WPM3401

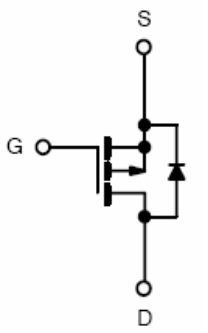
P-Channel Enhancement Mode MOSFET

www.willsemi.com

Description

The WPM3401 is the P-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology.

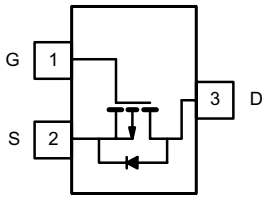
This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application, notebook computer power management and other battery powered circuits where high-side switching.



P−Channel MOSFET

Features

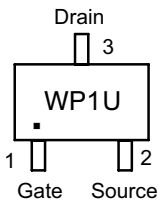
- -30V/-4.3A,RDS(ON)< 53mΩ@VGS= -10V
- -30V/-3.4A,RDS(ON)< 56mΩ@VGS=-4.5V
- Super high density cell design for extremely low RDS (ON)
- Exceptional on-resistance and maximum DC current capability
- SOT23-3 package design



Top View

Application

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch



U = Date Code

WP1 = Specific Device Code

Order information

Part Number	Package	Shipping
WPM3401-3/TR	SOT23-3	3000 Tape&Reel

Absolute Maximum Ratings (TA=25 ℃unless otherwise specified)

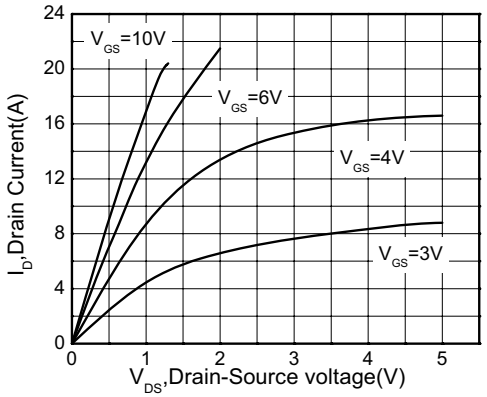
Parameter	Symbol			Value	Unit
V_{DS}	Drain-Source voltage			-30	V
V_{GS}	Gate-Source Voltage			±12	V
I_D	Continuous Drain Current	Steady-State	TA=25℃	-4.6	A
		Steady-State	TA=70℃	-3.6	
I_{DM}	Pulse Drain Current			-20	A
P_D	Power Dissipation	TA=25℃		1.3	W
		TA=70℃		0.8	
T_J	Operating Junction Temperature Range			-55~150	℃
Tstg	Storage Temperature Range				
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient			95	℃/W

Electrical Characteristics

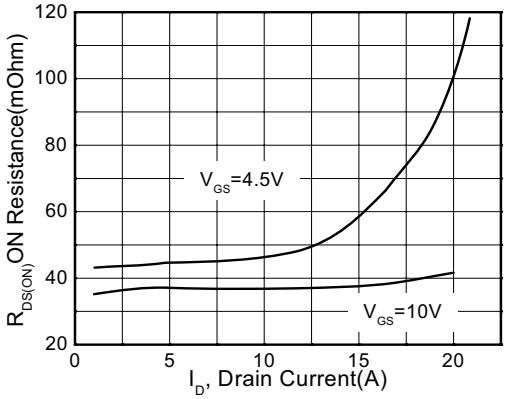
(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=-250uA	-30			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250uA	-0.5	-1.0	-1.5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±12V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V,V_{GS}=0V			-1	uA
		V_{DS}=-24V,V_{GS}=0V T_J=85℃			-5	
On State Drain Current (Pulse)	$I_{D(on)}$	V_{DS}= -5V,V_{GS} =-4.5V	-10			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=-10V,I_D=-4.3A		0.038	0.053	Ω
		V_{GS}=-4.5V,I_D=-3.5A		0.043	0.056	
Forward Transconductance	gfs	V_{DS}=-15V,I_D=-4.3A		13		S
Diode Forward Voltage	V_{SD}	I_S= -1.0A,V_{GS} =0V		-0.75	-1.5	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=-15V,V_{GS}=-10V I_D= -4.3A		27		nC
Gate-Source Charge	Q_{gs}			1.7		
Gate-Drain Charge	Q_{gd}			5		
Input Capacitance	C_{iss}	V_{DS}=-15V,V_{GS}=0V f=1MHz		1250		pF
Output Capacitance	C_{oss}			106		
Reverse Transfer Capacitance	C_{rss}			90		
Turn-On Time	$t_{d(on)}$	V_{DD}=-15V,R_L=15Ω I_D=-1.0A,V_{GEN}=-10V R_G=6Ω		10		nS
	t_r			18		
Turn-Off Time	$t_{d(off)}$			60		
	t_f			9		

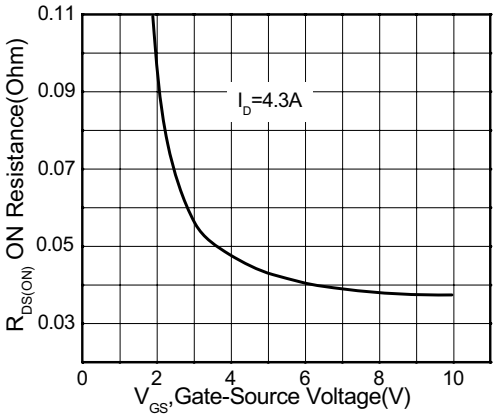
Typical Performance Characteristis



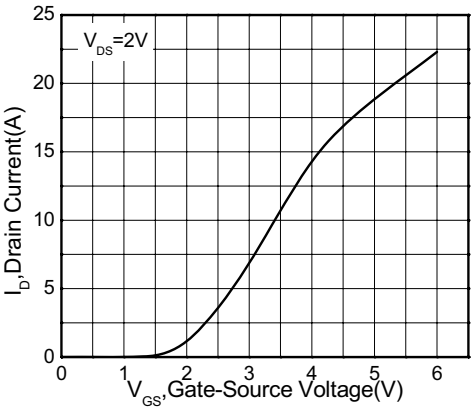
Drain Current VS Drain-Source voltage



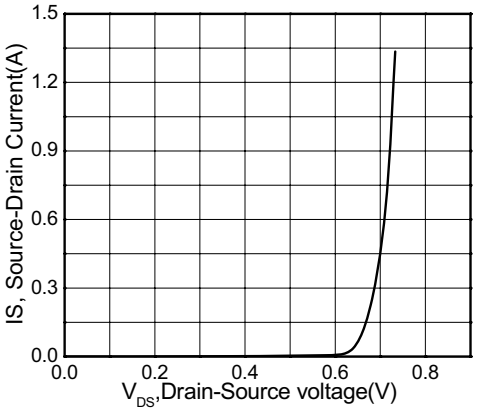
Drain Current vs ON Resistance



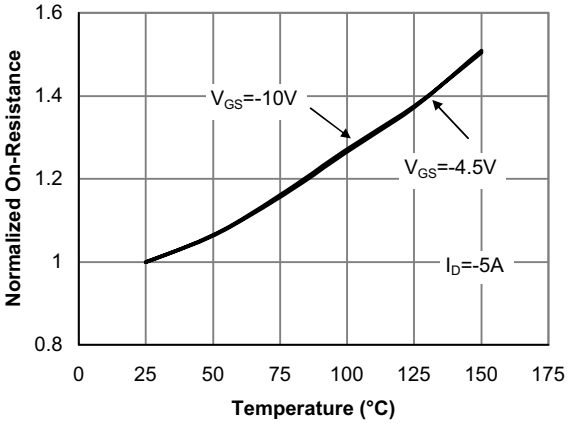
Gate-Source Voltage vs ON Resistance



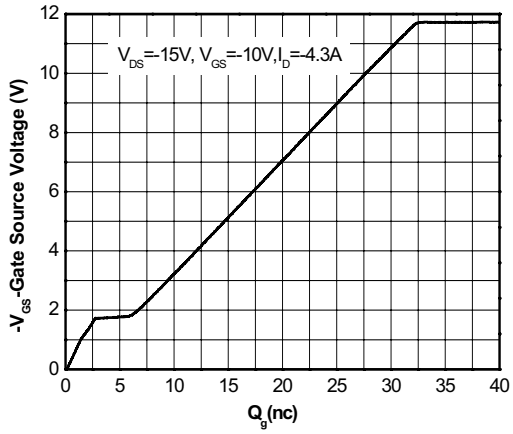
Drain Current VS Gate-Source Voltage



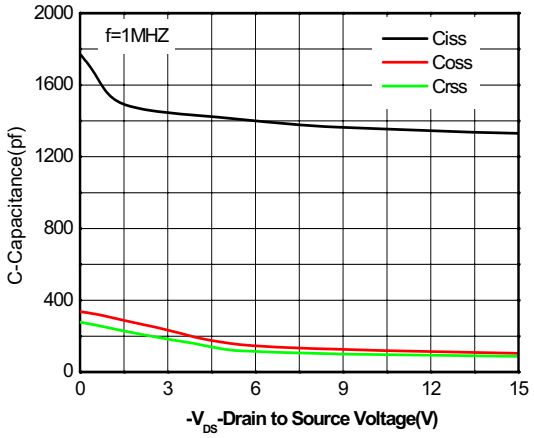
Drain Current VS Source-Drain Current



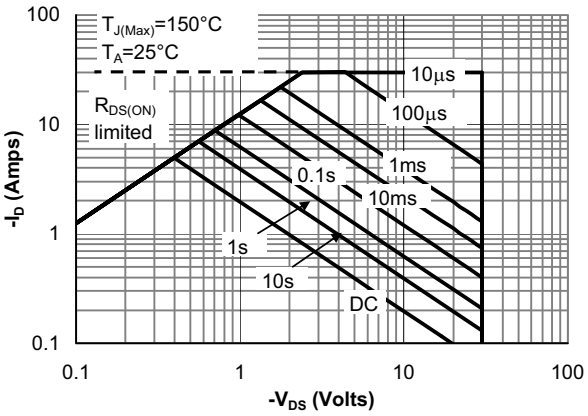
On-Resistance vs. Junction



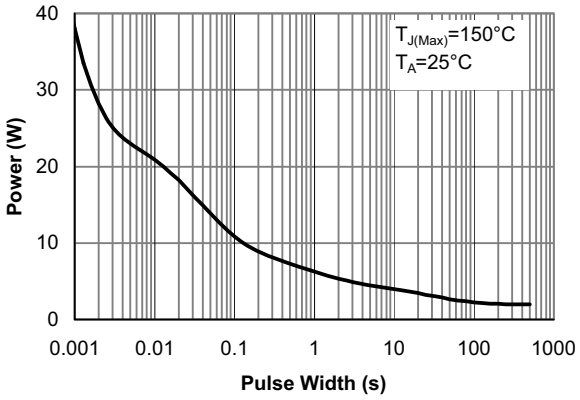
Gate-Charge Characteristics



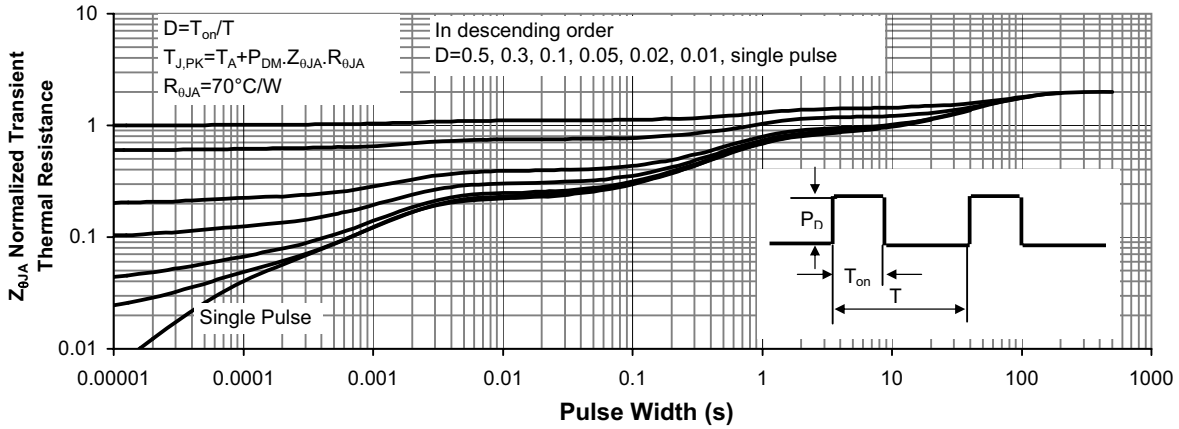
Capacitance Characteristics



Maximum Forward Biased Safe Operating Area (Note E)

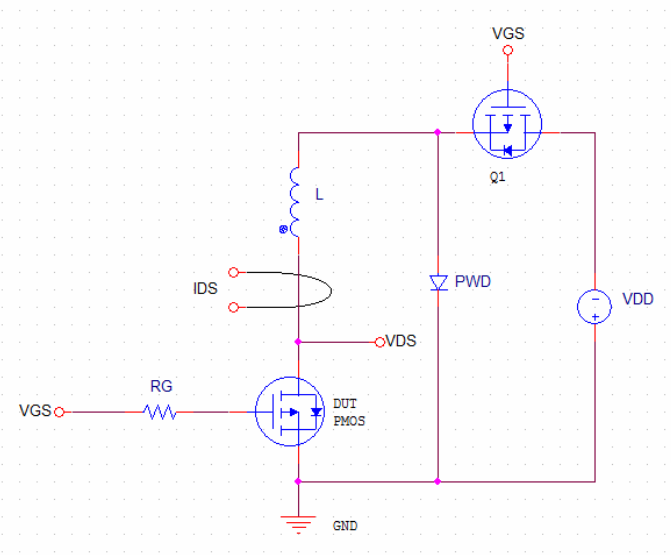


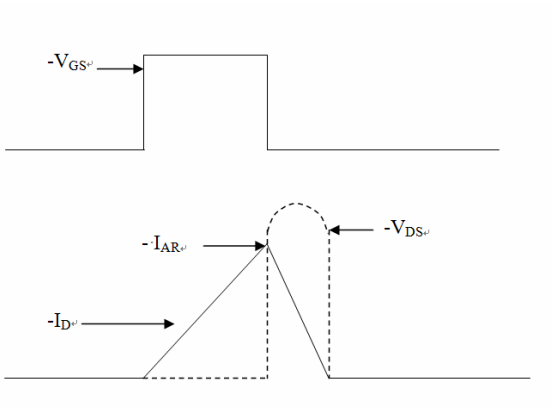
Single Pulse Power Rating Junction-to-Ambient (Note E)



Normalized Maximum Transient Thermal Impedance

Avalanche Energy(Single pulsed) Test Circuit & Waveforms

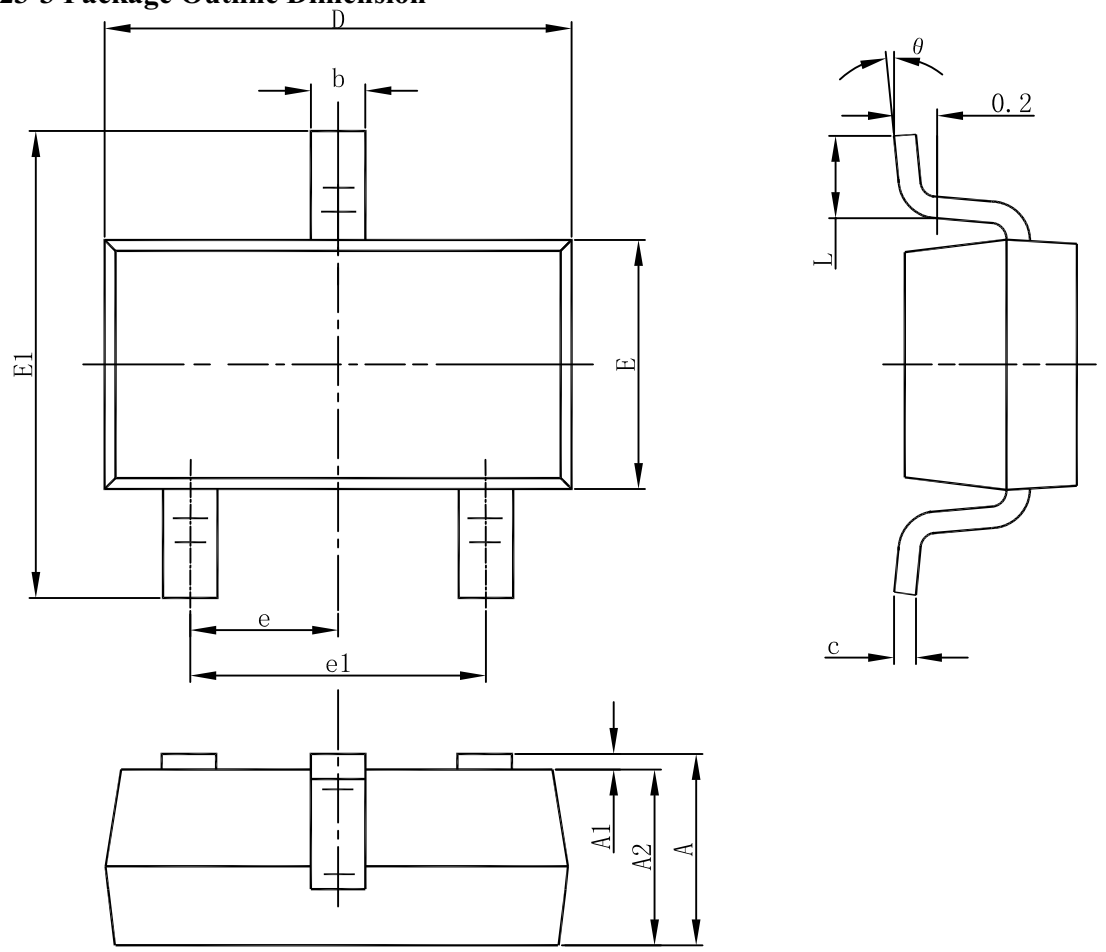




$E_{AS}=1/2\ L*I_{AR}^2$

Packaging Information

SOT23-3 Package Outline Dimension



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°