

# A3401

P-Channel Enhancement Mode MOSFET



### Features

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

### Product Summary

V <sub>DS</sub> (V)	I <sub>D</sub> (A)	R <sub>DS(ON)</sub> (mΩ) Max
- 30V	- 3A	80 @V <sub>GS</sub> = - 10 V
		105 @V <sub>GS</sub> = - 4.5V

### Applications

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



### Absolute Maximum Ratings (T<sub>A</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	- 30	V
Gate-Source Voltage	V <sub>GS</sub>	± 20	V
Drain Current-Continuous @ T <sub>J</sub> = 25°C	I <sub>D</sub>	- 3	A
-Pulsed <sup>b</sup>	I <sub>DM</sub>	- 10	A
Drain-Source Diode Forward Current <sup>a</sup>	I <sub>S</sub>	- 1.25	A
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	1.25	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

### Thermal Characteristics

Thermal Resistance, Junction-to-Ambient <sup>a</sup>	R <sub>θJA</sub>	100	°C/W
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## Electrical Characteristics (TA = 25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ <sup>c</sup>	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> = - 250 μA	- 30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = - 24V, V <sub>GS</sub> =0V			- 1	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ± 20V, V <sub>DS</sub> =0V			± 100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> = - 250 μA	- 1	- 1.7	- 2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = - 10V, I <sub>D</sub> = - 3A		70	80	mΩ
		V <sub>GS</sub> = - 4.5V, I <sub>D</sub> = - 2A		90	105	
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> = - 5V, V <sub>GS</sub> = - 10V	5			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = - 5V, I <sub>D</sub> = - 3A		5		S
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> = - 1.0A		- 0.8	- 1.2	V

## Dynamic

Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = - 15V V <sub>GS</sub> =0V f=1.0MHz		550		pF
Output Capacitance	C <sub>OSS</sub>			110		
Reverse Transfer Capacitance	C <sub>RSS</sub>			90		
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> = - 15V, I <sub>D</sub> = - 1A, V <sub>GEN</sub> = - 10V, R <sub>GEN</sub> = 6Ω, R <sub>L</sub> = 15Ω		200		ns
Rise Time	t <sub>r</sub>			100		
Turn-Off Delay Time	t <sub>D(OFF)</sub>			900		
Fall Time	t <sub>f</sub>			500		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-3A, V <sub>GS</sub> =-10V		13		nC
		V <sub>DS</sub> =-15V, I <sub>D</sub> =-3A, V <sub>GS</sub> =-4.5V		8		
Gate-Source Charge	Q <sub>gs</sub>	V <sub>D</sub> = - 15V, I <sub>D</sub> = - 3A, V <sub>GS</sub> = - 10V		3		
Gate-Drain Charge	Q <sub>gd</sub>			4		

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.

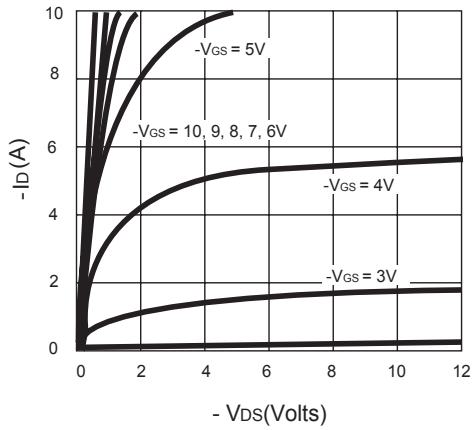


Figure 1. Output Characteristics

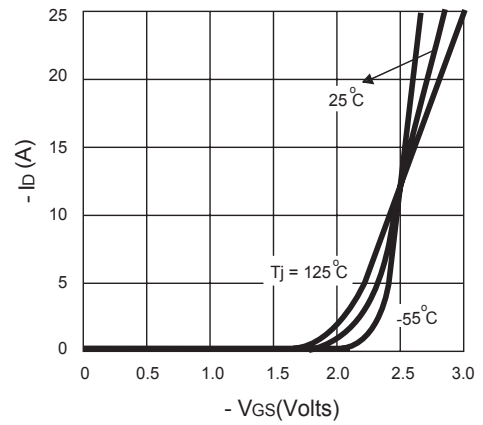


Figure 2. Transfer Characteristics

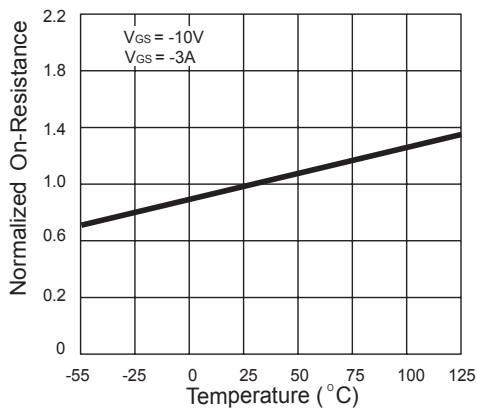


Figure 3. On-Resistance vs. Junction Temperature

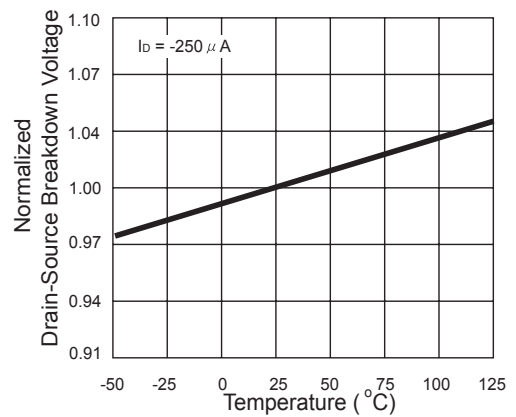


Figure 4. Drain-Source Breakdown Voltage vs. Temperature

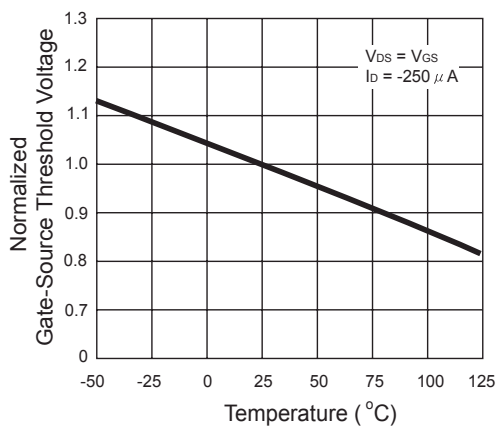


Figure 5. Gate Threshold vs. Junction Temperature

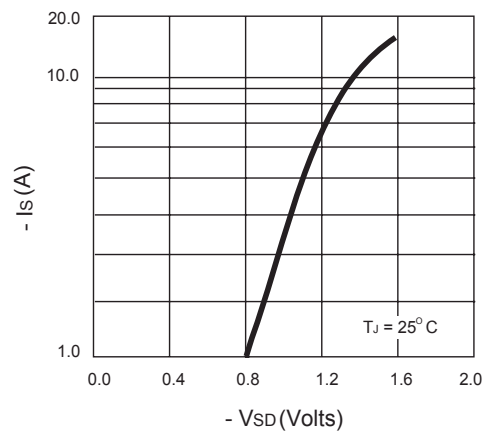


Figure 6. Body Diode Characteristics

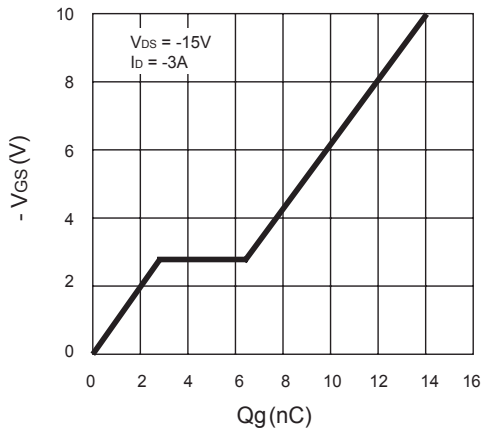


Figure 7. Gate-Charge Characteristics

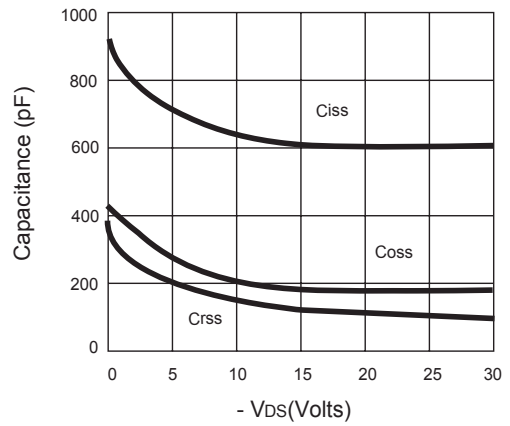


Figure 8. Capacitance Characteristics

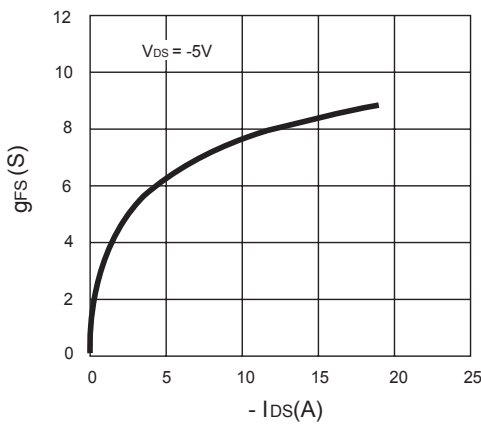


Figure 9. Transconductance vs. Drain Current

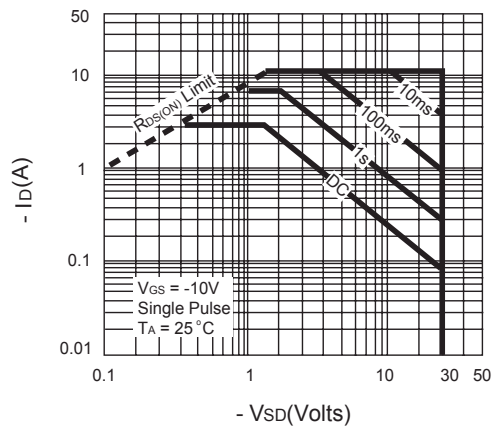


Figure 10. Maximum Forward Biased Safe Operating Area

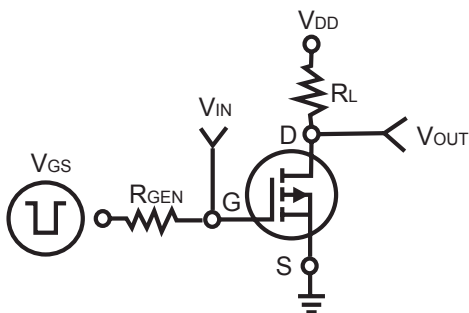


Figure 11. Switching Test Circuit

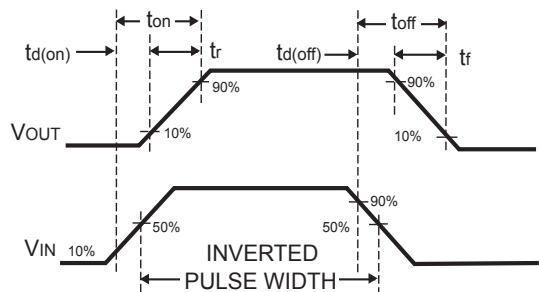


Figure 12. Switching Waveforms

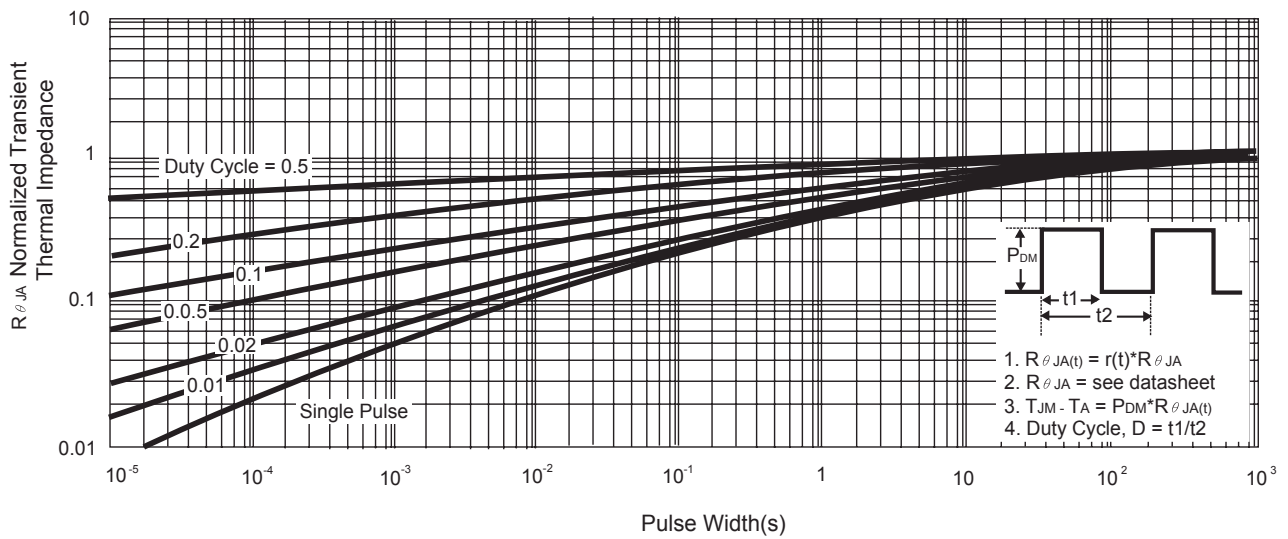


Figure 13. Normalized Maximum Transient Thermal Impedance