

### Description

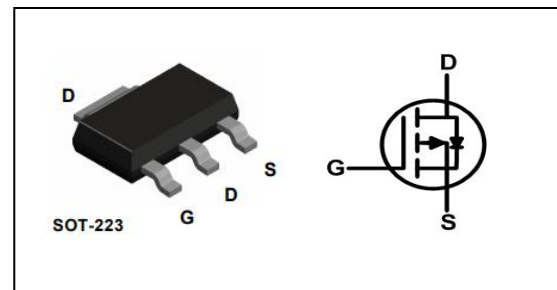
The HSL3P20 is the high cell density trenched P-ch MOSFETs, which provides excellent R<sub>DS(ON)</sub> and efficiency for most of the small power switching and load switch applications. The HSL3P20 meets the RoHS and Green Product requirement with full function reliability approved.

- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available
- Advanced high cell density Trench technology

### Product Summary

V <sub>DS</sub>	-200	V
R <sub>DS(ON),Max</sub>	2.4	Ω
I <sub>D</sub>	-3	A

### SOT223 Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-200	V
V <sub>GS</sub>	Gate-Source Voltage	± 20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup>	-3	A
I <sub>D</sub> @T <sub>C</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup>	-2	A
I <sub>D</sub> @T <sub>A</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup>	-0.9	A
I <sub>D</sub> @T <sub>A</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup>	-0.68	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	-3.5	A
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>3</sup>	1.5	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-ambient <sup>1</sup>	---	85	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	36	°C/W



**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-200	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-0.5A	---	1.9	2.4	Ω
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-2.0	-3.0	-4.0	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-160V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =-160V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	10	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ± 20V, V <sub>DS</sub> =0V	---	---	± 100	nA
gfs	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-0.8A	---	0.5	---	S
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-100V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.5A	---	8.5	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	1.5	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	1.8	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =-100V, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω I <sub>D</sub> =-0.5A	---	1.9	---	ns
T <sub>r</sub>	Rise Time		---	1.2	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	22	---	
T <sub>f</sub>	Fall Time		---	11	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V, f=1MHz	---	500	---	pF
C <sub>oss</sub>	Output Capacitance		---	39	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	20	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,4</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-1.2	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,4</sup>		---	---	-3.5	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1.3	V

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup>FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.



### Typical Characteristics

Figure 1. Output Characteristics

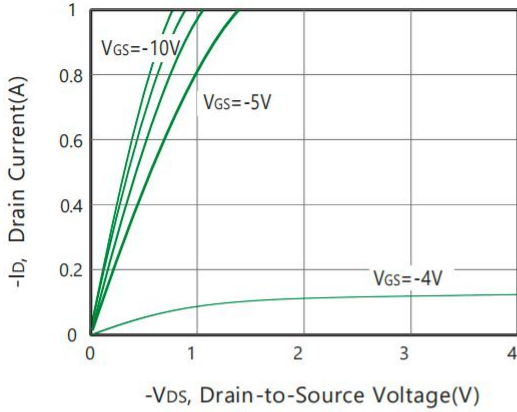


Figure 2. Body Diode Forward Voltage Variation with Source Current

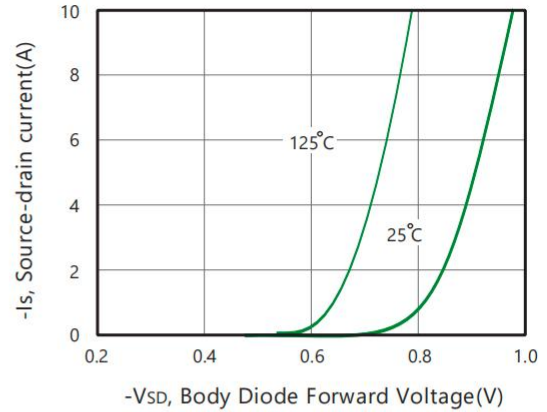


Figure 3. On-Resistance vs. Gate-Source Voltage

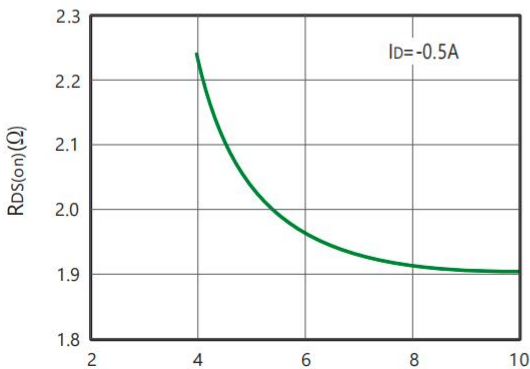


Figure 4. On-Resistance Variation with Drain Current and Temperature

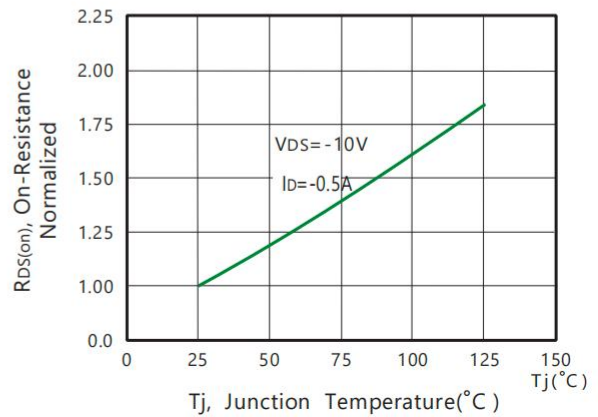


Figure 5. Gate Threshold Variation with Temperature

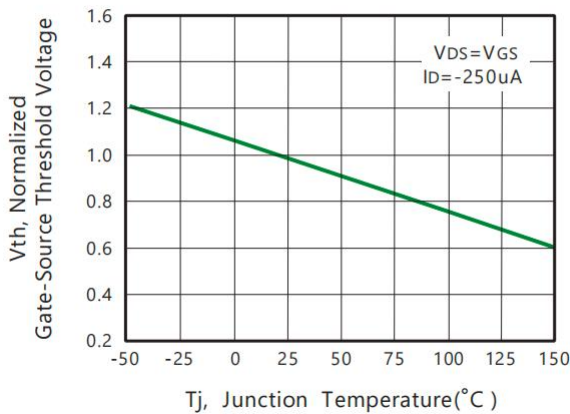


Figure 6. Gate Charge

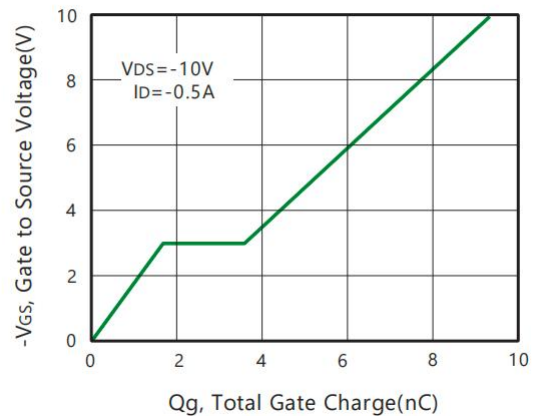




Figure 7. Capacitance

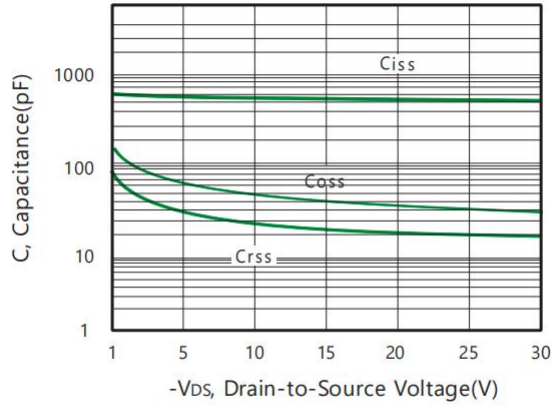


Figure 8. Maximum Safe Operating Area

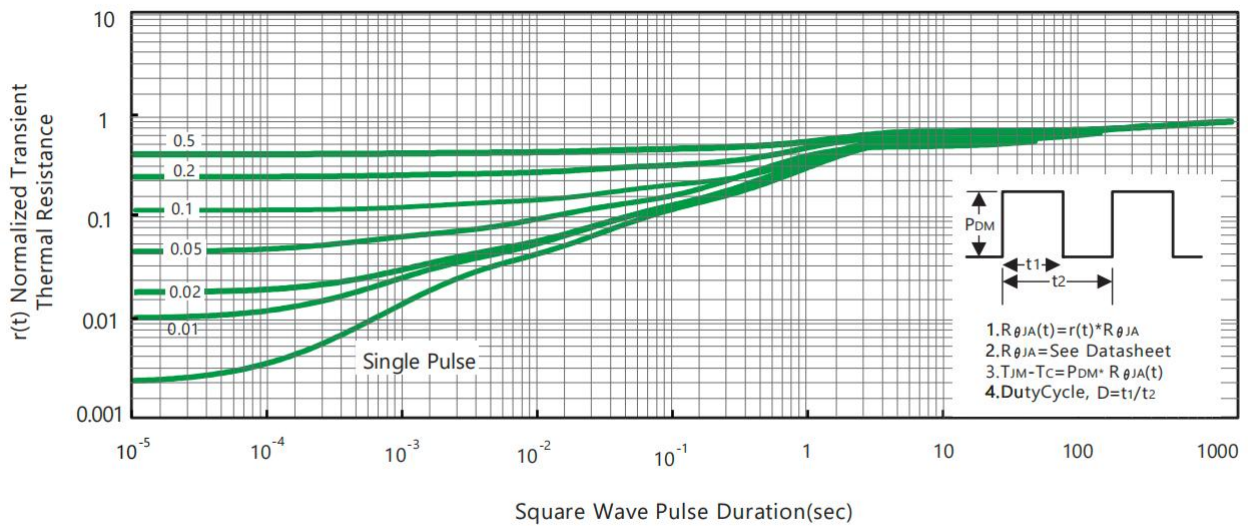
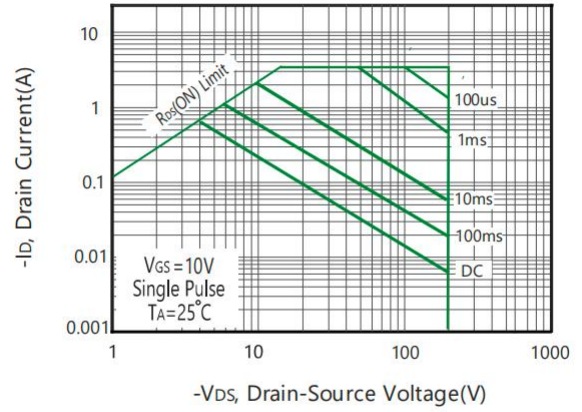
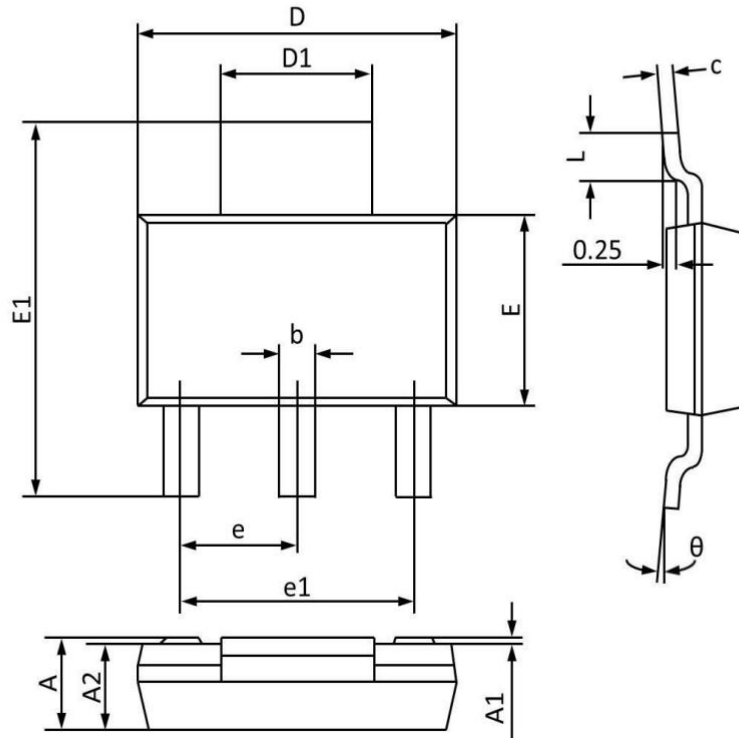


Figure 9. Normalized Thermal Transient Impedance Curve



**PACKAGE OUTLINE DIMENSIONS**

**SOT223**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.800	1.500	0.071	0.060
A1	0.120	0.000	0.005	0.000
A2	1.750	1.450	0.069	0.057
b	0.820	0.600	0.032	0.024
c	0.350	0.200	0.014	0.008
D	6.700	6.200	0.264	0.244
D1	3.100	2.900	0.122	0.114
E	3.700	3.300	0.146	0.130
E1	7.300	6.700	0.287	0.264
e	2.30(BSC)		0.091(BSC)	
e1	4.700	4.400	0.185	0.173
L	1.150	0.900	0.045	0.035
theta	10°	0°	10°	0°