



## 20V N-Channel MOSFETs

### General Description

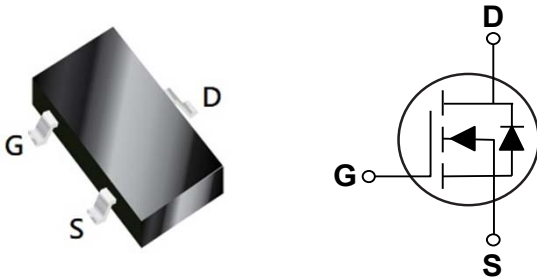
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
20 V	65 mΩ	2.3 A

### Features

- $R_{DS(ON)} \leq 65m\Omega @ V_{GS}=4.5V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available

SOT-23 Pin Configuration



### Applications

- Battery Protection
- Load Switch
- Uninterruptible Power Supply

### Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Value	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current - Continuous ( $T_A=25^\circ C$ )	2.3	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	6.9	A
$P_D$	Power Dissipation ( $T_A=25^\circ C$ )	0.77	W
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
Marking Code		A2SHB.	

### Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance Junction to Case	125	$^\circ C/W$



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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	$V_{GS}=0V, I_D=250\mu\text{A}$	20	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V$	---	---	1	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	$\pm 100$	nA

## On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=3A$	---	---	65	m $\Omega$
		$V_{GS}=2.5V, I_D=2A$	---	---	90	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu\text{A}$	0.5	---	1.2	V

## Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$Q_g$	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V, I_D=3A$	---	2.4	---	nC
$Q_{gs}$	Gate-Source Charge		---	0.88	---	
$Q_{gd}$	Gate-Drain Charge		---	0.77	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=10V, V_{GS}=4.5V, R_{GEN}=3\Omega, I_D=3A$	---	6.8	---	ns
$T_r$	Rise Time		---	57	---	
$T_{d(off)}$	Turn-Off Delay Time		---	14	---	
$T_f$	Fall Time		---	53	---	
$C_{iss}$	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1\text{MHz}$	---	150	---	pF
$C_{oss}$	Output Capacitance		---	34	---	
$C_{rss}$	Reverse Transfer Capacitance		---	26	---	

## Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current		---	---	2.3	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=3A$	---	---	1.3	V

## NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$  , duty cycle  $\leq 2\%$ .
3. The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.



# 20V N-Channel MOSFETs

## Characteristics Curves

FIG. 1-Output Characteristics

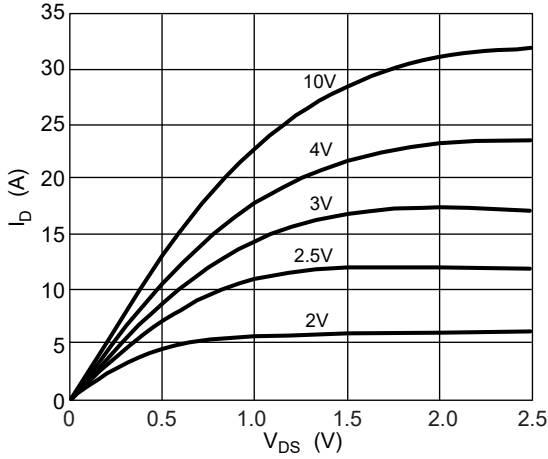


FIG. 2-Transfer Characteristics

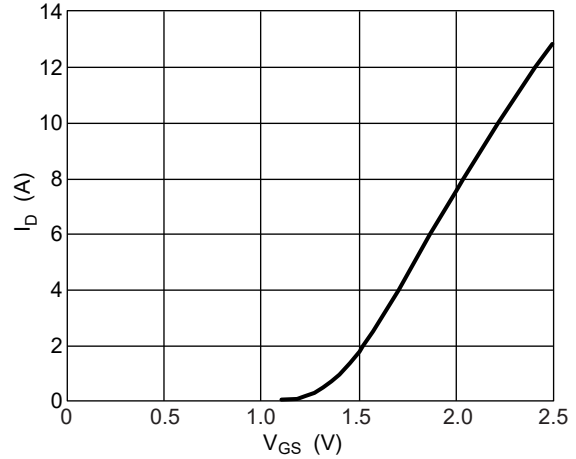


FIG. 3- $I_D$  vs  $T_J$

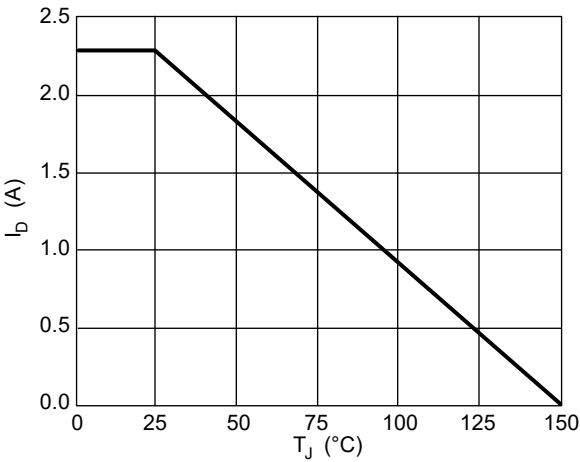


FIG. 4-Gate Charge Characteristics

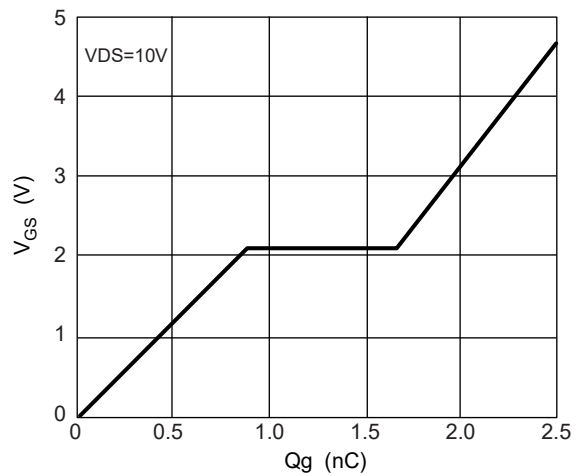


FIG. 5- $R_{DS(ON)}$  vs  $I_D$

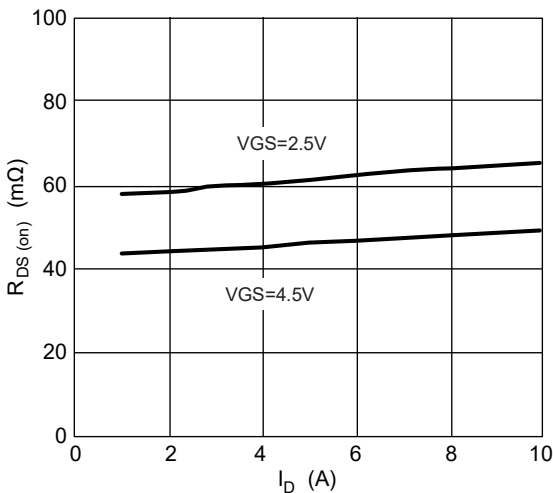
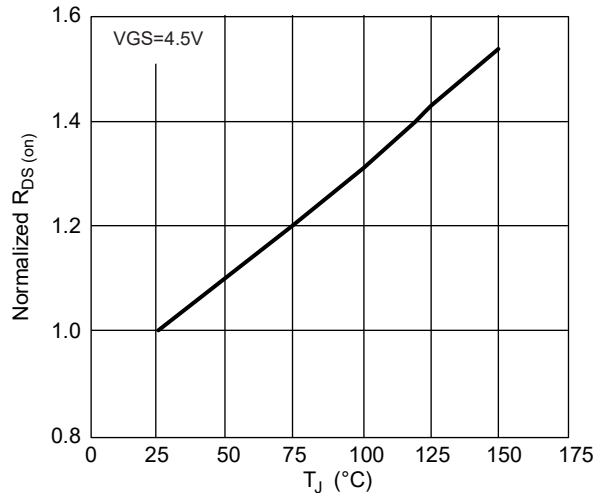


FIG. 6-Normalized  $R_{DS(ON)}$  vs  $T_J$





Characteristics Curves

FIG. 7-Switching Time Waveform

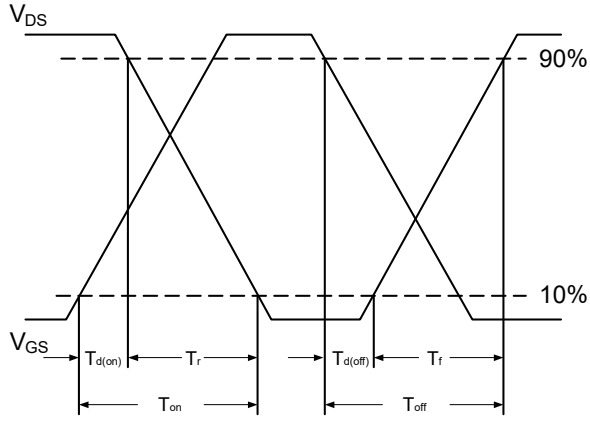
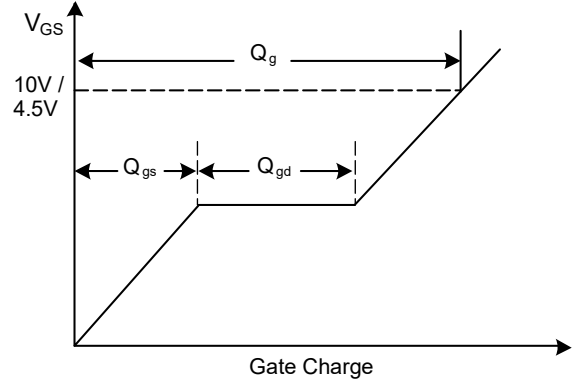
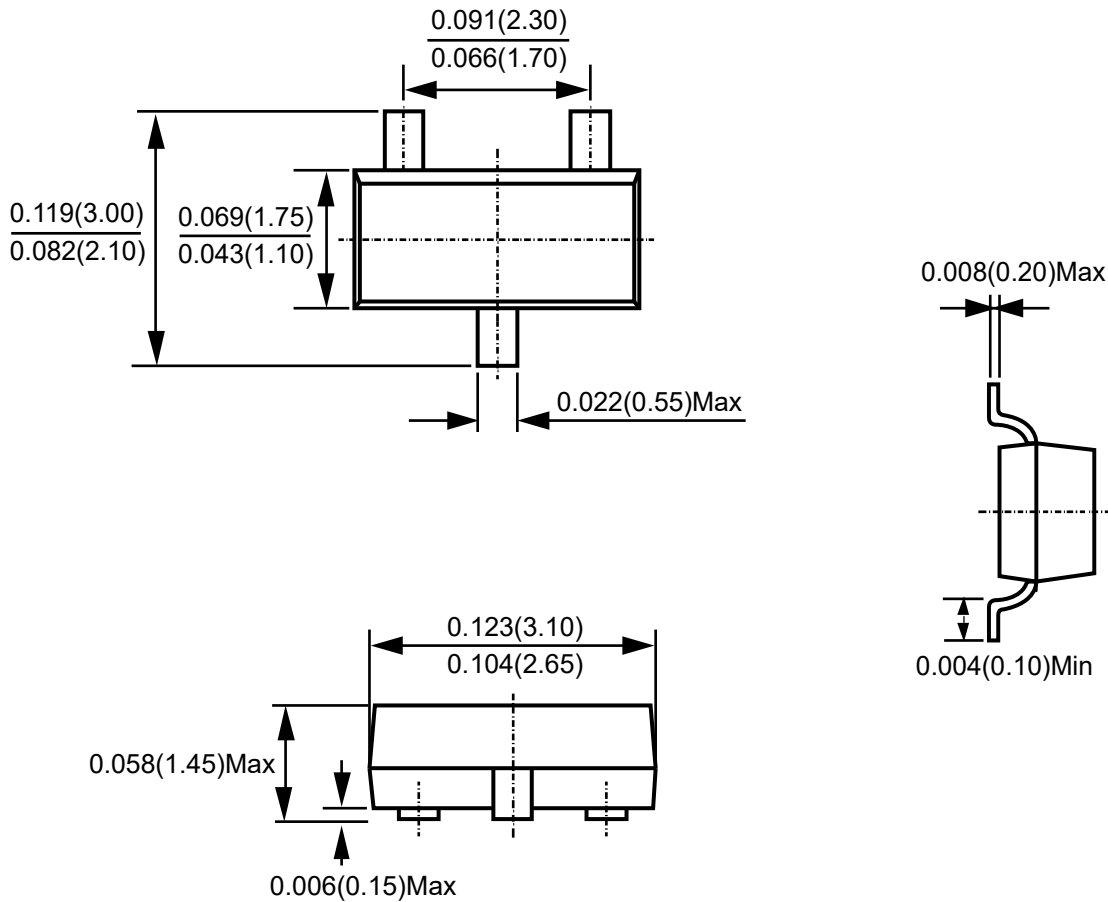


FIG. 8-Gate Charge Waveform



Package Outline Dimensions



SOT-23

Dimensions in inches and (millimeters)



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