

Features

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

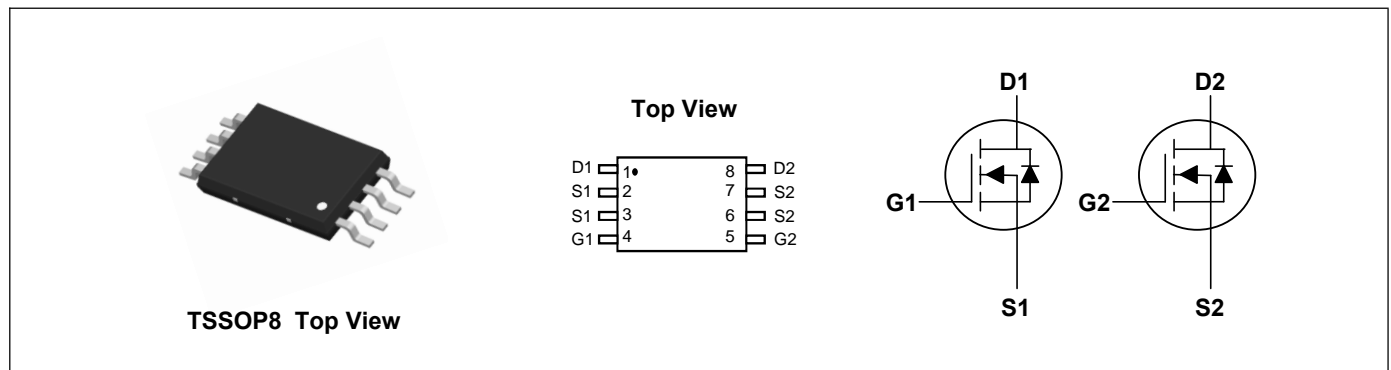
Product Summary



V_{DS}	20	V
I_D	4.5	A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	30	m Ω
$R_{DS(ON)}$ (at $V_{GS}=2.5V$)	35	m Ω

Applications

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



Absolute Maximum Ratings ($T_A=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ¹	$I_D@T_A=25^\circ\text{C}$	4.5	A
Continuous Drain Current ¹	$I_D@T_A=70^\circ\text{C}$	3.6	A
Pulsed Drain Current ²	I_{DM}	20	A
Total Power Dissipation ³	$P_D@T_A=25^\circ\text{C}$	1	W
Total Power Dissipation ³	$P_D@T_A=70^\circ\text{C}$	0.64	W
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	---	125	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
Static Drain-Source On-Resistance ²	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=4.5A$	---	---	30	m Ω
		$V_{GS}=3.0V, I_D=4.2A$	---	---	33	m Ω
		$V_{GS}=2.5V, I_D=3.9A$	---	---	35	m Ω
		$V_{GS}=1.8V, I_D=3.6A$	---	---	43	m Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	---	1.0	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=16V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	± 100	nA
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_D=4A$	---	30	---	S
Total Gate Charge	Q_g	$V_{DS}=15V, V_{GS}=4.5V, I_D=4A$	---	8.6	---	nC
Gate-Source Charge	Q_{gs}		---	1.37	---	
Gate-Drain Charge	Q_{gd}		---	2.3	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=10V, V_{GS}=4.5V, R_G=3.3\Omega, I_D=4A$	---	5.2	---	ns
Rise Time	T_r		---	34	---	
Turn-Off Delay Time	$T_{d(off)}$		---	23	---	
Fall Time	T_f		---	9.2	---	
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	670	---	pF
Output Capacitance	C_{oss}		---	75	---	
Reverse Transfer Capacitance	C_{rss}		---	68	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current ^{1,4}	I_S	$V_G=V_D=0V, \text{Force Current}$	---	---	1	A
Diode Forward Voltage ²	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	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 $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The power dissipation is limited by 150°C 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

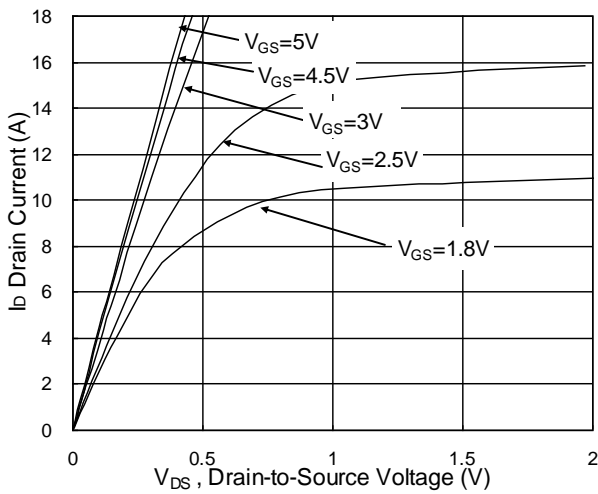


Fig.1 Typical Output Characteristics

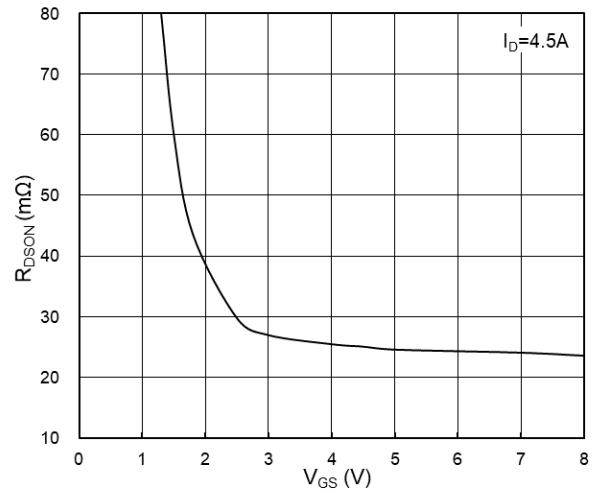


Fig.2 On-Resistance vs G-S Voltage

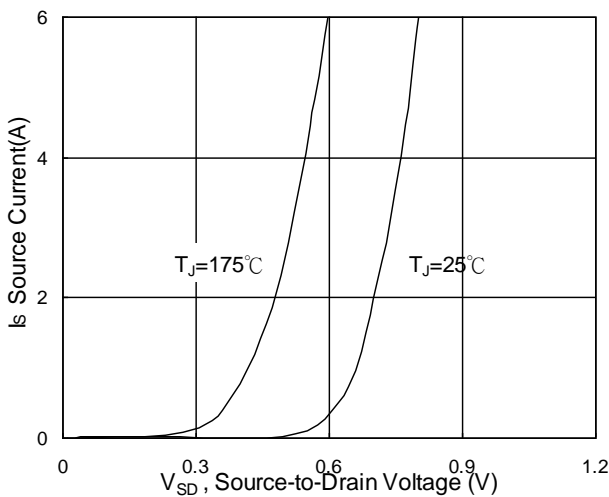


Fig.3 Source Drain Forward Characteristics

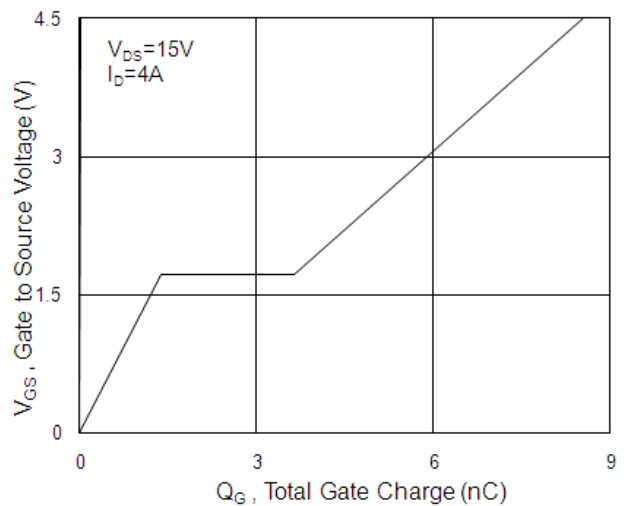


Fig.4 Gate-Charge Characteristics

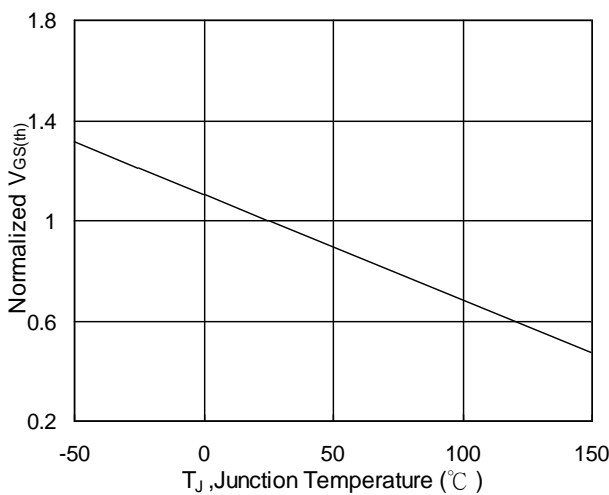


Fig.5 Normalized $V_{GS(th)}$ vs T_J

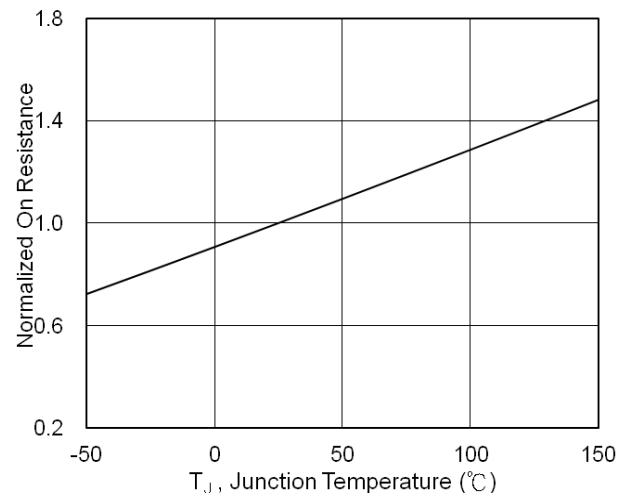


Fig.6 Normalized $R_{DS(on)}$ vs T_J

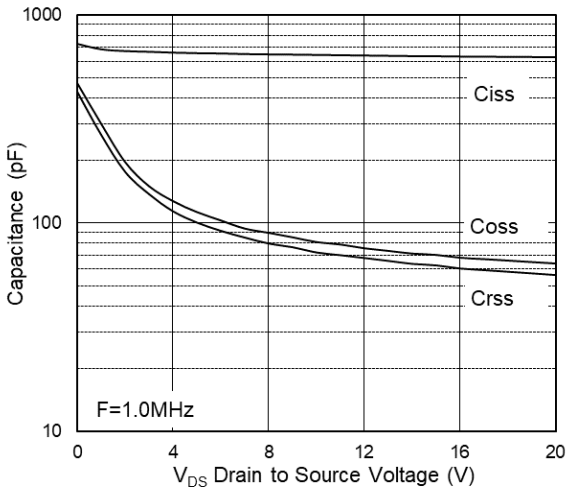


Fig.7 Capacitance

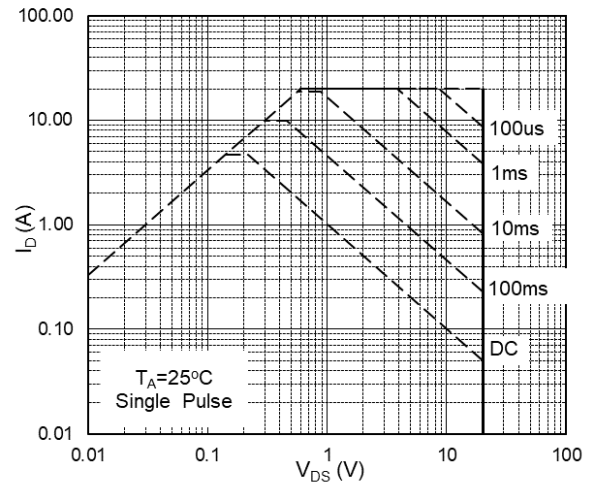


Fig.8 Safe Operating Area

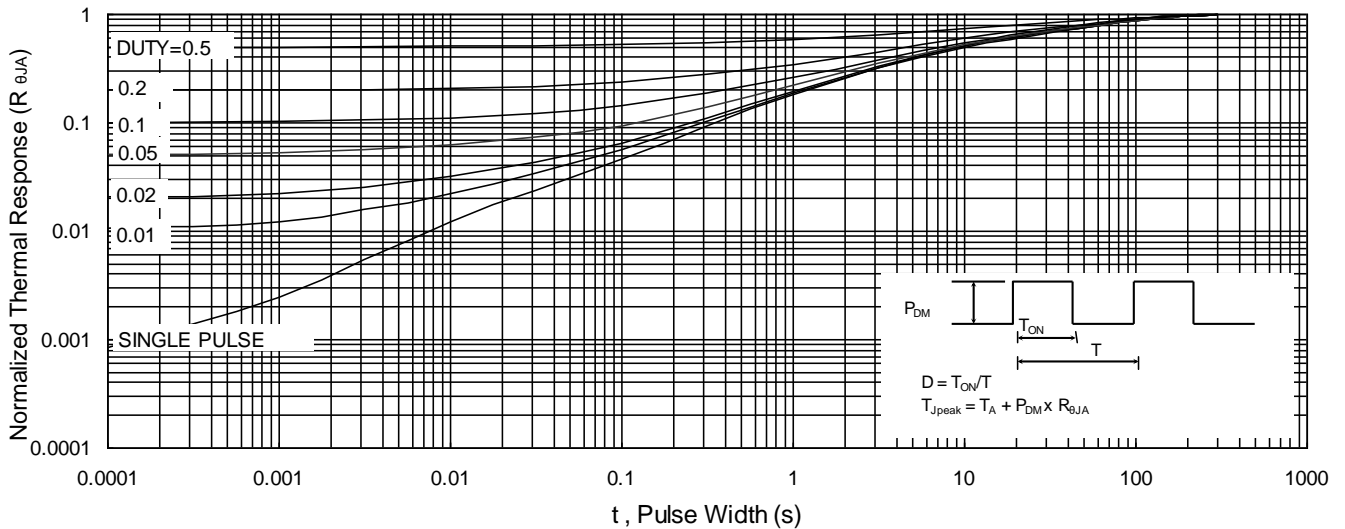


Fig.9 Normalized Maximum Transient Thermal Impedance

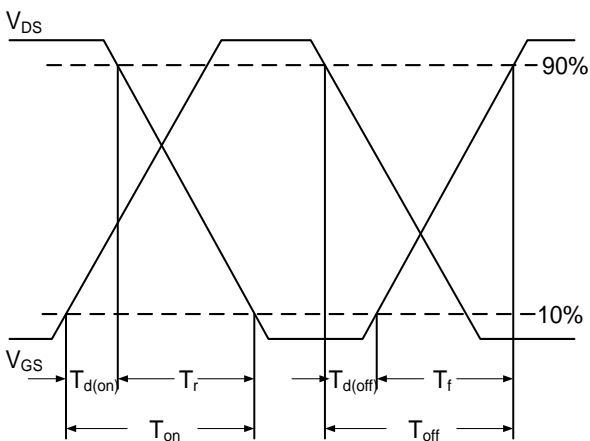


Fig.10 Switching Time Waveform

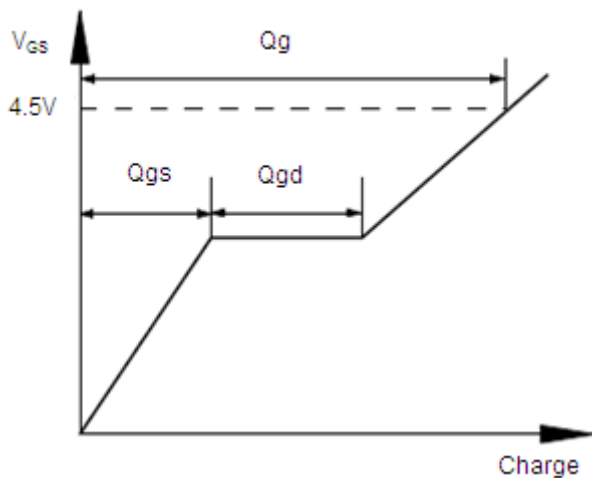
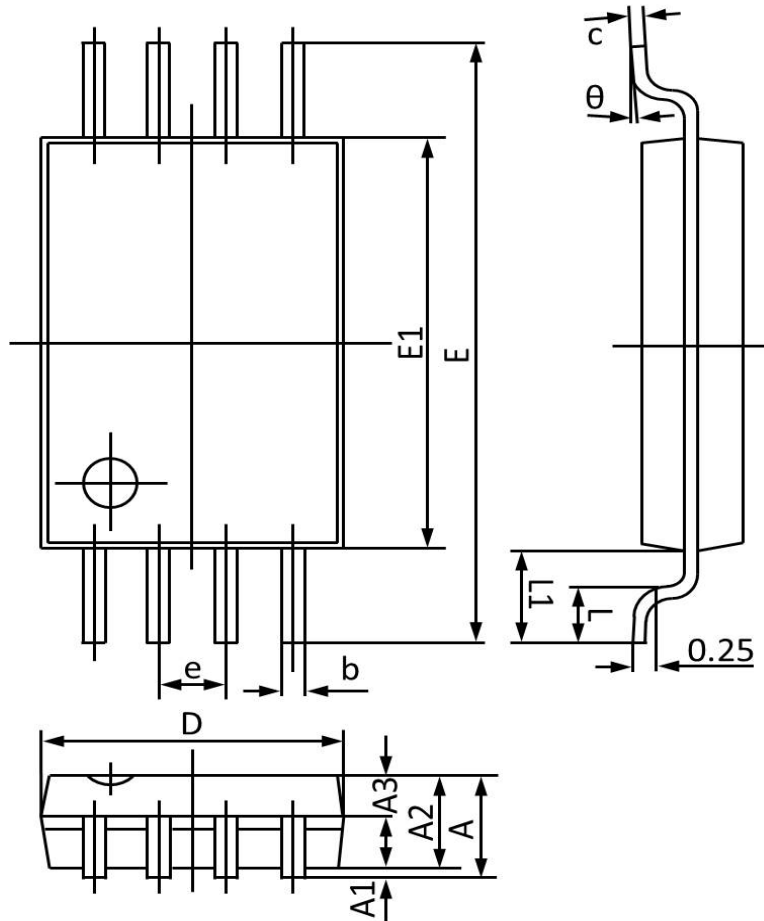


Fig.11 Gate Charge Waveform

TSSOP8 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	1.05	1.12	1.20	E	6.40 BSC		
A1	0.05	0.10	0.15	E1	4.30	4.40	4.50
A2	0.80	0.95	1.05	e	0.65 BSC		
A3	0.39	0.45	0.49	L	0.45	0.60	0.75
b	0.19	0.25	0.30	L1	1.00 BSC		
c	0.10	0.15	0.20	θ	0°		8°
D	2.90	3.00	3.10				