

#### General Description

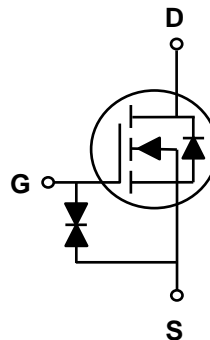
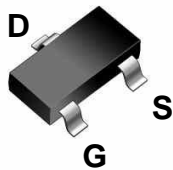
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

#### Features

$V_{DS}$	20V
$I_D$ (at $V_{GS}=4.5V$ )	0.5A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$ )	220m $\Omega$ (Typ)

ESD Protected Up to 2.0KV (HBM)

SOT323



#### Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	TC=25 $^\circ C$	$I_D$	0.5 A
	TC=70 $^\circ C$	$I_D$	0.4 A
Drain Current – Pulsed	$I_{DM}$	3.3	A
Maximum Power Dissipation	$P_D$	0.18	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

#### Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-to-solder point	$R_{\theta Jc}$		40	$^\circ C / W$
Thermal Resistance junction-to-Ambient	$R_{\theta JA}$		830	$^\circ C / W$

## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V			1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V			±10	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.3	0.7	1.2	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.5A		220	300	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.4A		290	400	mΩ
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.2A		420	700	mΩ
I <sub>S</sub>	Maximum Body-Diode Continuous Current				0.5	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iSS</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, F=1.0MHz		56		pF
C <sub>oSS</sub>	Output Capacitance			20		pF
C <sub>rSS</sub>	Reverse Transfer Capacitance			2.5		pF
<b>SWITCHING PARAMETERS</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>GS</sub> =4.5V V <sub>DS</sub> =10V R <sub>G</sub> =25Ω I <sub>D</sub> =0.5A		2		nS
t <sub>r</sub>	Turn-on Rise Time			18.8		nS
t <sub>d(off)</sub>	Turn-Off Delay Time			10		nS
t <sub>f</sub>	Turn-Off Fall Time			23		nS
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =0.5A, V <sub>GS</sub> =4.5V		1		nC
Q <sub>gs</sub>	Gate-Source Charge			0.28		nC
Q <sub>gd</sub>	Gate-Drain Charge			0.2		nC
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>SD</sub> =1A		0.70	1.3	V

Note:

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

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

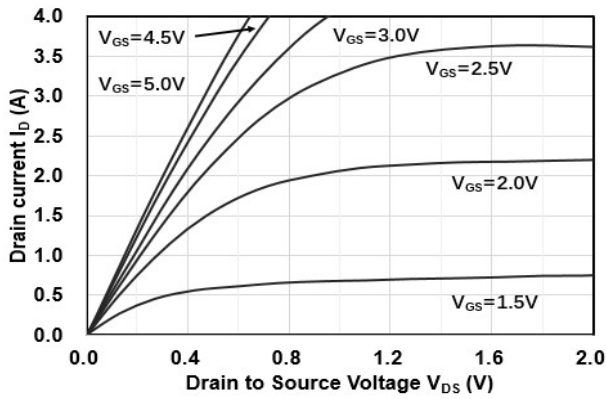


Figure1. Output Characteristics

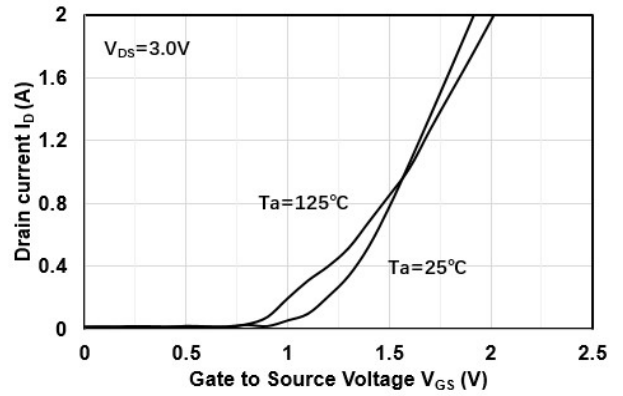


Figure2. Transfer Characteristics

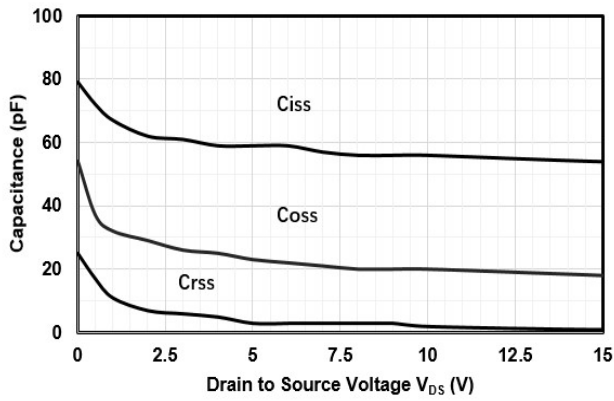


Figure3. Capacitance Characteristics

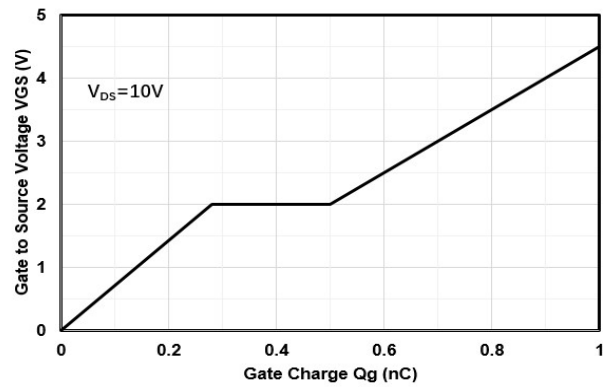


Figure4. Gate Charge

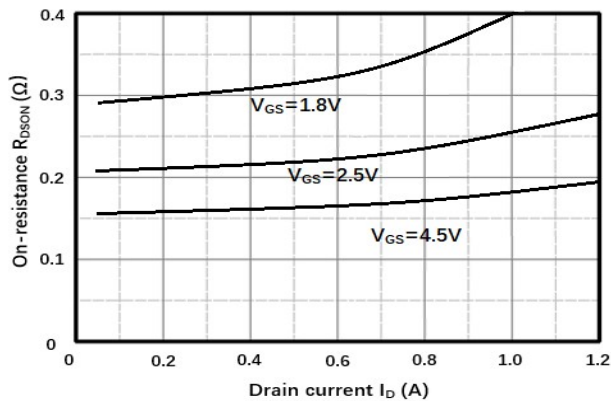


Figure5. Drain-Source on Resistance

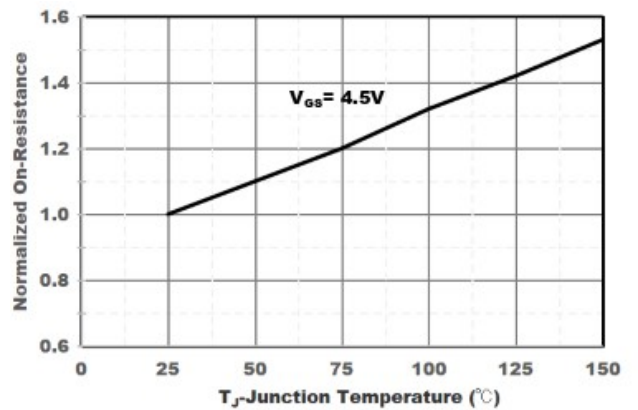


Figure6. Drain-Source on Resistance

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

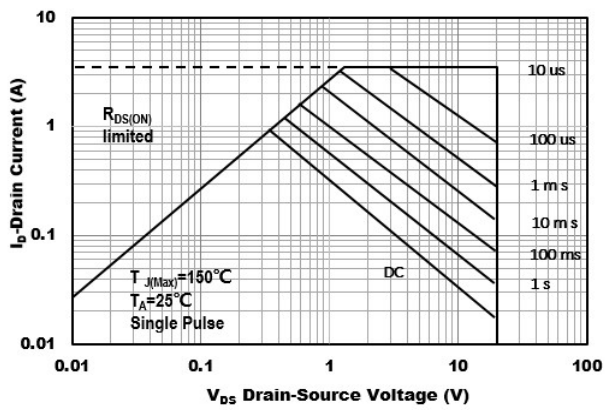


Figure7. Safe Operation Area

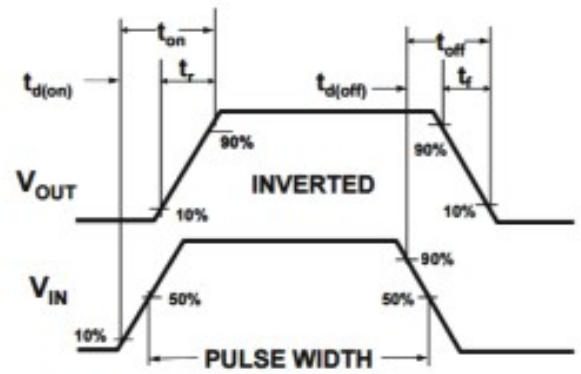
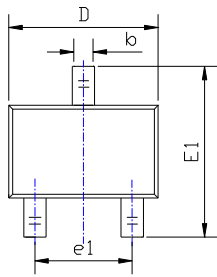
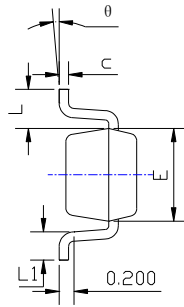


Figure8. Switching wave

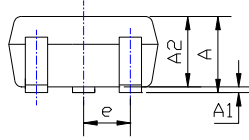
## SOT323 PACKAGE INFORMATION



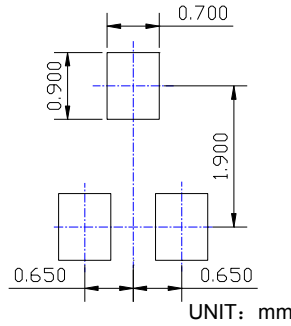
TOP VIEW



SIDE VIEW



SIDE VIEW



UNIT: mm

SUGGESTED SOLDER PAD LAYOUT

SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.035	0.043	0.900	1.100
A1	0.000	0.004	0.000	0.100
A2	0.035	0.039	0.900	1.000
b	0.006	0.016	0.150	0.400
c	0.004	0.010	0.100	0.250
D	0.071	0.087	1.800	2.200
E	0.045	0.053	1.150	1.350
E1	0.085	0.096	2.150	2.450
e	0.026TYP		0.650TYP	
e1	0.047	0.055	1.200	1.400
L	0.021REF		0.525REF	
L1	0.010	0.018	0.260	0.460
$\theta$	0°	8°	0°	8°

**NOTE:**

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.