

A2301

P-Channel Enhancement Mode MOSFET



Features

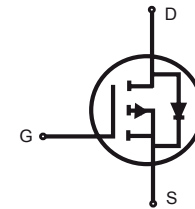
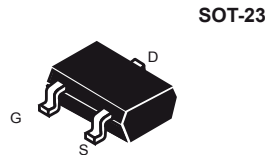
- High performance trench technology
- Low ON-resistance
- 2.5V gate drive
- Low profile surface mount package
- Lead (Pb) free product

Product Summary

V _{DS} (V)	I _D (A)	R _{DS(ON)} (mΩ) Max
- 20V	- 2.3A	130 @V _{GS} = - 4.5V
		230 @V _{GS} = - 2.5V

Applications

- Load switch
- PWM application
- Power management
- Battery operated systems



Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V _{DS}	- 20	V
Gate-Source Voltage	V _{GS}	± 8	V
Drain Current-Continuous @ T _J = 25°C	I _D	- 2.3	A
-Pulsed ^b	I _{DM}	- 8	A
Drain-Source Diode Forward Current ^a	I _S	- 0.8	A
Maximum Power Dissipation ^a	P _D	0.9	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

Thermal Characteristics

Thermal Resistance, Junction-to-Ambient ^a	R _{θJA}	120	°C/W
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Electrical Characteristics (T_A = 25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D = - 250 μA	- 20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 16V, V _{GS} =0V			- 1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} = ± 8V, V _{DS} =0V			± 100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} I _D = - 250 μA	- 0.40	- 0.6	- 1	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = - 4.5V, I _D = - 2.3A			130	mΩ
		V _{GS} = - 2.5V, I _D = - 1.8A			230	
On-State Drain Current	I _{D(ON)}	V _{DS} = - 5V, V _{GS} = - 4.5V	- 5			A
Forward Transconductance	g _{FS}	V _{DS} = - 5V, I _D = - 2A		3		S
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _D = - 0.8A		- 0.8	- 1.2	V

Dynamic

Input Capacitance	C _{ISS}	V _{DS} = - 15V V _{GS} =0V f=1.0MHz		360		pF
Output Capacitance	C _{OSS}			80		
Reverse Transfer Capacitance	C _{RSS}			40		
Turn-On Delay Time	t _{D(ON)}	V _{DD} = - 10V, I _D = - 1A, V _{GS} = - 4.5V, R _{GEN} = 6Ω, R _L = 10Ω		15		ns
Rise Time	t _r			20		
Turn-Off Delay Time	t _{D(OFF)}			80		
Fall Time	t _f			50		
Total Gate Charge	Q _g	V _D = - 10V, I _D = - 2.3A, V _{GS} = - 4.5V		4		nC
Gate-Source Charge	Q _{gs}			0.6		
Gate-Drain Charge	Q _{gd}			1		

Notes:

- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

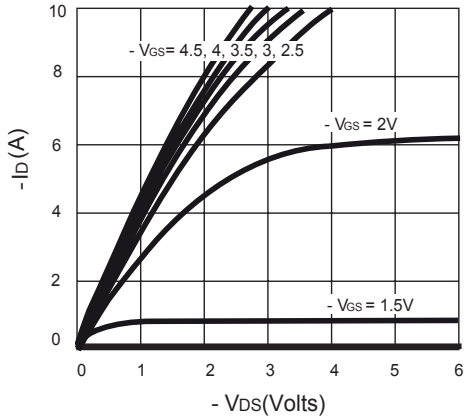


Figure 1. Output Characteristics

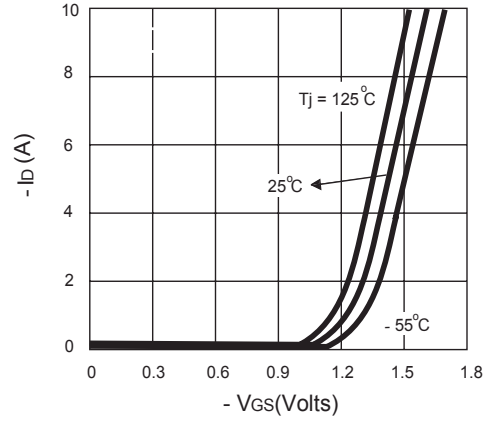


Figure 2. Transfer Characteristics

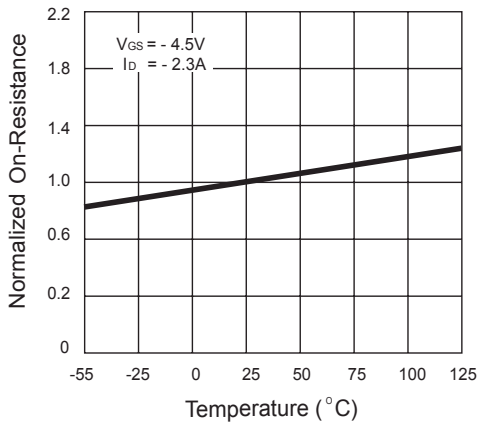


Figure 3. On-Resistance vs. Junction Temperature

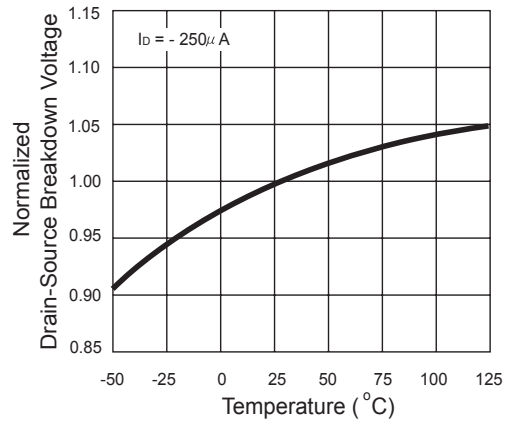


Figure 4. Drain-Source Breakdown Voltage vs. Temperature

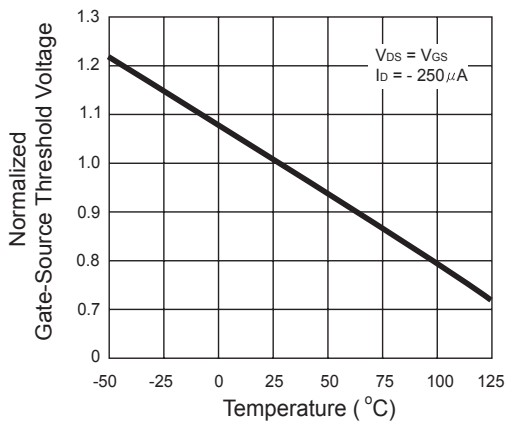


Figure 5. Gate Threshold vs. Junction Temperature

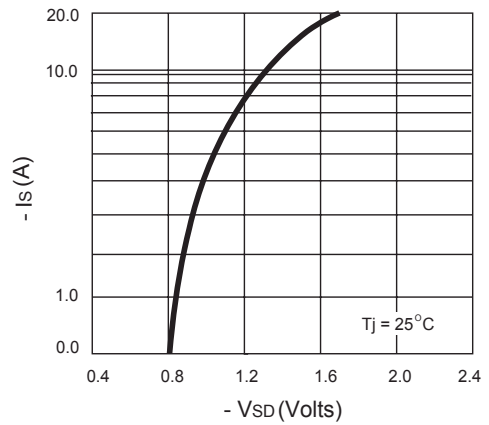


Figure 6. Body Diode Characteristics

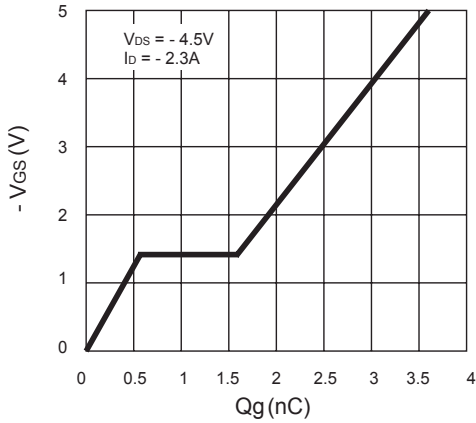


Figure 7. Gate-Charge Characteristics

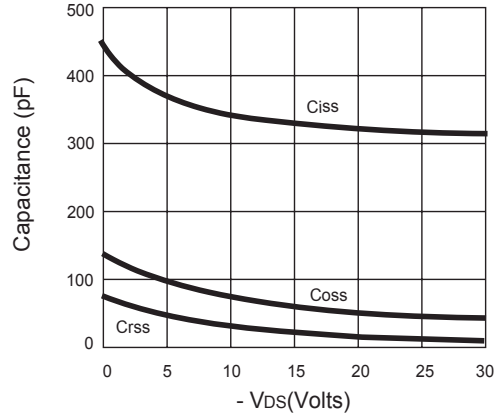


Figure 8. Capacitance Characteristics

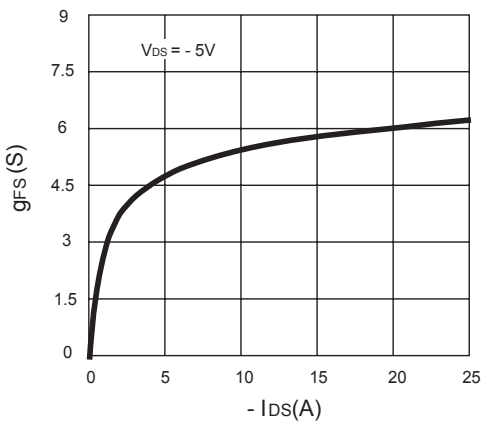


Figure 9. Transconductance vs. Drain Current

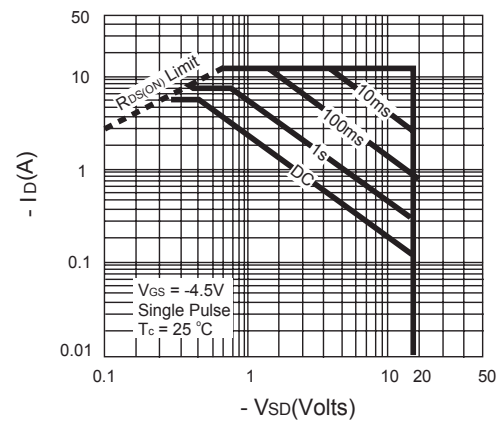


Figure 10. Maximum Forward Biased Safe Operating Area

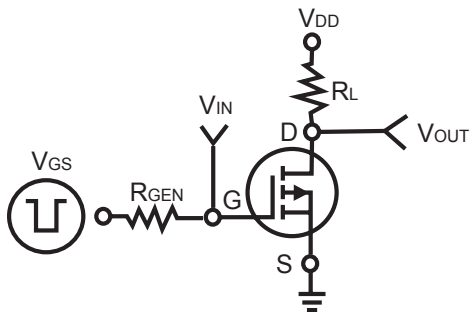


Figure 11. Switching Test Circuit

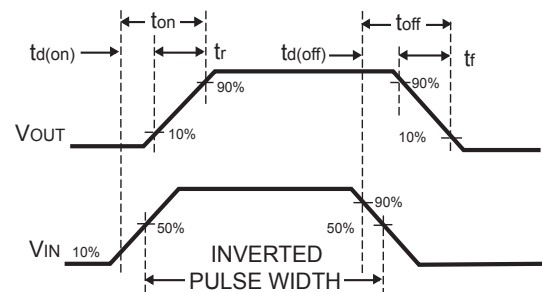


Figure 12. Switching Waveforms

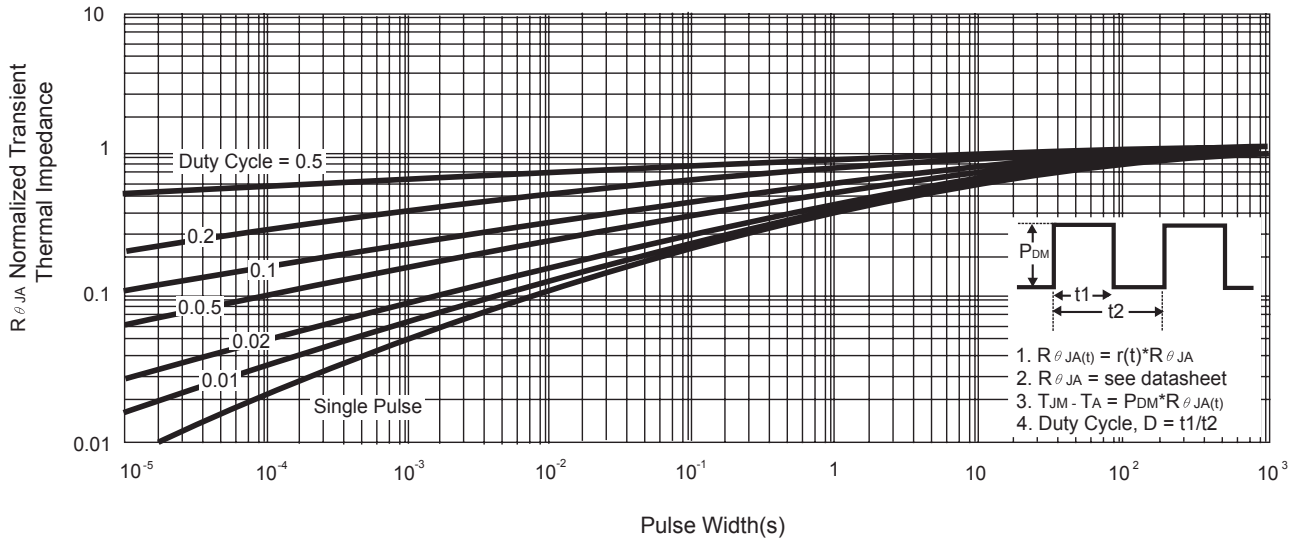
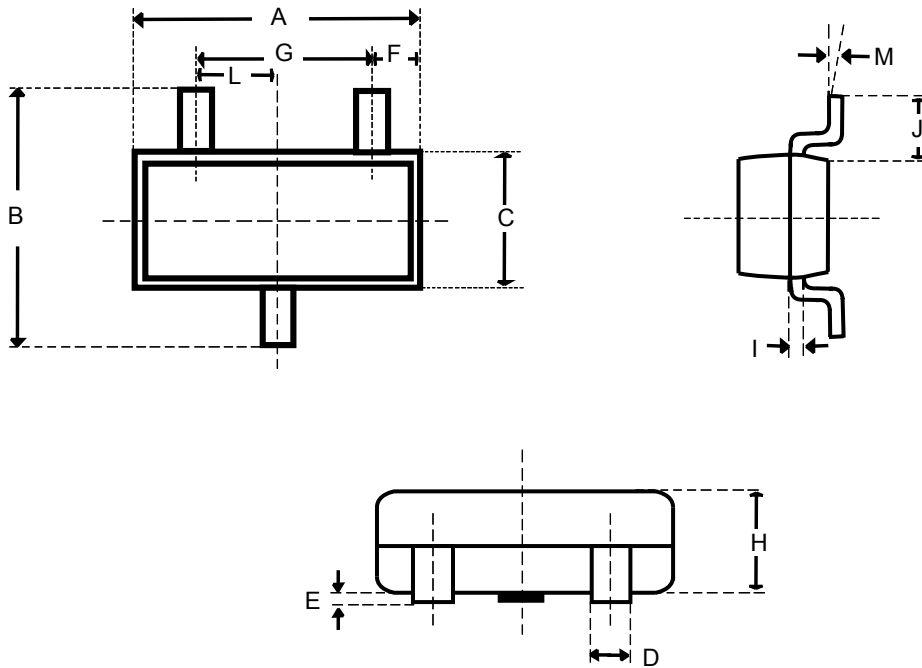


Figure 13. Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions

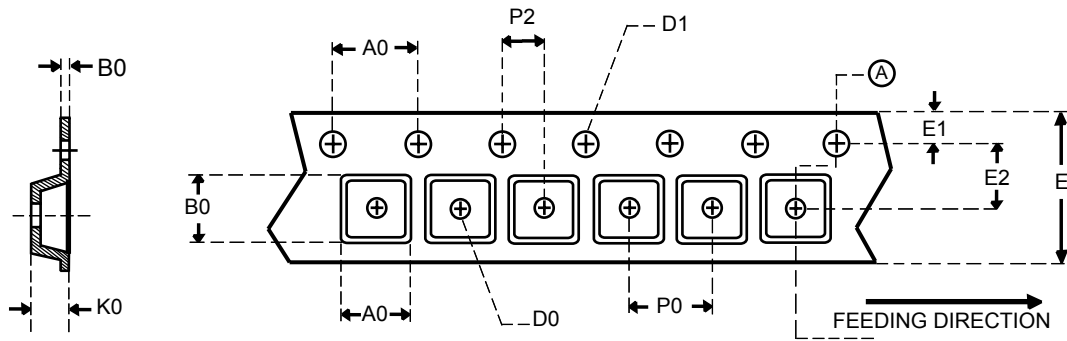
SOT-23



SYMBOLS	MILLIMETERS		INCHES	
	Min.	Max.	Min.	Max.
A	2.70	3.10	0.106	0.122
B	2.40	2.80	0.094	0.110
C	1.40	1.60	0.055	0.063
D	0.35	0.50	0.014	0.020
E	0	0.10	0	0.004
F	0.45	0.55	0.018	0.022
G	1.90 REF.		0.075 REF.	
H	1.00	1.30	0.039	0.051
I	0.10	0.20	0.004	0.008
J	0.40	-	0.016	-
L	0.85	1.15	0.033	0.045
M	0°	10°	0°	10°

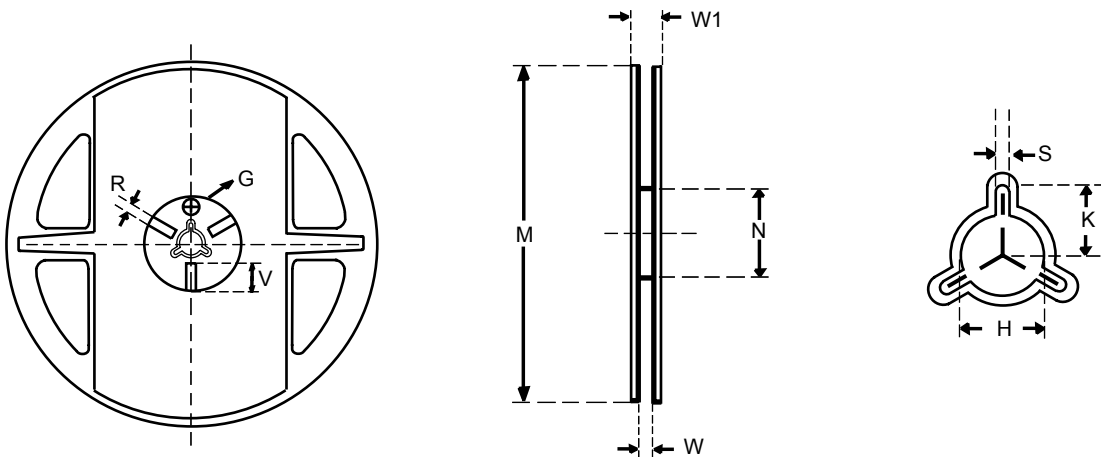
Carrier Tape & Reel Dimensions

SOT-23



Package	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOT-23	3.20 ± 0.10	3.00 ± 0.10	1.33 ± 0.10	ψ1.00 +0.25	ψ1.50 +0.10	8.00 +0.30 -0.10	ψ1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.20 ± 0.02

UNIT : mm



Tape size	Reel Size	M	N	W	W1	H	K	S	G	R	V
8mm	ψ178	ψ178 ± 1	ψ60 ± 1	9.0 0.5	12.0 ± 0.5	ψ13.5 ± 0.5	10.5	2.0 ± 0.5	ψ10	5.0	18.0

UNIT : mm