



## 20V P-Channel MOSFETs

### General Description

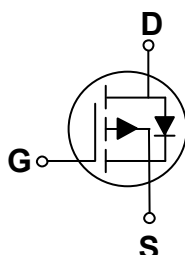
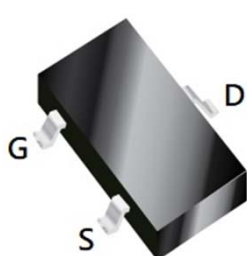
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
-20 V	21 m $\Omega$	-7 A

### Features

- $R_{DS(ON)} \leq 21m\Omega @ V_{GS} = -4.5V$
- Fast Switching
- Green Device Available

SOT-23 Pin Configuration



### Applications

- Battery Protection
- Load Switch
- Uninterruptible Power Supply

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current - Continuous ( $T_A=25^\circ\text{C}$ )	-7	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	-23.8	A
$P_D$	Power Dissipation ( $T_A=25^\circ\text{C}$ )	1	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		2307	

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	125	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	80	$^\circ\text{C/W}$

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	$V_{DS}=-16V, V_{GS}=0V$	---	---	-1	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 12, V_{DS}=0V$	---	---	$\pm 100$	nA

## On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5V, I_D=-4A$	---	---	21	m $\Omega$
		$V_{GS}=-2.5V, I_D=-3A$	---	---	28	
		$V_{GS}=-1.8V, I_D=-1.5A$	---	---	35	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.4	---	-1.0	V
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-4A$	---	21	---	S

## Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$Q_g$	Total Gate Charge	$V_{DS}=-15V, V_{GS}=-4.5V, I_D=-4A$	---	27.3	---	nC
$Q_{gs}$	Gate-Source Charge		---	3.6	---	
$Q_{gd}$	Gate-Drain Charge		---	6.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-10V, V_{GS}=-4.5V, R_G=3.3\Omega, I_D=-4A$	---	9.2	---	nS
$T_r$	Rise Time		---	59	---	
$T_{d(off)}$	Turn-Off Delay Time		---	99	---	
$T_f$	Fall Time		---	71	---	
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$	---	2280	---	pF
$C_{oss}$	Output Capacitance		---	220	---	
$C_{rss}$	Reverse Transfer Capacitance		---	187	---	

## Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V$ , Force Current	---	---	-4.7	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A$	---	---	-1	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. Essentially independent of operating temperature.



Characteristics Curves

FIG. 1-Forward Characteristics of Body Diode

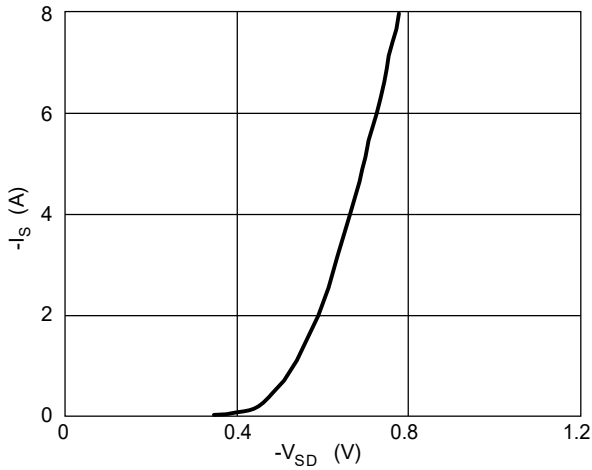


FIG. 2-Normalized  $V_{GS(th)}$  vs  $T_J$

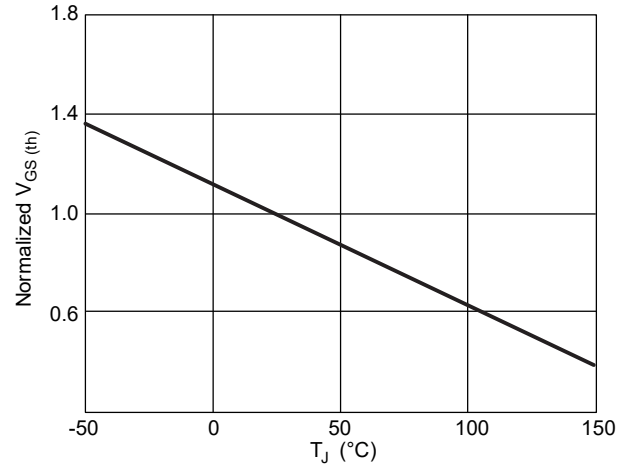


FIG. 3-Normalized  $R_{DS(on)}$  vs  $T_J$

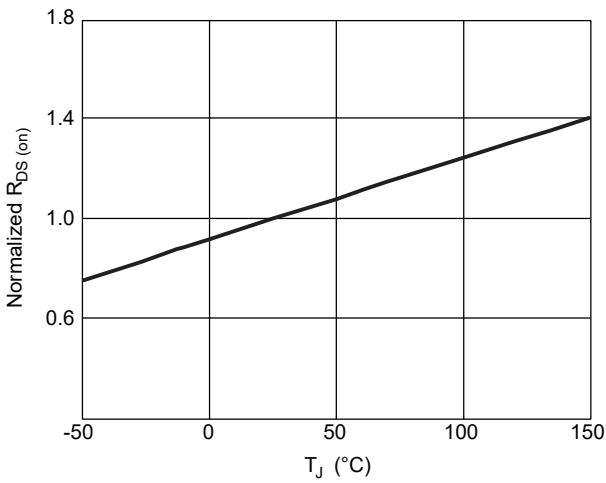


FIG. 4-Gate Charge Waveform

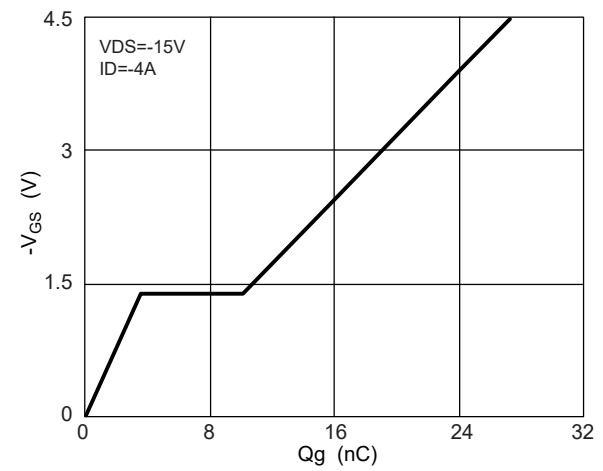


FIG. 5-Safe Operation Area

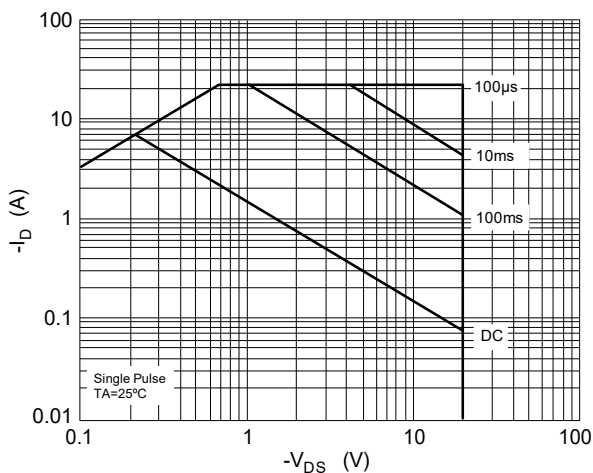
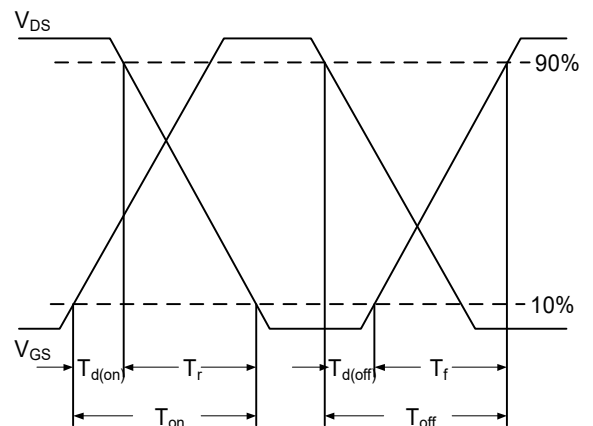
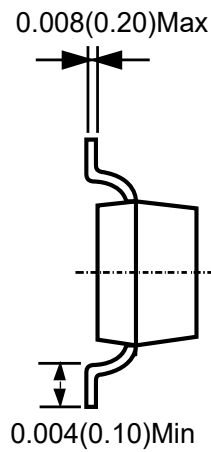
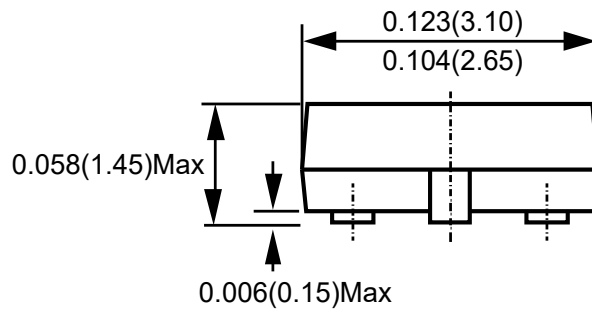
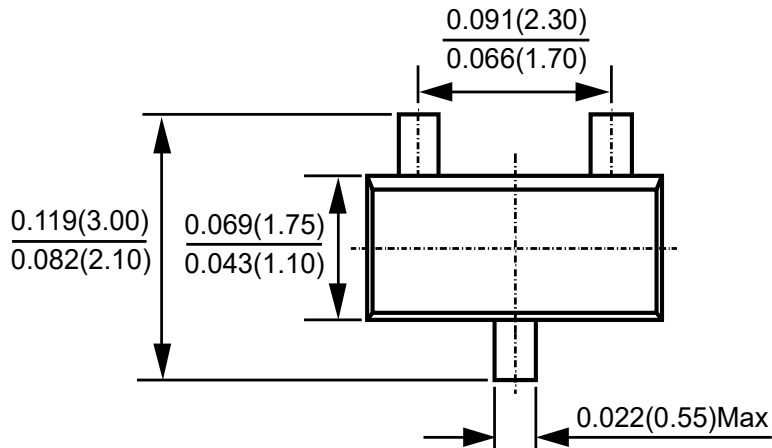


FIG. 6-Switching Time Waveform





Package Outline Dimensions



SOT-23

Dimensions in inches and (millimeters)



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