

## Description

The 5P40 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ . This device is suitable for use as a load switch and battery protection applications.

## General Features

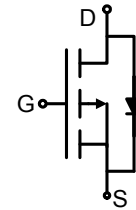


$V_{DSS}$	$R_{DS(ON)}$ @-4.5V(Typ)	$R_{DS(ON)}$ @-10V (Typ)	$I_D$
-40V	98m $\Omega$	73m $\Omega$	-5.3 A

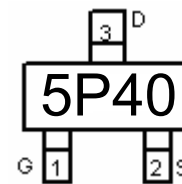
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

## Application

- Battery applications
- Load switch



Schematic diagram



Marking and pin assignment



SOT-23-3L

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	-5.3	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	-20	A
Maximum Power Dissipation	$P_D$	2.0	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^{\circ}\text{C}$

## Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	62.5	$^{\circ}\text{C/W}$
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## Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

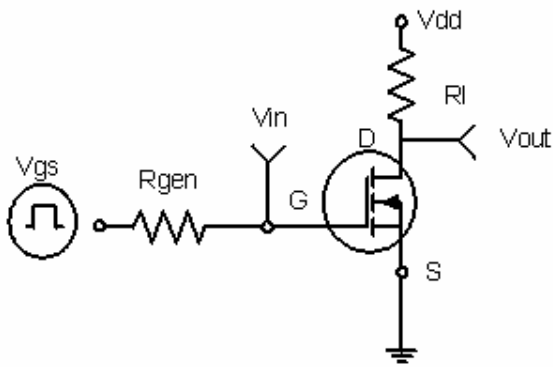
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-40V, V_{GS}=0V$	-	-	-1	$\mu A$

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.5	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-5A$	-	73	85	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$	-	98	126	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-4.1A$	10	-	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=-20V, V_{GS}=0V,$ $F=1.0MHz$	-	650	-	PF
Output Capacitance	$C_{OSS}$		-	90	-	PF
Reverse Transfer Capacitance	$C_{RSS}$		-	70	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-20V, R_L=2\Omega$ $V_{GS}=-10V, R_{GEN}=3\Omega$	-	9	-	nS
Turn-on Rise Time	$t_r$		-	8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28	-	nS
Turn-Off Fall Time	$t_f$		-	10	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-20V, I_D=-3.1A,$ $V_{GS}=-10V$	-	14	-	nC
Gate-Source Charge	$Q_{gs}$		-	2.9	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3.8	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-2.5A$	-	0.8	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	-5.3	A

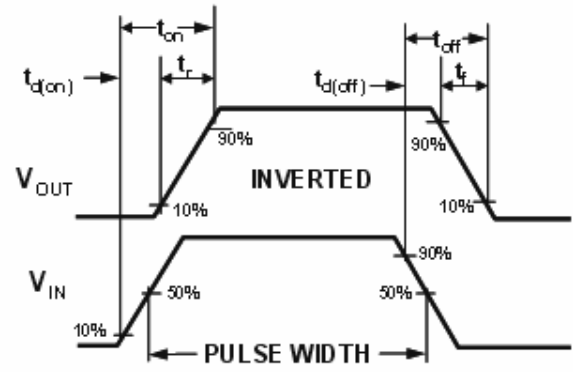
## Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

**Typical Electrical and Thermal Characteristics**



**Figure 1: Switching Test Circuit**



**Figure 2: Switching Waveforms**