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
- Load Switch

Product Summary

V_{DS}	100	V
I_D	3.6	A
$R_{DS(ON)}$ (at V_{GS}=10V)	47	mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	50	mΩ

RoHS

Top View

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S [ ]•1    8[ ] D
S [ ] 2    7[ ] D
S [ ] 3    6[ ] D
G [ ] 4    5[ ] D
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SOP-8 Top View
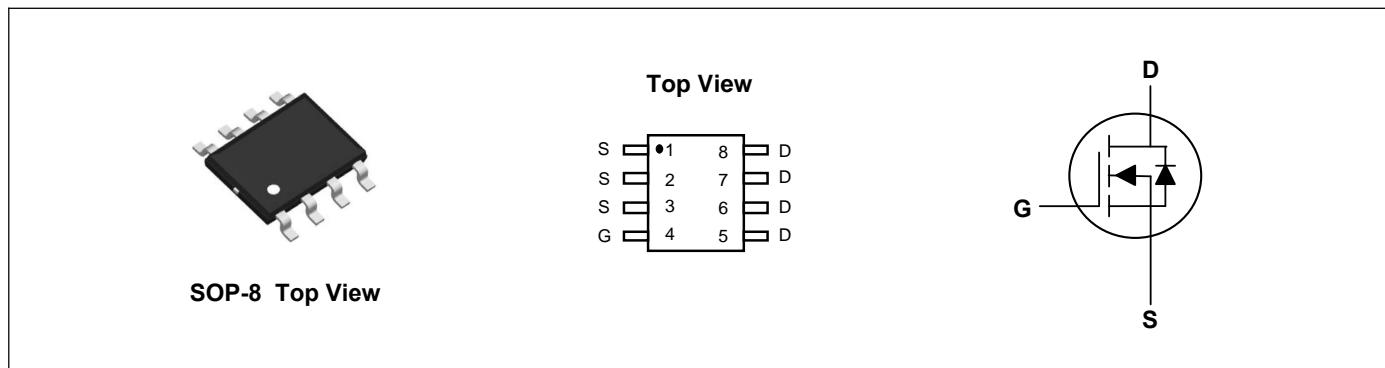
Absolute Maximum Ratings(T_A=25℃, unless otherwise noted)

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_A=25℃	3.6	A
Continuous Drain Current, VGS @ 10V[1]	I_D@T_A=70℃	2.9	A
Pulsed Drain Current[2]	I_{DM}	15	A
Single Pulse Avalanche Energy[3]	EAS	36.5	mJ
Avalanche Current	I_{AS}	27	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]	$R_{\theta JA}$	---	85	℃/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	100	---	---	V
BV$_{DSS}$ Temperature Coefficient	$\triangle$BV$_{DSS}$/$\triangle$T$_J$	Reference to 25℃ , I$_D$=1mA	---	0.098	---	V/℃
Static Drain-Source On-Resistance[2]	R$_{DS(ON)}$	V$_{GS}$=10V, I$_D$=3A	---	---	47	mΩ
		V$_{GS}$=4.5V, I$_D$=2A	---	---	50	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$_{GS(th)}$		---	-5.52	---	mV/℃
Drain-Source Leakage Current	I$_{DSS}$	V$_{DS}$=80V , V$_{GS}$=0V , T$_J$=25℃	---	---	10	uA
		V$_{DS}$=80V , V$_{GS}$=0V , T$_J$=55℃	---	---	100	
Gate-Source Leakage Current	I$_{GSS}$	V$_{GS}$=$\pm$20V , V$_{DS}$=0V	---	---	$\pm$100	nA
Forward Transconductance	gfs	V$_{DS}$=5V , I$_D$=3A	---	6.2	---	S
Gate Resistance	R$_g$	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	1.6	---	Ω
Total Gate Charge (10V)	Q$_g$	V$_{DS}$=80V , V$_{GS}$=10V , I$_D$=3A	---	60	---	nC
Gate-Source Charge	Q$_{gs}$		---	9.2	---	
Gate-Drain Charge	Q$_{gd}$		---	9.9	---	
Turn-On Delay Time	T$_{d(on)}$	V$_{DD}$=50V , V$_{GS}$=10V , R$_G$=3.3Ω, I$_D$=3A	---	10.8	---	ns
Rise Time	T$_r$		---	27	---	
Turn-Off Delay Time	T$_{d(off)}$		---	56	---	
Fall Time	T$_f$		---	24	---	
Input Capacitance	C$_{iss}$	V$_{DS}$=15V , V$_{GS}$=0V , f=1MHz	---	3848	---	pF
Output Capacitance	C$_{oss}$		---	137	---	
Reverse Transfer Capacitance	C$_{rss}$		---	82	---	

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	---	---	3.6	A
Pulsed Source Current[2,5]	I$_{SM}$		---	---	15	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$_F$=3A , di/dt=100A/μs，T$_J$=25℃	---	25	---	nS
Reverse Recovery Charge	Q$_{rr}$		---	29	---	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 $\leqq$ 300us , duty cycle $\leqq$ 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 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.

*www.atcsemi.com*

Typical Characteristics
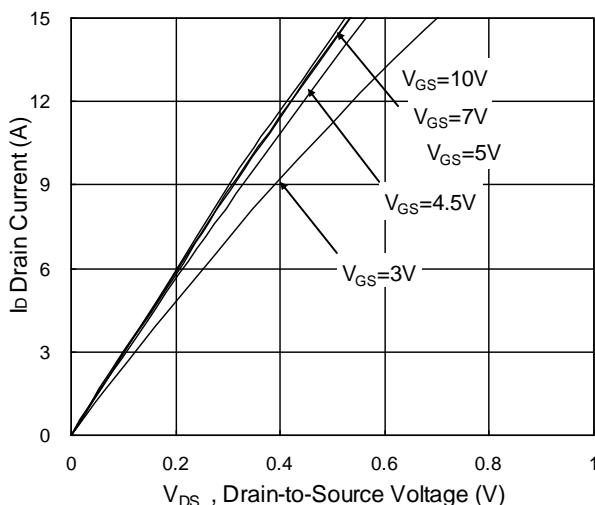
Fig.1 Typical Output Characteristics
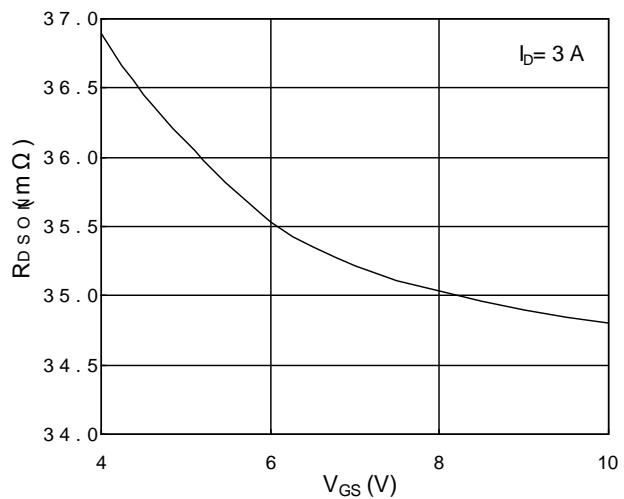
Fig.2 On-Resistance vs. G-S Voltage
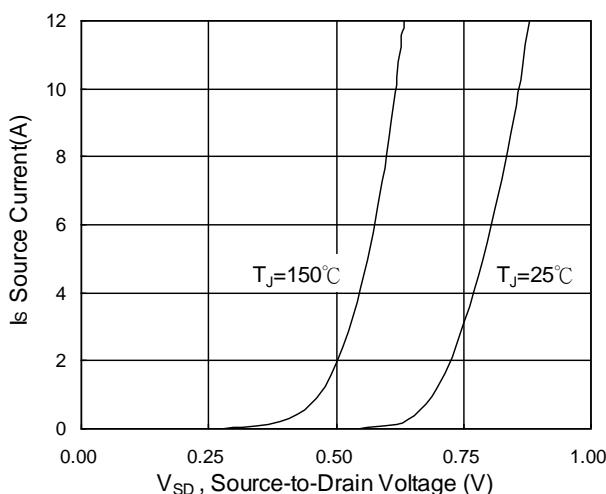
Fig.3 Forward Characteristics of Reverse
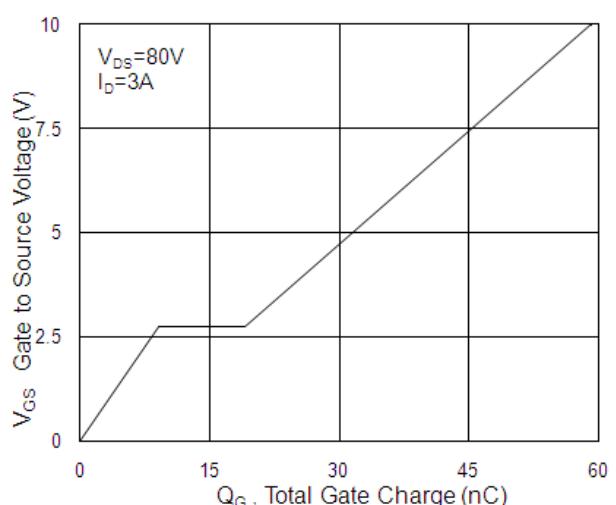
Fig.4 Gate-Charge Characteristics
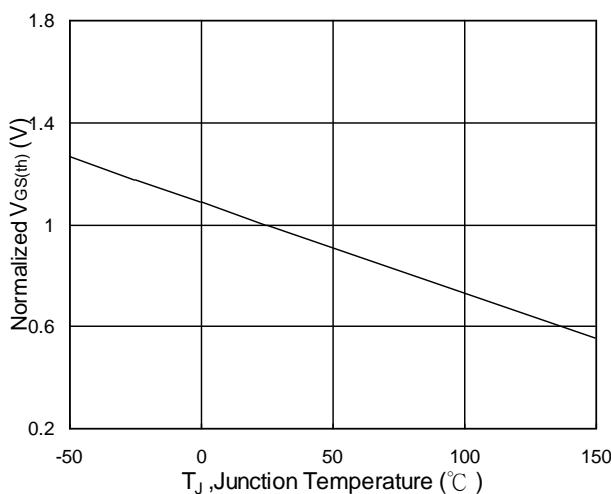
Fig.5 Normalized $V_{GS(th)}$ vs. T_J
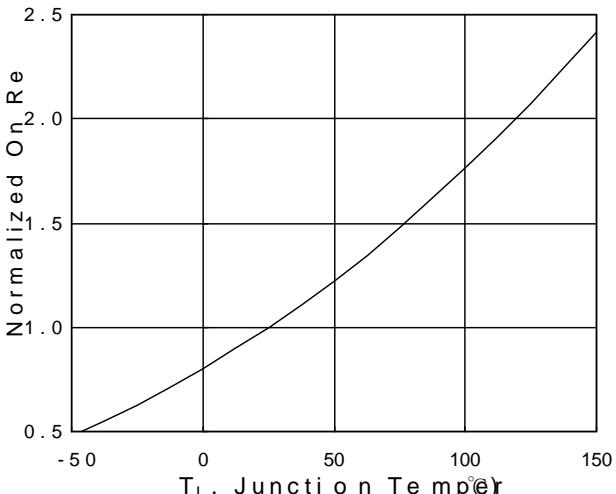
Fig.6 Normalized R_{DSON} vs. T_J
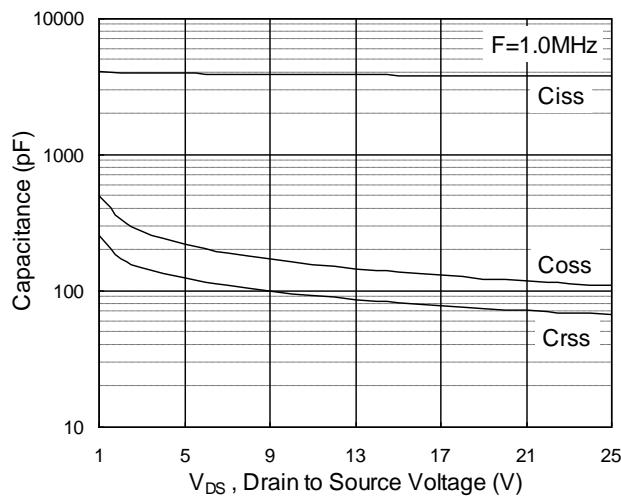
Fig.7 Capacitance
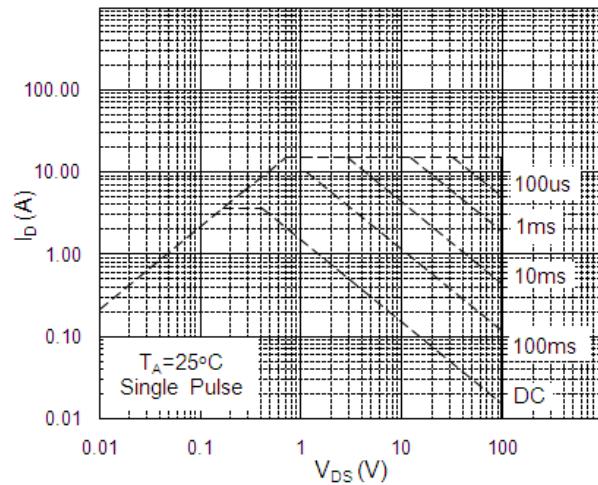
Fig.8 Safe Operating Area

$D = T_{ON}/T$

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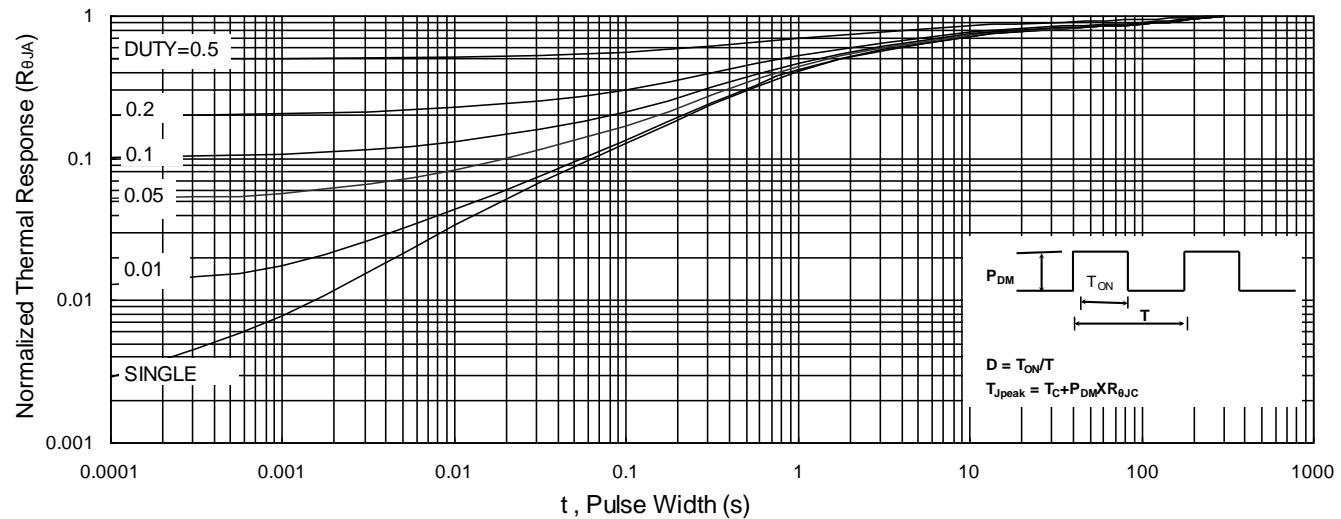
Fig.9 Normalized Maximum Transient Thermal Impedance
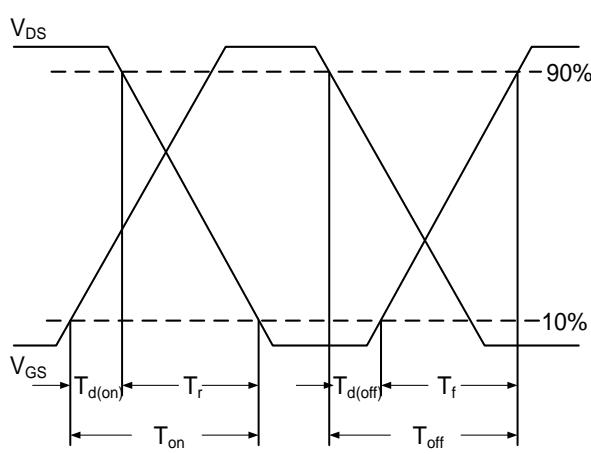
Fig.10 Switching Time Waveform

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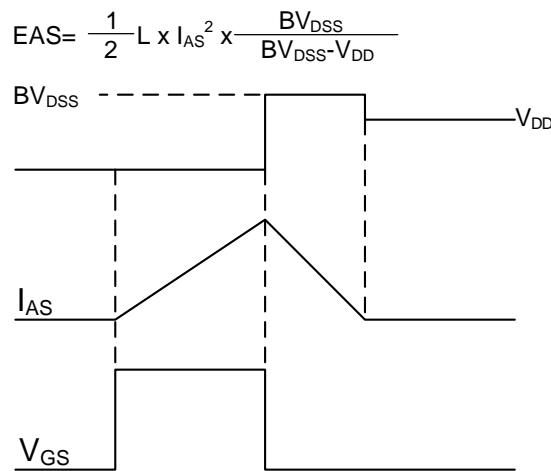
Fig.11 Unclamped Inductive Switching Waveform

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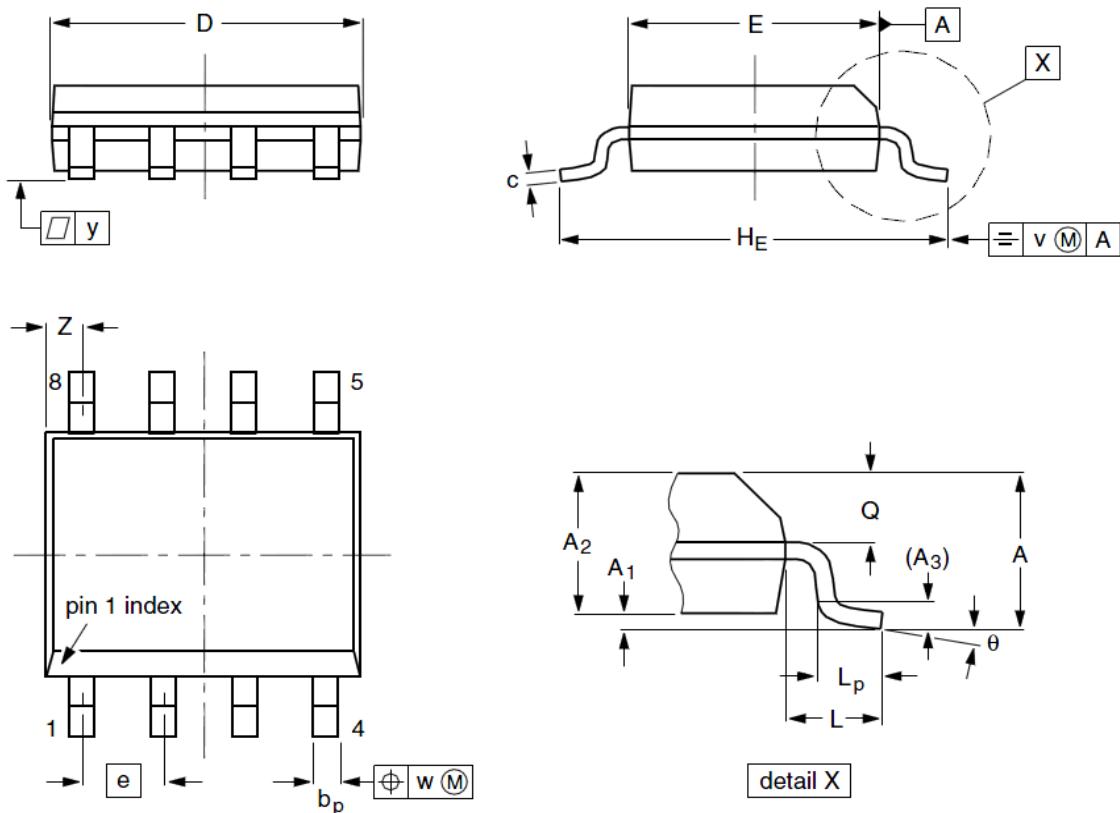
Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	1.35	1.55	1.75	A_1	0.10	0.18	0.25
A_2	1.25	1.45	1.65	A_3	--	0.25	--
b_p	0.36	0.42	0.51	c	0.19	0.22	0.25
D	4.70	4.92	5.10	E	3.80	3.90	4.00
e	--	1.27	--	H_E	5.80	6.00	6.20
L	--	1.05	--	L_P	0.40	0.68	1.00
Q	0.60	0.65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