

General Description

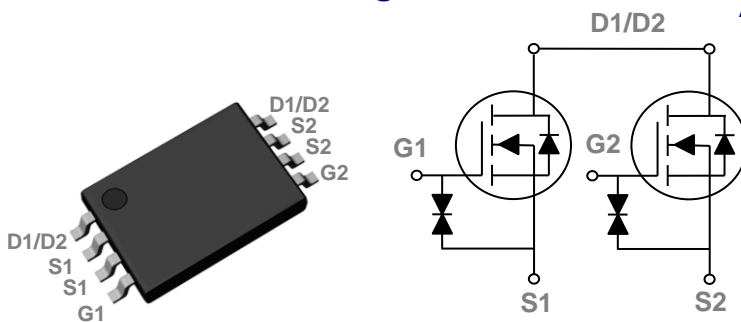
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BVDSS	RDSON	ID
20V	24.5mΩ	7A

Features

- 20V,7A, RDS(ON) 24.5mΩ @VGS = 4.5V
- G-S ESD Diode Embedded
- Improved dv/dt capability
- Fast switching
- Green Device Available

TSSOP8 Dual Pin Configuration



Applications

- Notebook
- Load Switch
- LED applications

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	7	A
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	5.6	A
I_{DM}	Drain Current – Pulsed ¹	28	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	2	W
	Power Dissipation – Derate above 25°C	16	mW/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62.5	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=16V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	± 10	μA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=2.5A$	16.5	20.5	24.5	$m\Omega$
		$V_{GS}=4V, I_D=2.5A$	17.0	21.0	25.0	$m\Omega$
		$V_{GS}=3.7V, I_D=2.5A$	18.0	22.0	28.0	$m\Omega$
		$V_{GS}=3.1V, I_D=2.5A$	19.0	23.5	30.0	$m\Omega$
		$V_{GS}=2.5V, I_D=2.5A$	22.0	27.0	35.0	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.5	0.75	1.2	V

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2,3}	$V_{DS}=10V, V_{GS}=10V, I_D=3A$	---	9.2	15	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	0.4	2	
Q_{gd}	Gate-Drain Charge ^{2,3}		---	1.9	3	
$T_{d(on)}$	Turn-On Delay Time ^{2,3}	$V_{DD}=10V, V_{GS}=10V, R_G=6\Omega, I_D=3A$	---	2.8	5	ns
T_r	Rise Time ^{2,3}		---	7.2	11	
$T_{d(off)}$	Turn-Off Delay Time ^{2,3}		---	15.8	25	
T_f	Fall Time ^{2,3}		---	4.6	7	
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, F=1\text{MHz}$	---	390	600	pF
C_{oss}	Output Capacitance		---	70	105	
C_{rss}	Reverse Transfer Capacitance		---	60	90	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	7	A
I_{SM}	Pulsed Source Current		---	---	14	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

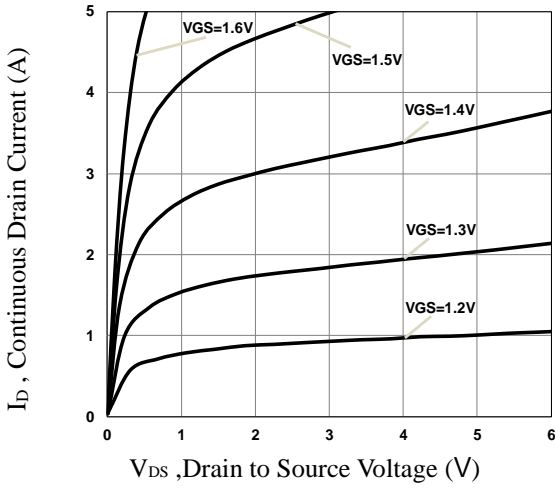


Fig.1 Typical Output Characteristics

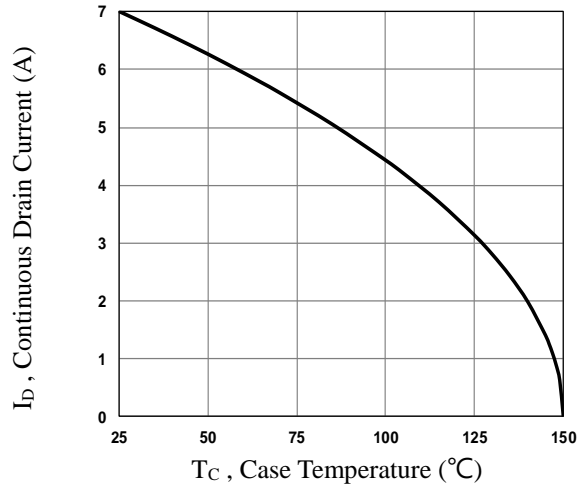


Fig.2 Continuous Drain Current vs. T_c

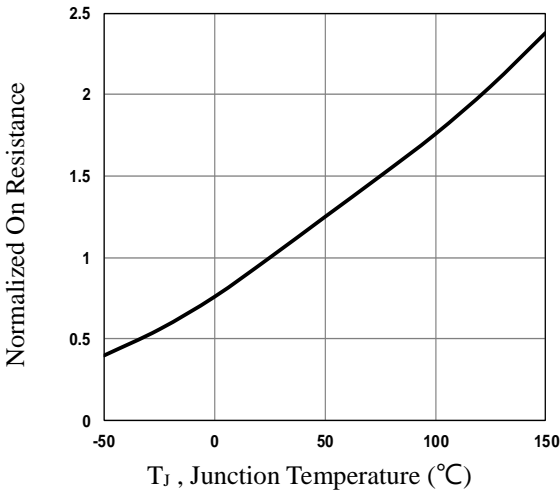


Fig.3 Normalized R_{DS(on)} vs. T_j



Fig.4 Normalized V_{th} vs. T_j

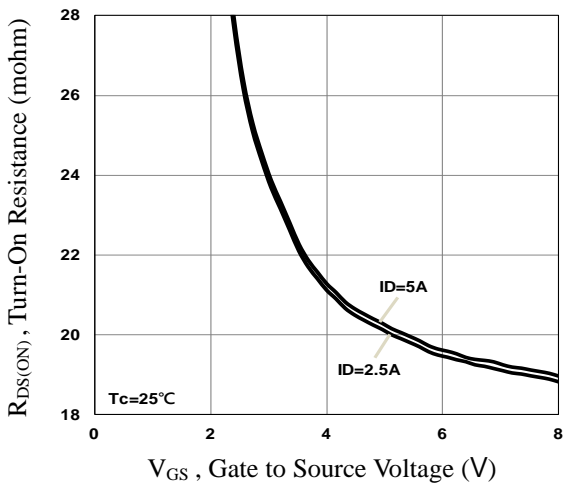


Fig.5 Turn-On Resistance vs. V_{GS}

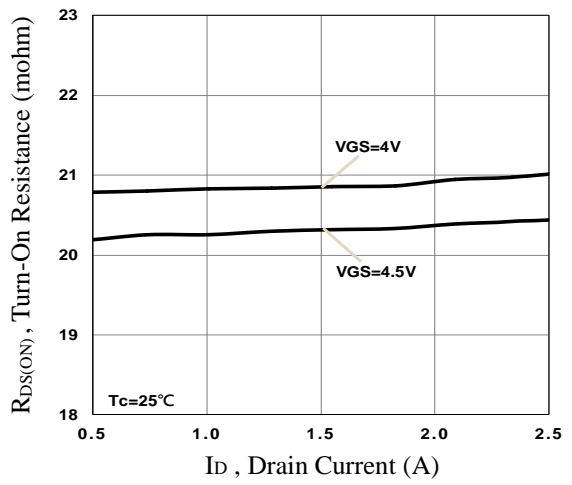


Fig.6 Turn-On Resistance vs. I_D

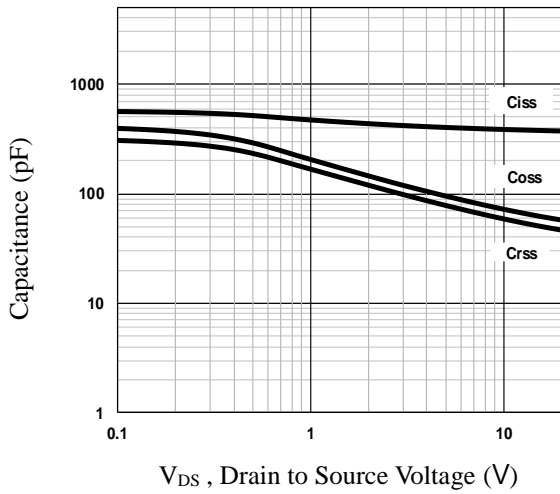


Fig.7 Capacitance Characteristics

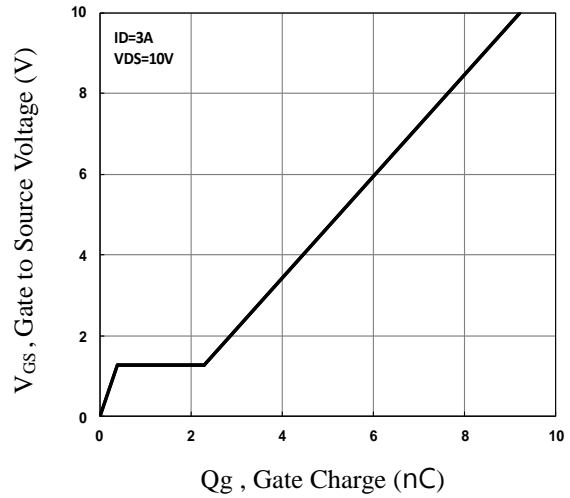


Fig.8 Gate Charge Characteristics

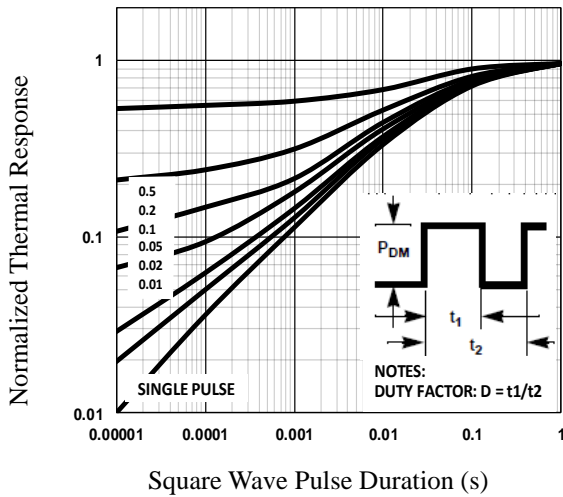


Fig.9 Normalized Transient Impedance

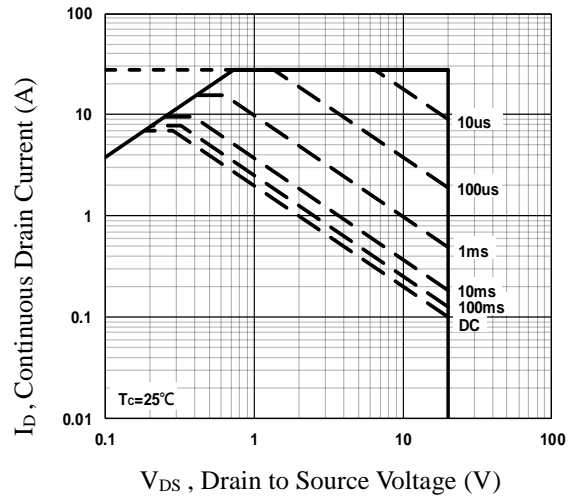


Fig.10 Maximum Safe Operation Area

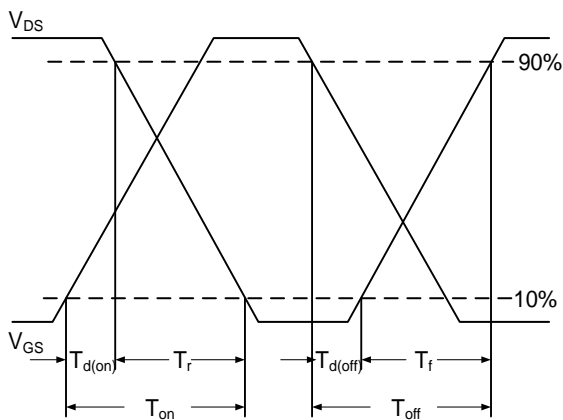


Fig.11 Switching Time Waveform

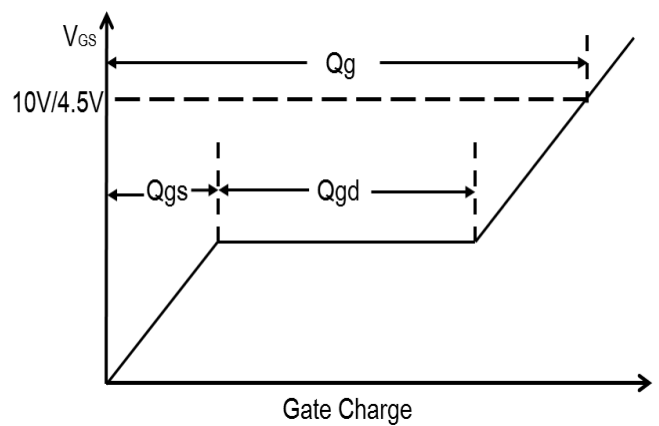
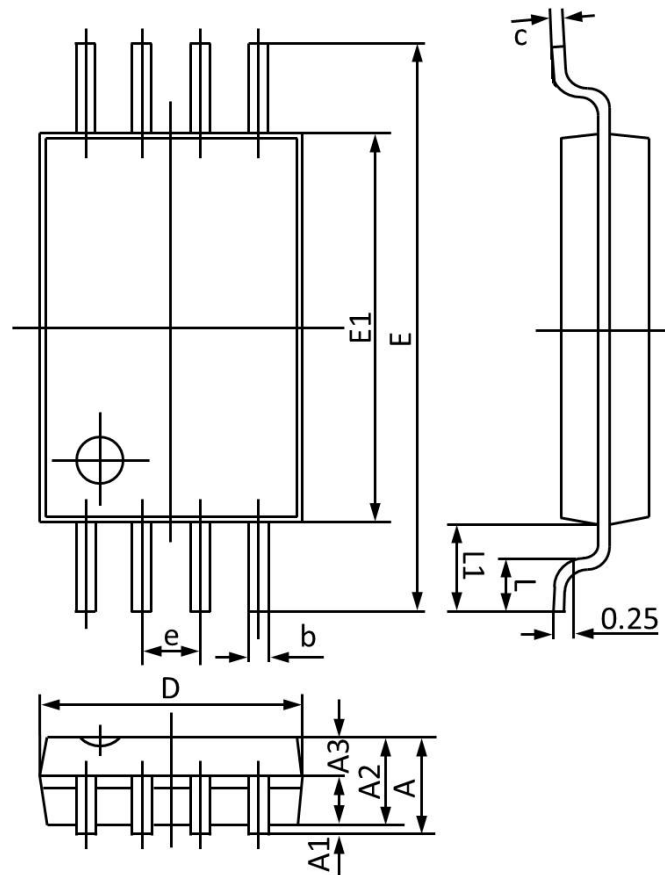


Fig.12 Gate Charge Waveform

TSSOP8 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.000	1.200	0.039	0.047
A1	0.020	0.180	0.001	0.007
A2	0.900	1.100	0.035	0.043
A3	0.390	0.490	0.015	0.019
b	0.170	0.300	0.007	0.012
c	0.120	0.190	0.005	0.008
D	2.850	3.100	0.112	0.122
E	6.200	6.600	0.244	0.260
E1	4.300	4.500	0.169	0.177
e	0.650(BSC)		0.026(BSC)	
L	0.400	0.800	0.016	0.031
L1	1.000(BSC)		0.039(BSC)	