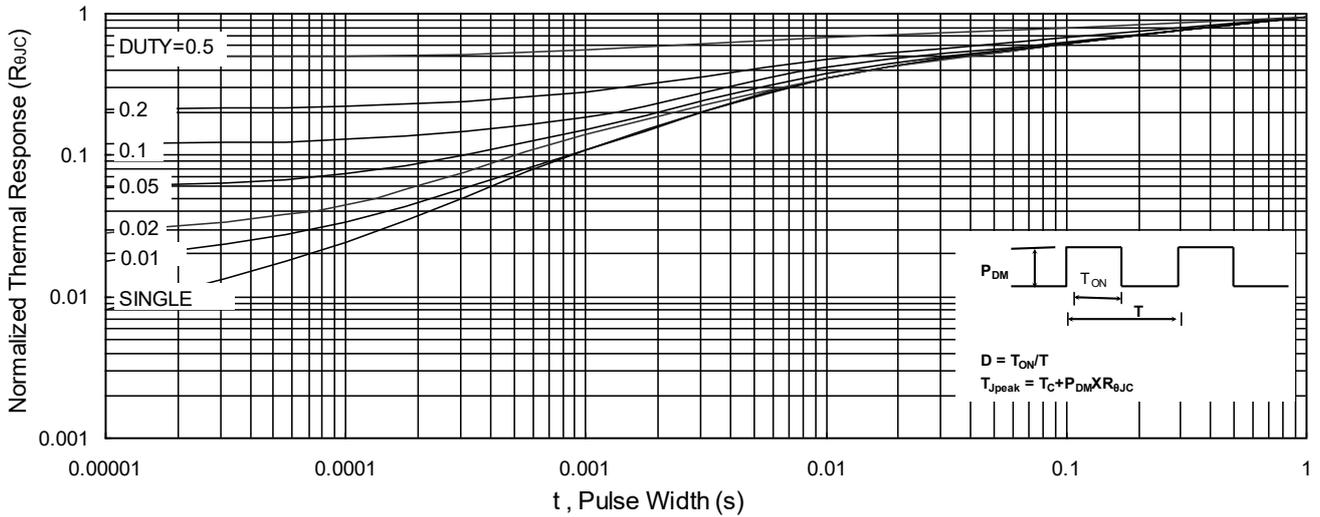
Fig.9 Normalized Maximum Transient Thermal Impedance
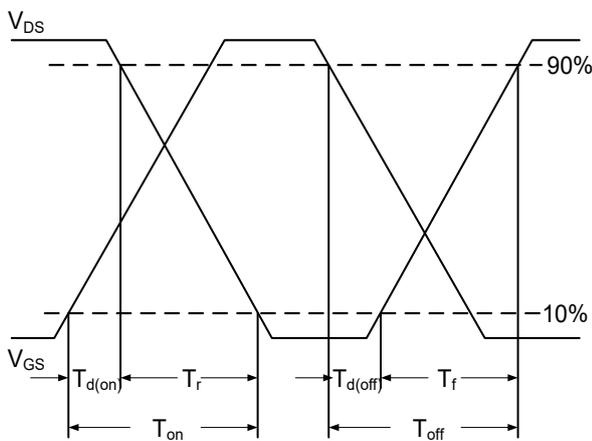
Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$
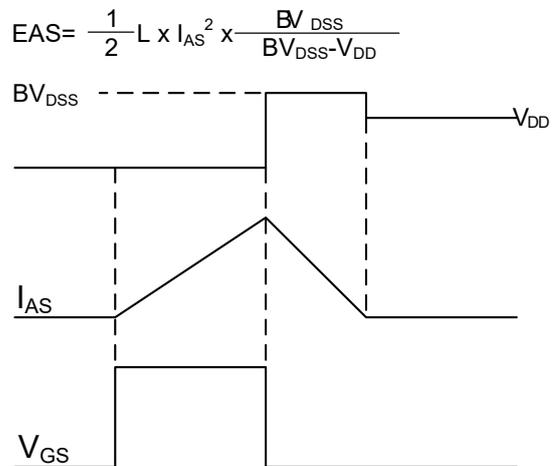
Fig.11 Unclamped Inductive Switching Waveform

DFN5X6-8L Package Outline Dimensions

BOTTOM VIEW

VIEW 'A'
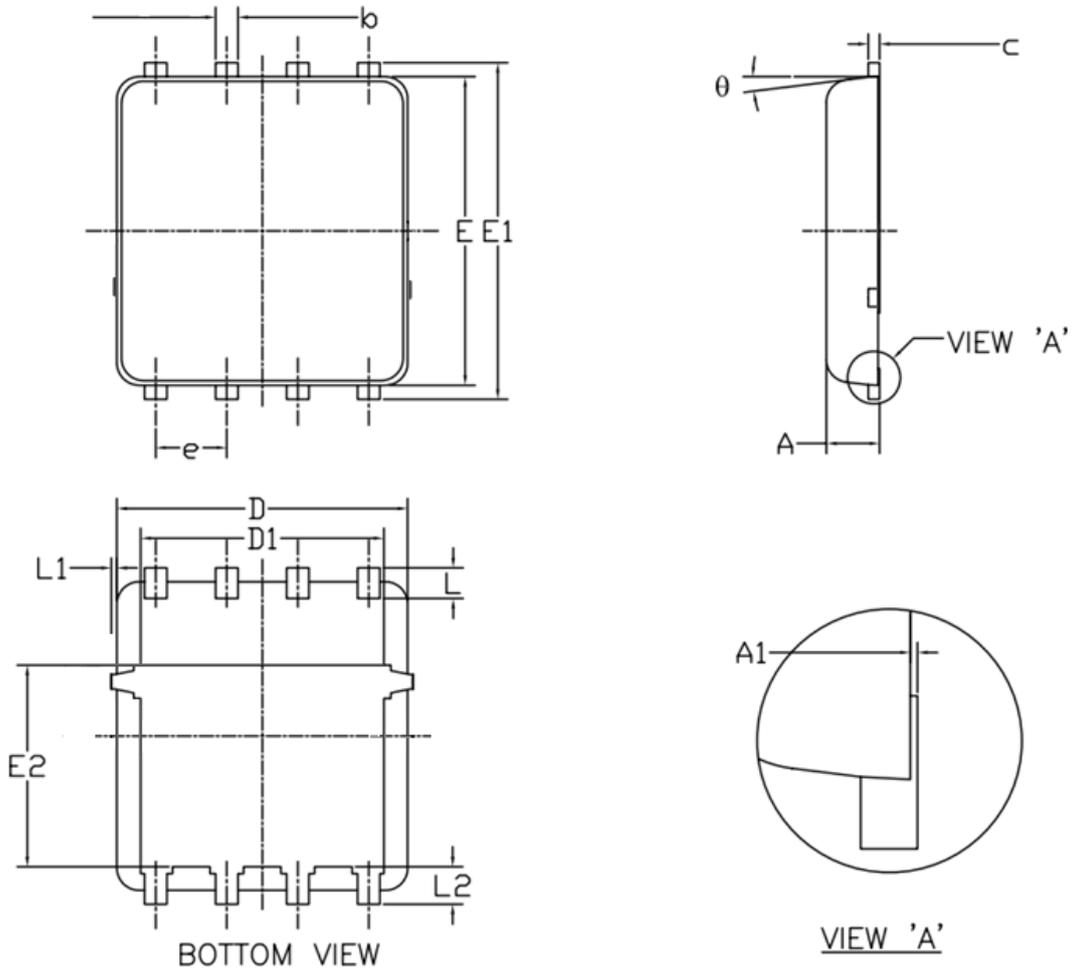
Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	**Typ**	**Max**		**Min**	**Typ**	**Max**
A	0.90	1.00	1.20	**E1**	5.90	6.10	6.35
A1	0.00	--	0.05	**E2**	3.38	3.58	3.92
b	0.30	0.40	0.51	**e**	1.27 BSC		
c	0.20	0.25	0.33	**L**	0.51	0.61	0.71
D	4.80	4.90	5.40	**L1**	--	--	0.15
D1	3.61	4.00	4.25	**L2**	0.41	0.51	0.61
E	5.65	5.80	6.06	**θ**	0°	--	12°