



20V N-Channel MOSFETs

General Description

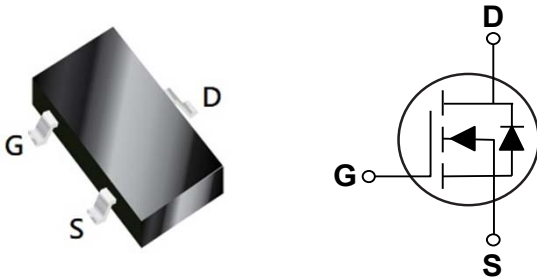
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
20 V	35 m Ω	5 A

Features

- $R_{DS(ON)} \leq 35m\Omega @ V_{GS}=4.5V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available

SOT-23 Pin Configuration



Applications

- Battery Protection
- Load Switch
- Power Management

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

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 10	V
I_D	Drain Current - Continuous	5	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	18	A
P_D	Power Dissipation	1.25	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
Marking Code		A0SHB	

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	100	$^\circ\text{C/W}$



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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	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 10V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=5A$	---	---	35	m Ω
		$V_{GS}=2.5V, I_D=4.5A$	---	---	45	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.5	---	1.2	V
gfs	Forward Transconductance	$V_{DS}=5V, I_D=6A$	20	---	---	S

Dynamic and switching Characteristics (NOTE 3)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V, I_D=3A$	---	10	---	nC
Q_{gs}	Gate-Source Charge		---	1.5	---	
Q_{gd}	Gate-Drain Charge		---	1.6	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=10V, V_{GS}=4.5V, R_{GEN}=6\Omega, I_D=1A$	---	8	---	ns
T_r	Rise Time		---	9	---	
$T_{d(off)}$	Turn-Off Delay Time		---	15	---	
T_f	Fall Time		---	4	---	
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1\text{MHz}$	---	640	---	pF
C_{oss}	Output Capacitance		---	140	---	
C_{rss}	Reverse Transfer Capacitance		---	80	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current		---	---	5	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A$	---	---	1.2	V

NOTES :

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. Guaranteed by design, not subject to production.



Characteristics Curves

FIG. 1- I_D vs T_A

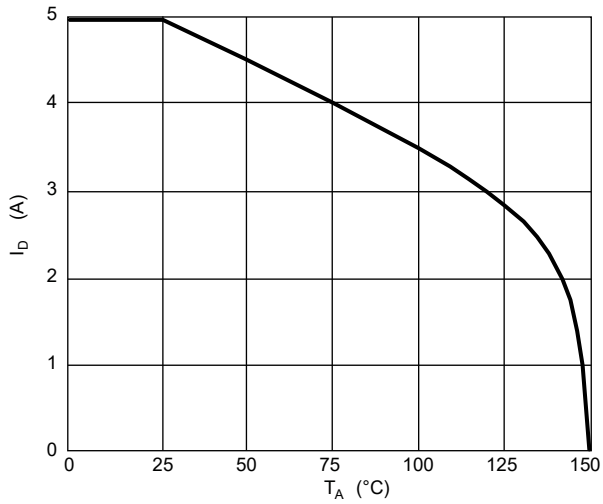


FIG. 2- P_D vs T_A

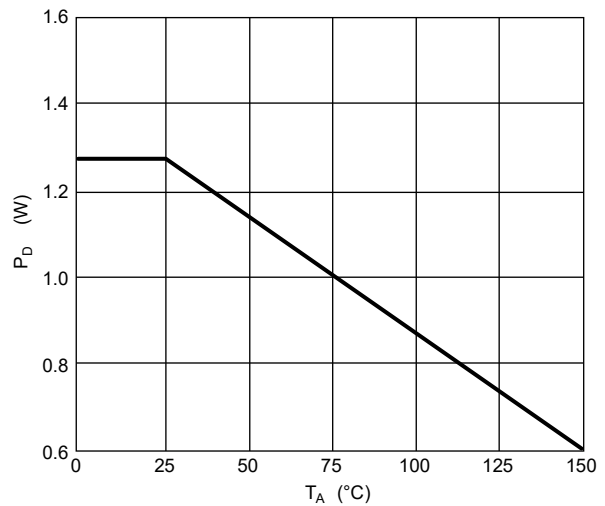


FIG. 3-Normalized $R_{DS(ON)}$ vs T_J

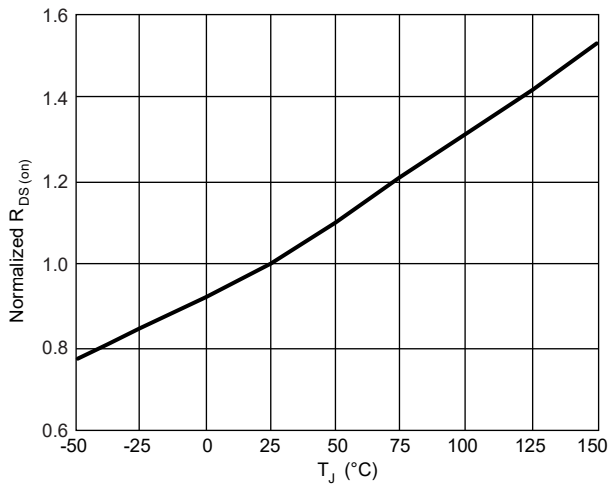


FIG. 4-Gate Charge Characteristics

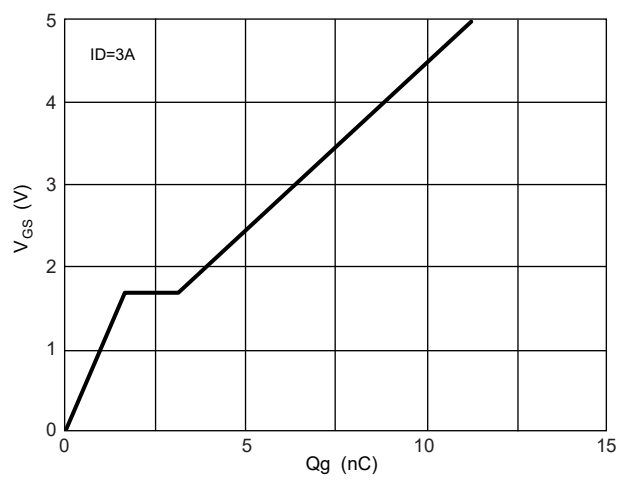


FIG. 5- $R_{DS(ON)}$ vs V_{GS}

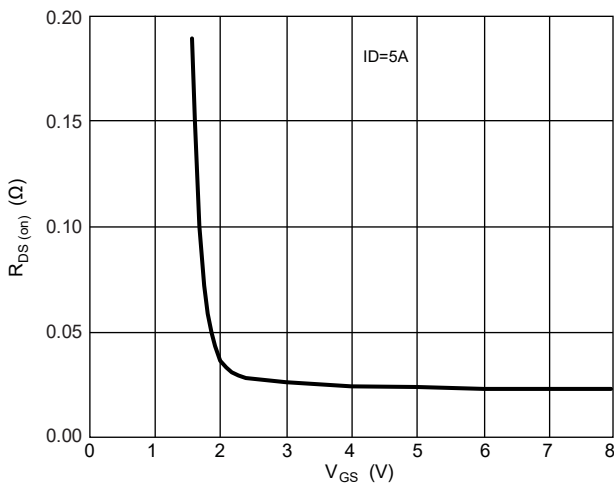
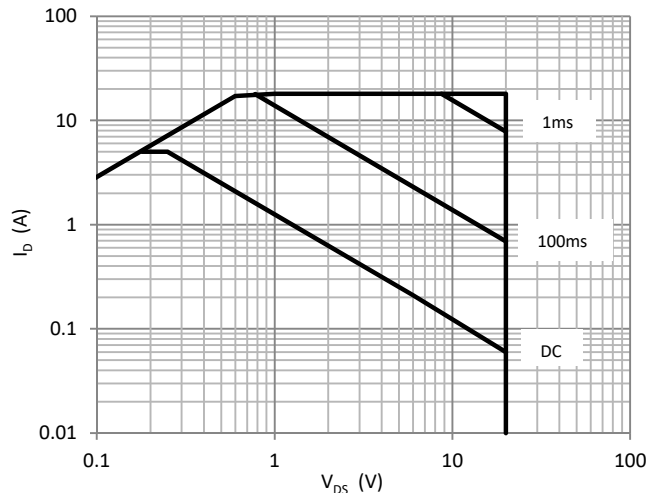


FIG. 6-Safe Operation Area





Characteristics Curves

FIG. 7-Switching Time Waveform

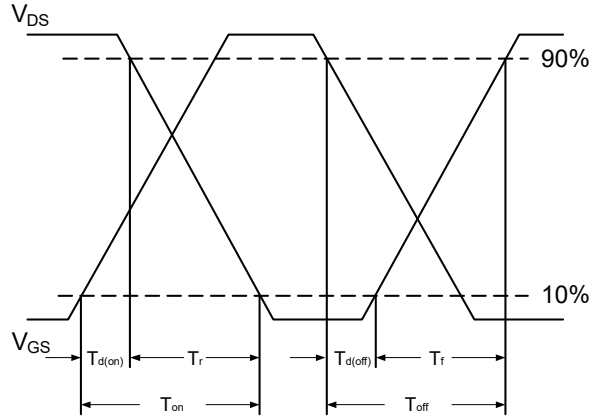
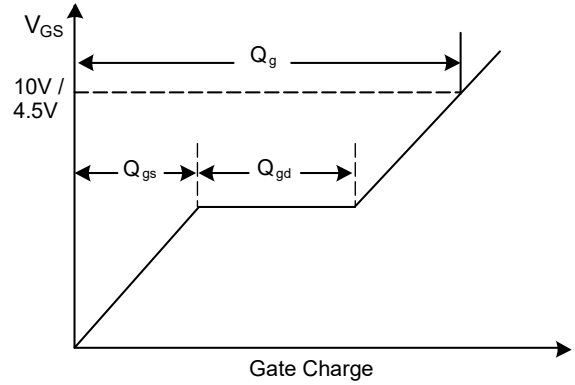
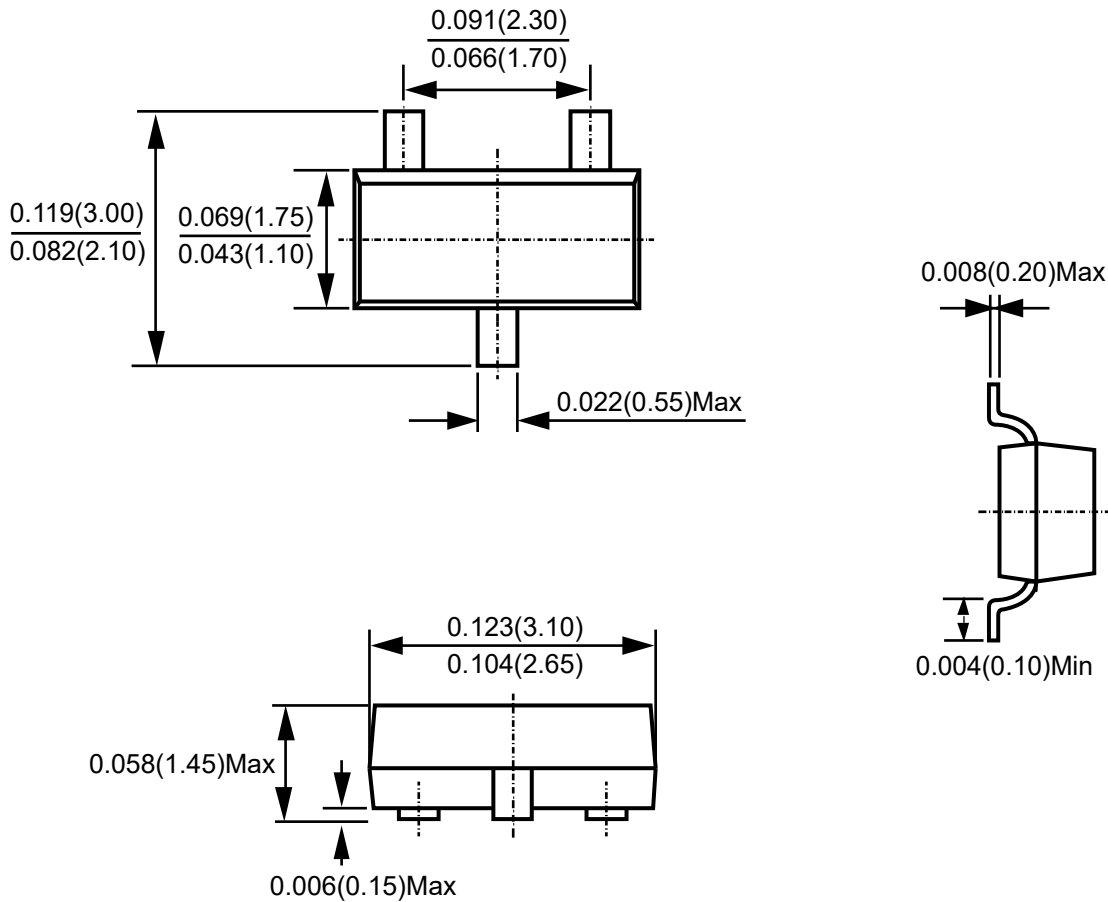


FIG. 8-Gate Charge Waveform



Package Outline Dimensions



SOT-23

Dimensions in inches and (millimeters)



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