

A2321

P-Channel Enhancement Mode MOSFET



Features

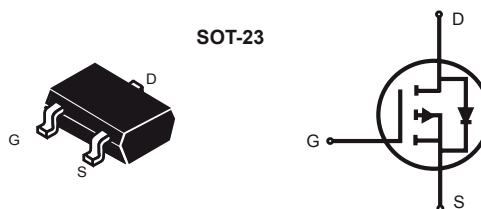
- High performance trench technology
- Low ON-resistance
- 2.5V gate drive
- Low profile surface mount package
- Lead (Pb) free product

Product Summary

V _{DS} (V)	I _D (A)	R _{DS(ON)} (mΩ) Max
- 20V	- 3.4A	60 @V _{GS} = - 4.5V
		80 @V _{GS} = - 2.5V
		125 @V _{GS} = - 1.8V

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 = 125°C	I _D	- 3.4	A
-Pulsed ^b	I _{DM}	- 12	A
Drain-Source Diode Forward Current ^a	I _S	- 1.0	A
Maximum Power Dissipation ^a	P _D	0.95	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}	115	°C/W
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Electrical Characteristics (TA = 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 = - 10 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	- 0.4		- 1.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = - 4.5V, I _D = - 3.2A		50	60	mΩ
		V _{GS} = - 2.5V, I _D = - 2.0A		70	80	
		V _{GS} = - 1.8V, I _D = - 1.0A		115	125	
On-State Drain Current	I _{D(ON)}	V _{DS} = - 5V, V _{GS} = - 4.5V	- 6			A
Forward Transconductance	g _{FS}	V _{DS} = - 5V, I _D = - 3.4A		4		S
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _D = - 1.0A		-0.85	- 1.2	V

Dynamic

Input Capacitance	C _{ISS}	V _{DS} = - 6V V _{GS} =0V f=1.0MHz		700		pF
Output Capacitance	C _{OSS}			180		
Reverse Transfer Capacitance	C _{RSS}			130		
Turn-On Delay Time	t _{D(ON)}	V _{DD} = - 6V, I _D = - 1A, V _{GEN} = - 4.5V, R _G = 6Ω, R _L = 6Ω		16	30	ns
Rise Time	t _r			37	60	
Turn-Off Delay Time	t _{D(OFF)}			58	90	
Fall Time	t _f			40	60	
Total Gate Charge	Q _g	V _D = - 6V, I _D = - 3.4A, V _{GS} = - 4.5V		7.5	11	nC
Gate-Source Charge	Q _{gs}			1.1		
Gate-Drain Charge	Q _{gd}			2.0		

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.

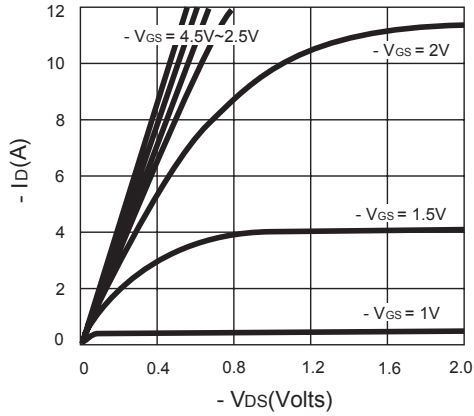


Figure 1. On-Regions Characteristics

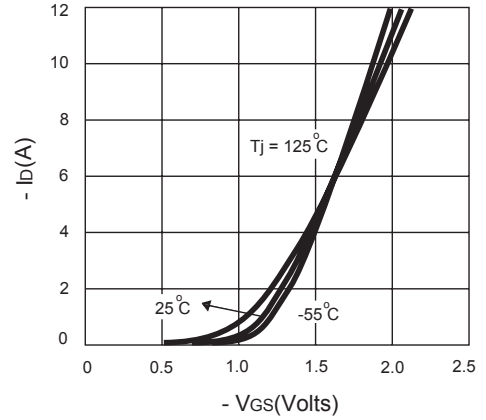


Figure 2. Transfer Characteristics

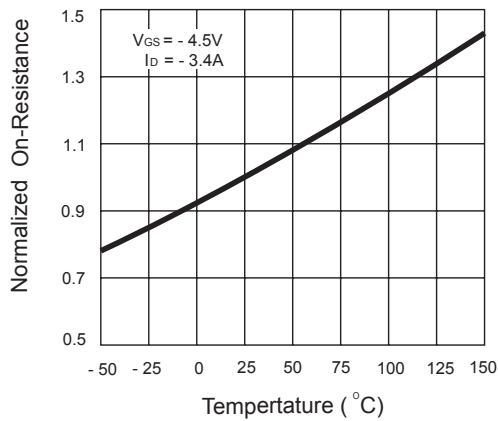


Figure 3. On-Resistance vs. Junction Temperature

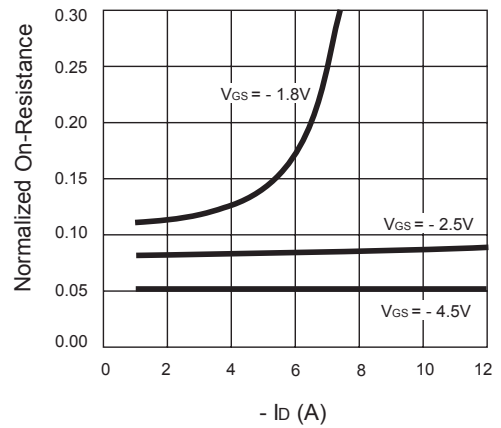


Figure 4. On Resistance Variation with Drain Current

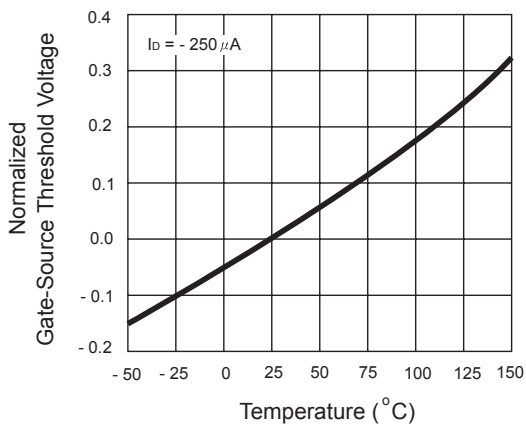


Figure 5. Gate Threshold vs. Junction Temperature

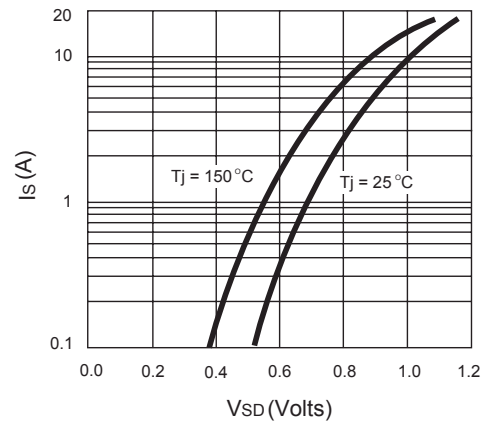


Figure 6. Body Diode Characteristics

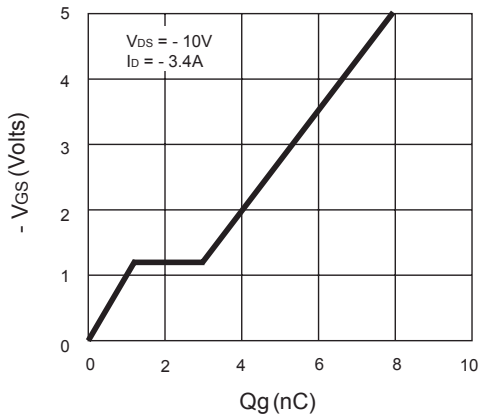


Figure 7. Gate-Charge Characteristics

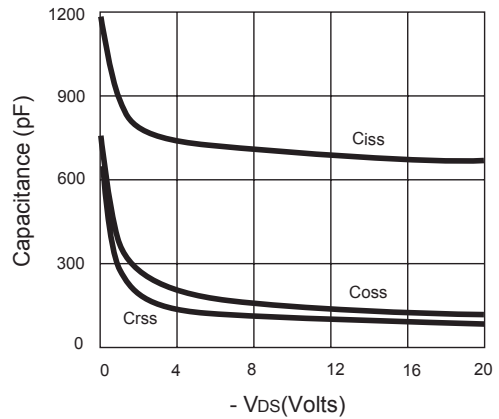


Figure 8. Capacitance Characteristics

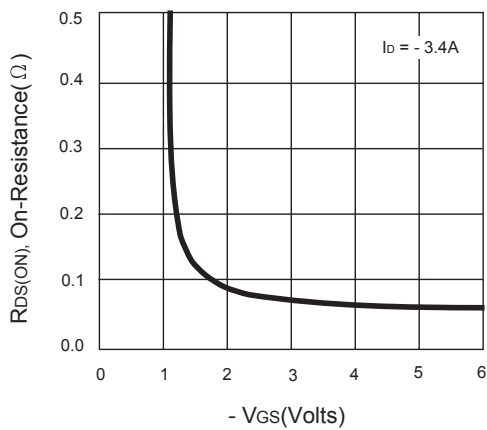


Figure 9. On-Resistance Variation with Gate-to-Source Voltage

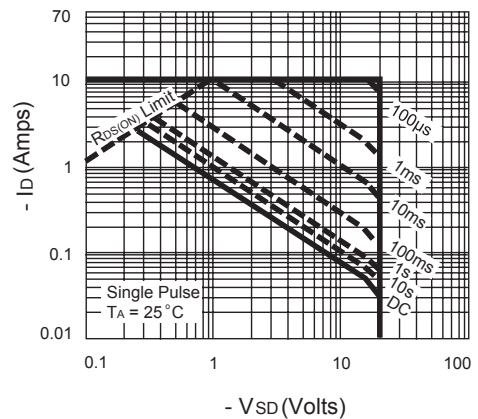


Figure 10. Maximum Forward Biased Safe Operating Area

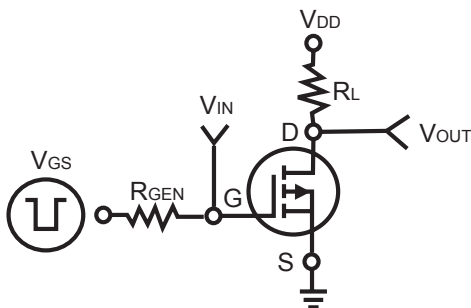


Figure 11. Switching Test Circuit

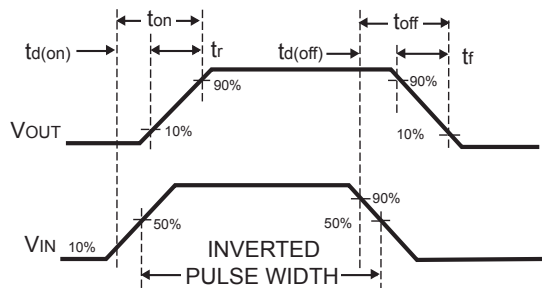


Figure 12. Switching Waveforms

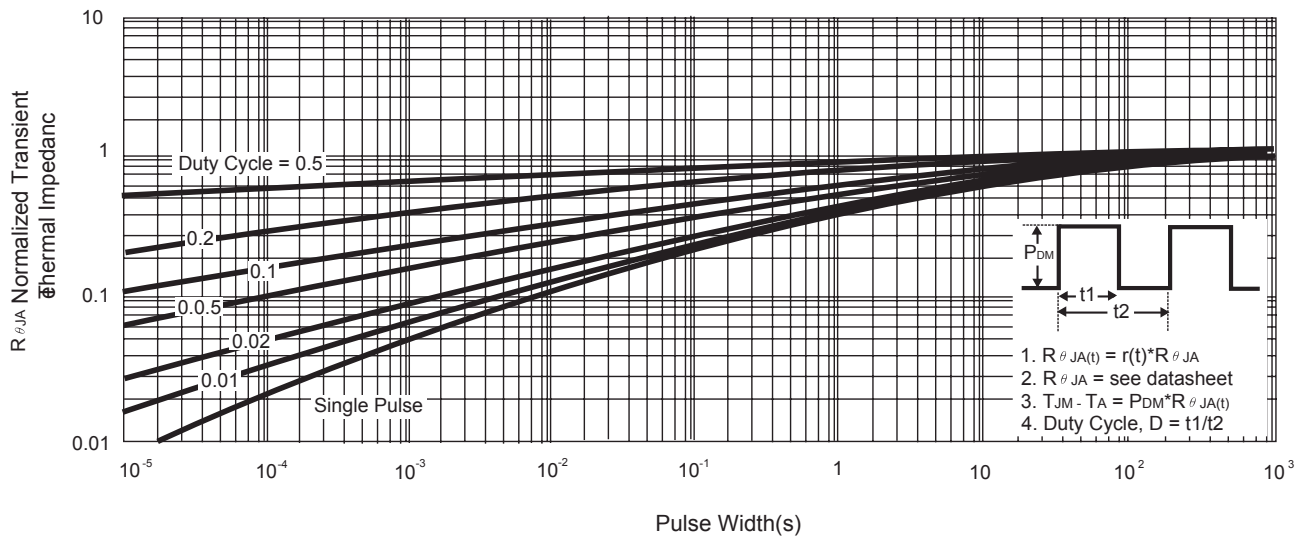
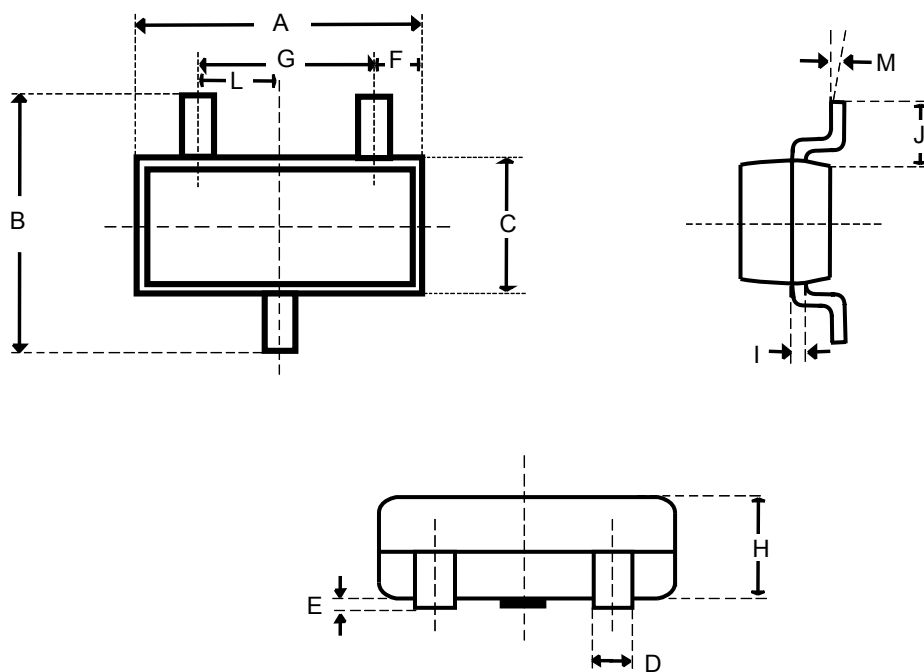


Figure 13. Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions

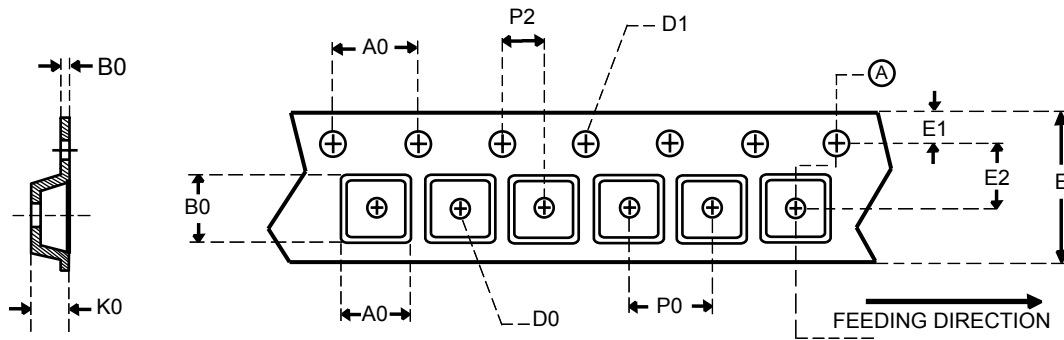
SOT-23



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°

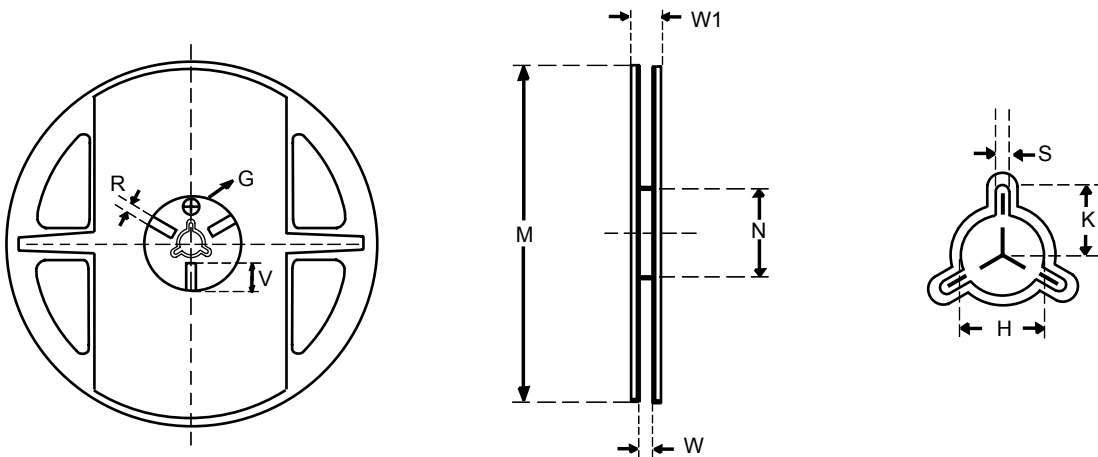
Carrier Tape & Reel Dimensions

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