

20V Single N-Channel Enhancement-Mode MOSFET

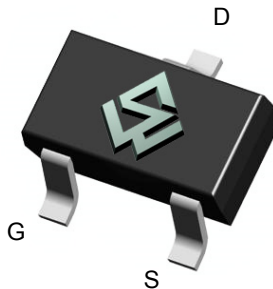
General Description

- Low gate charge.
- Use as a load switch.
- Use in PWM applications

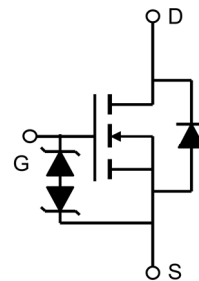
Product Summary

- BV_{DSS} 20V
- $R_{DS(on)}$ @VGS = 4.5V < 24mΩ
- $R_{DS(on)}$ @VGS = 2.5V < 38mΩ
- $R_{DS(on)}$ @VGS = 1.8V < 50mΩ

SOT23-3L



ESD protected



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±8	V
Drain Current ($T_A=25^\circ\text{C}$)	I_D	6.5	A
Drain Current ($T_A=75^\circ\text{C}$)		4.2	A
Pulsed Drain Current ^a	I_{DM}	28	A
Power Dissipation ^b ($T_A=25^\circ\text{C}$)	P_D	1.4	W
Power Dissipation ^b ($T_A=75^\circ\text{C}$)		0.9	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	°C

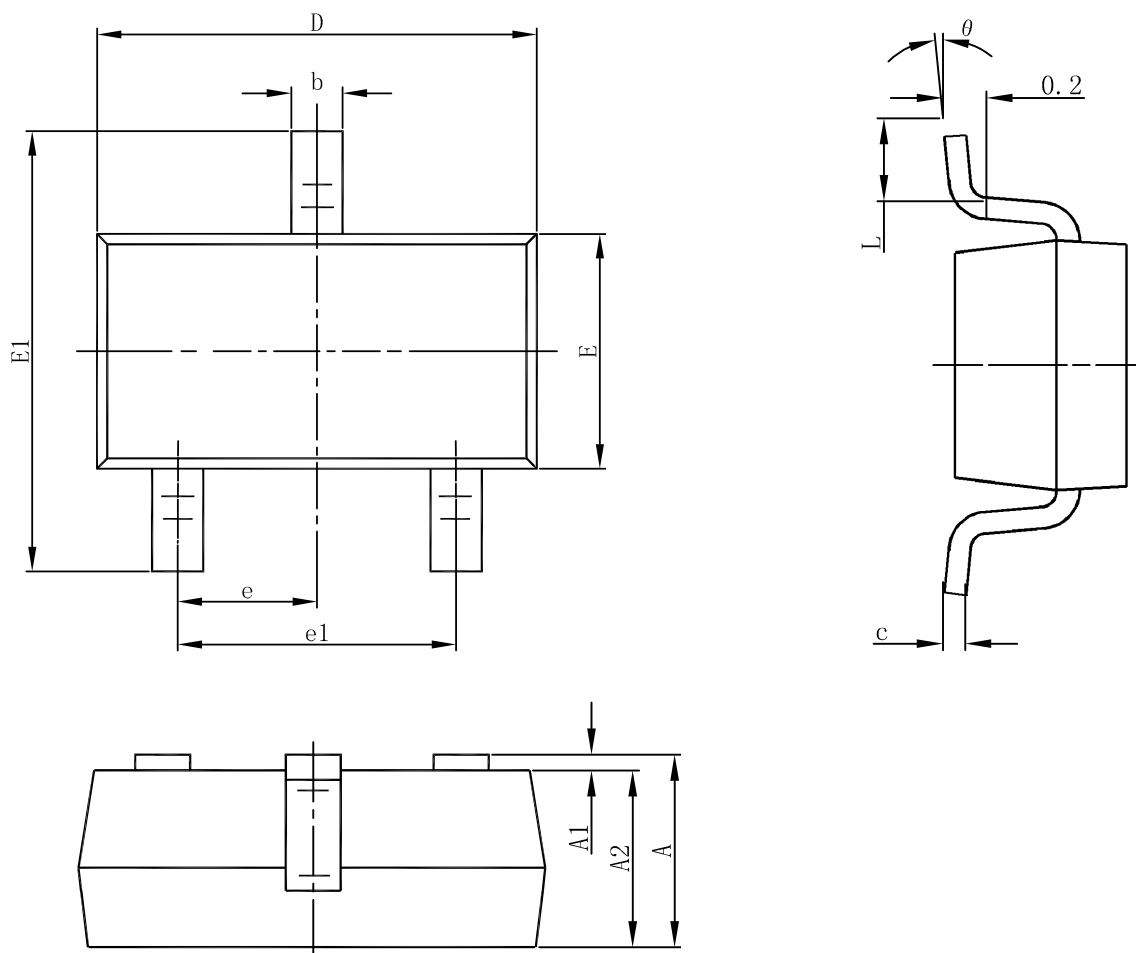
Thermal Characteristics

Parameter	Symbol	Maximum	Units
Junction-to-Ambient ^a ($t \leq 10\text{s}$)	$R_{\theta JA}$	100	°C/W
Junction-to-Ambient ^{a,d} (Steady-State)		130	°C/W
Junction-to-Lead (Steady-State)	$R_{\theta JL}$	90	°C/W

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	20			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 20V, V_{GS} = 0V$			1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS} = \pm 8V, V_{DS} = 0V$			± 10	μA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.4		1.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 6.5A$			24	$m\Omega$
		$V_{GS} = 2.5V, I_D = 5.5A$			38	$m\Omega$
		$V_{GS} = 1.8V, I_D = 4.5A$			50	$m\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = 4.5V, I_D = 1A$		15		S
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = 1.0A$			1.2	V
I_S	Maximum Body-Diode Continuous Current				2.0	A
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 10V, V_{GS} = 0V$ $f = 1.0MHz$		1290		pF
C_{oss}	Output Capacitance			285		pF
C_{rss}	Reverse Transfer Capacitance			170		pF
Q_g	Total Gate Charge	$V_{DS} = 10V, I_D = 6.5A$ $V_{GS} = 4.0V$		23		nC
Q_{gs}	Gate-Source Charge			5.2		nC
Q_{gd}	Gate-Drain Charge			5.6		nC
$t_{D(ON)}$	Turn-On Delay Time	$V_{DD} = 10V, I_D = 1A$ $V_{GS} = 4.0V$ $R_{GEN} = 6\text{ ohm}$		10		ns
t_r	Turn-On Rise Time			6		ns
$t_{D(OFF)}$	Turn-Off Delay Time			32		ns
t_f	Turn-Off Fall Time			7		ns

- Repetitive rating, Pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$
- The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using $\leq 10s$ junction-to-ambient thermal resistance.
- The value of $R_{\theta JA}$ is measured with the device mounted on $1in^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any given application depends on the user's specific board design.
- The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

SOT23-3L Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°