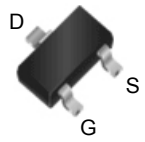
WPM2031

Single P-Channel, -20V, -0.65A, Power MOSFET **Http://www.sh-willsemi.com**

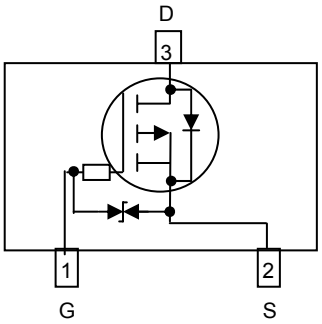
V_{DS} (V)	Rds(on) (Ω)
-20	0.495@ V_{GS}= – 4.5V
	0.665@ V_{GS}= – 2.5V
	0.882@ V_{GS}= – 1.8V
ESD Protected	



SOT-723

Descriptions

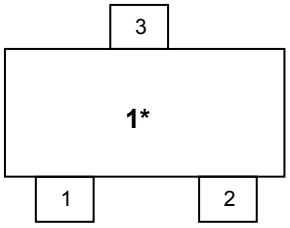
The WPM2031 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS\ (ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM2031 is Pb-free and Halogen-free.



Pin configuration (Top view)

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package SOT-723



1 =Device Code
* = Month(A~Z)

Marking

Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Order information

Device	Package	Shipping
WPM2031-3/TR	SOT-723	8000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	-20		V
Gate-Source Voltage		V_{GS}	±5		
Continuous Drain Current [a]	T_A=25°C	I_D	-0.65	-0.60	A
	T_A=70°C		-0.52	-0.48	
Maximum Power Dissipation [a]	T_A=25°C	P_D	0.42	0.36	W
	T_A=70°C		0.27	0.23	
Continuous Drain Current [b]	T_A=25°C	I_D	-0.55	-0.51	A
	T_A=70°C		-0.44	-0.41	
Maximum Power Dissipation [b]	T_A=25°C	P_D	0.30	0.26	W
	T_A=70°C		0.19	0.17	
Pulsed Drain Current [c]		I_{DM}	-1.0		A
Operating Junction Temperature		T_J	150		°C
Lead Temperature		T_L	260		°C
Storage Temperature Range		T_{stg}	-55 to 150		°C

Thermal resistance ratings

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	280	340	°C/W
	Steady State		345	410	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	400	470	
	Steady State		245	280	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	280	340	

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR-4 board using minimum pad size, 1oz copper

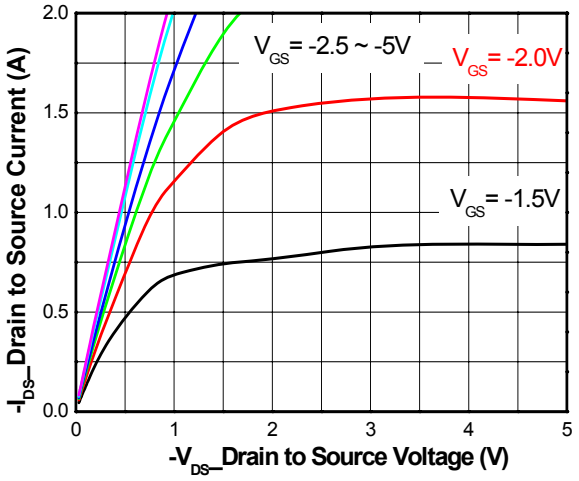
c Pulse width<380μs, Duty Cycle<2%

d Maximum junction temperature T_J=150°C.

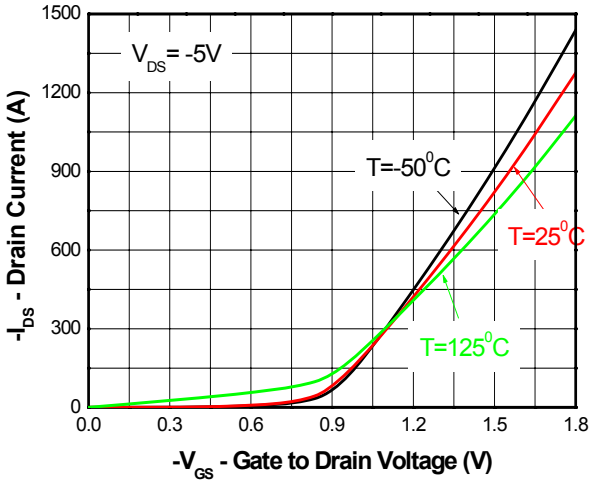
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = -250uA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =-16V, V_{GS} = 0V			-1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±5V			±5	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = -250uA	-0.44	-0.65	-0.81	V
Drain-to-source On-resistance [b, c]	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -0.45A		495	853	mΩ
		V_{GS} = -2.5V, I_D = -0.35A		665	1053	
		V_{GS} = -1.8V, I_D = -0.25A		882	1303	
Forward Transconductance	g_{FS}	V_{DS} = -5 V, I_D =-0.45A		1.25		S
CAPACITANCES, CHARGES						
Input Capacitance	C_{ISS}	V_{GS} = 0 V,		74.5		pF
Output Capacitance	C_{OSS}	f = 100 KHz,		10.8		
Reverse Transfer Capacitance	C_{RSS}	V_{DS} = -10 V		10.2		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = -4.5 V, V_{DS} = -10 V, I_D = -0.45A		1.67		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.17		
Gate-to-Source Charge	Q_{GS}			0.30		
Gate-to-Drain Charge	Q_{GD}			0.59		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = -4.5 V, V_{DS} = -10 V, I_D=-0.45A R_G=6 Ω		0.50		us
Rise Time	tr			1.76		
Turn-Off Delay Time	td(OFF)			7.0		
Fall Time	tf			8.5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = -0.15A		-0.75	-1.5	V

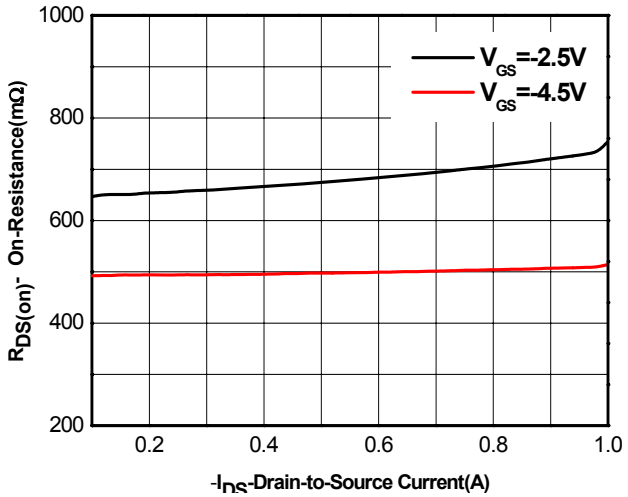
Typical Characteristics (Ta=25°C, unless otherwise noted)



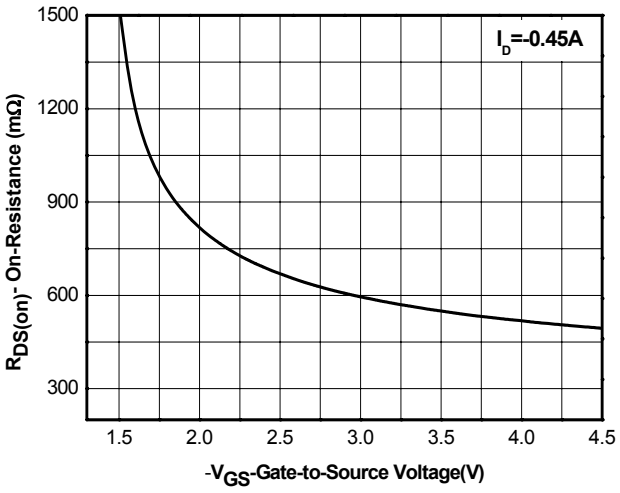
Output characteristics



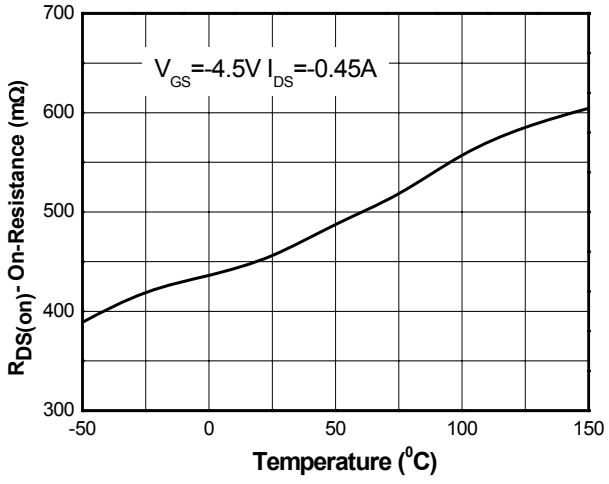
Transfer characteristics



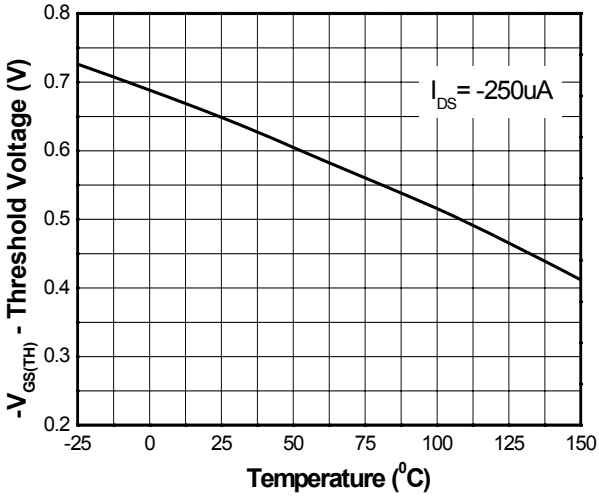
On-Resistance vs. Drain current



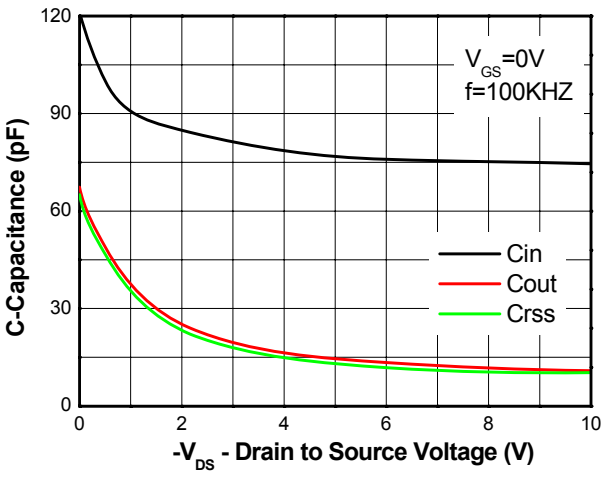
On-Resistance vs. Gate-to-Source voltage



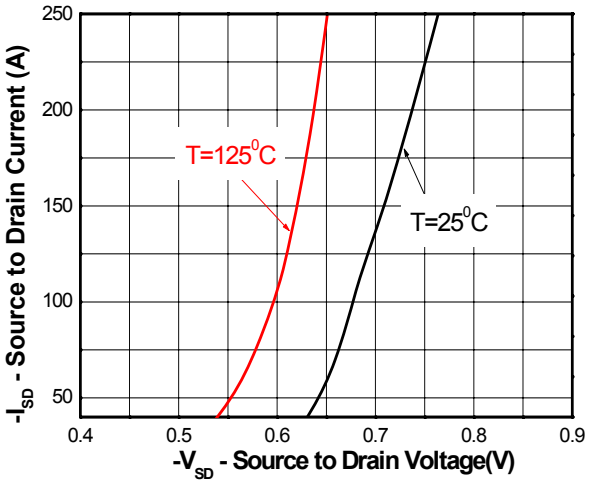
On-Resistance vs. Junction temperature



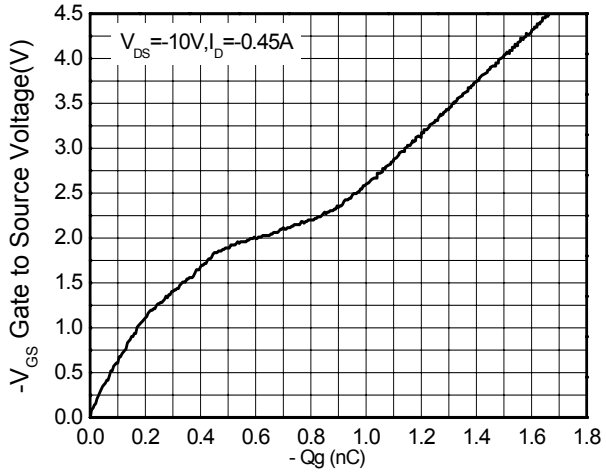
Threshold voltage vs. Temperature



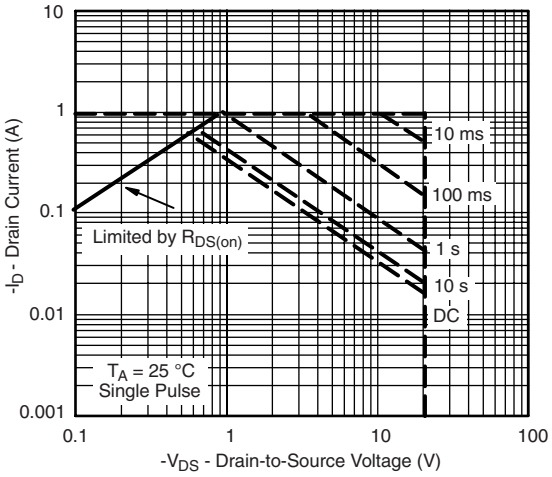
Capacitance



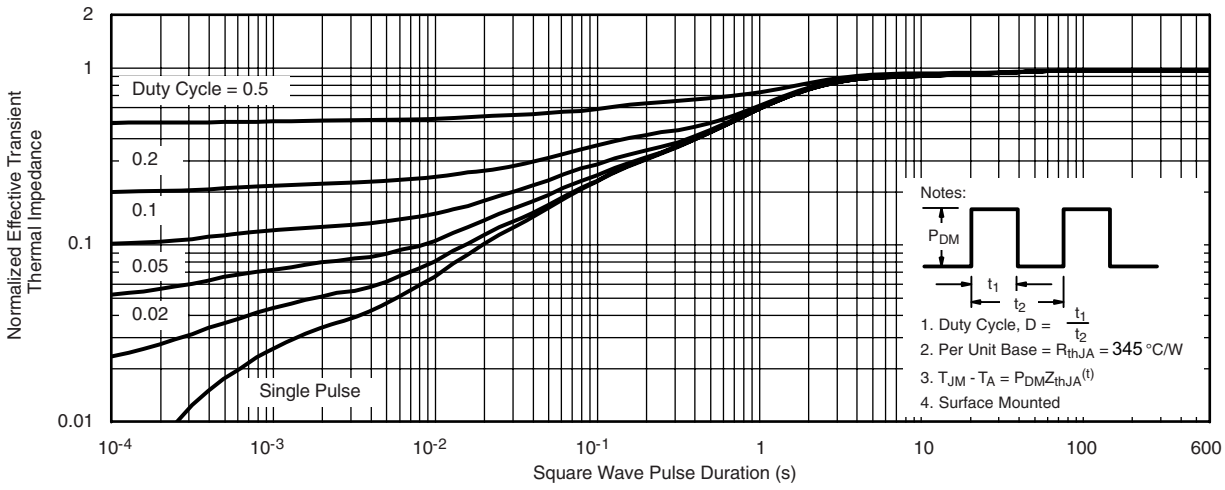
Body diode forward voltage



Gate Charge Characteristics



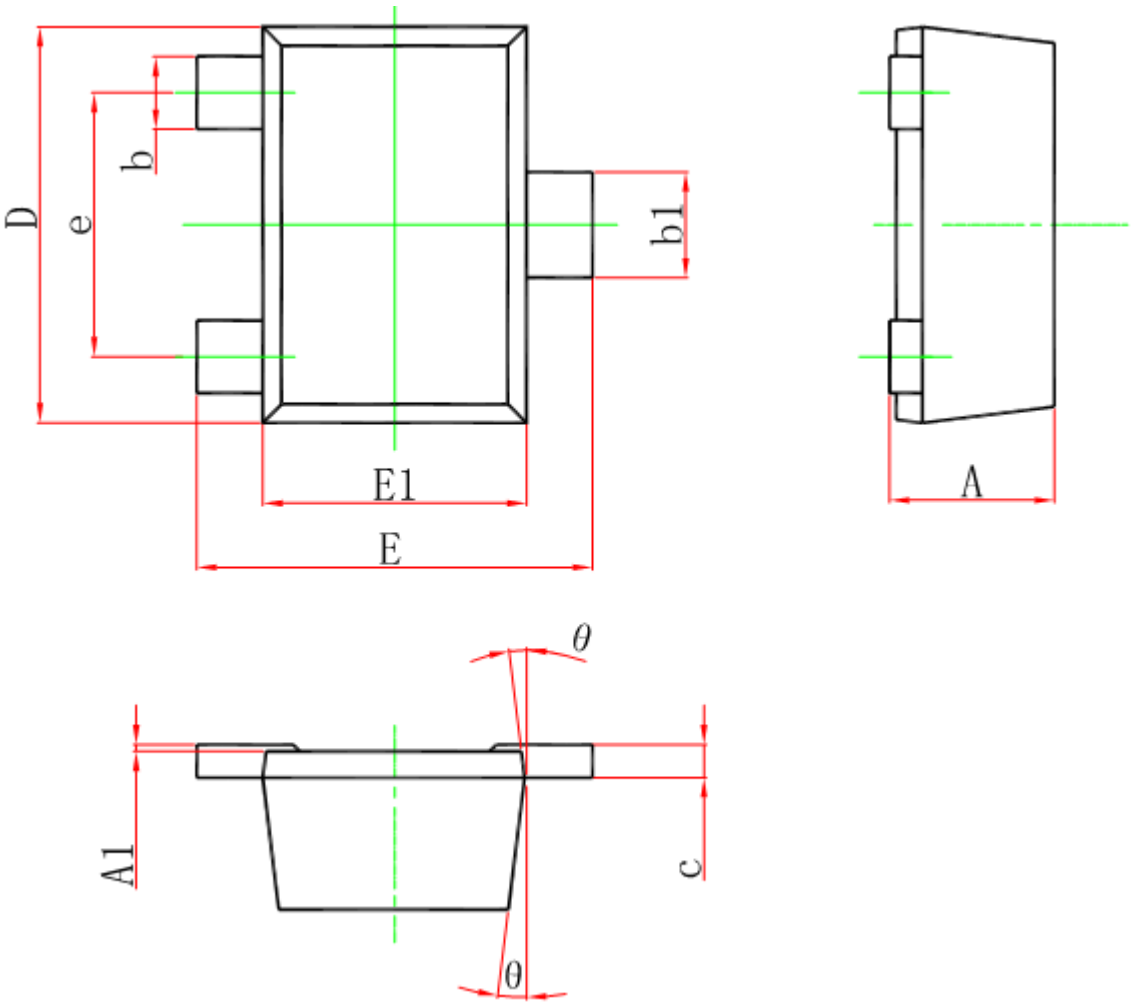
Safe operating power



Transient thermal response (Junction-to-Ambient)

Package outline dimensions

SOT-723



Symbol	Dimensions in millimeter	
	Min.	Max.
A		0.500
A1	0.000	0.050
b	0.170	0.270
b1	0.270	0.370
c		0.150
D	1.150	1.250
E	1.150	1.250
E1	0.750	0.850
e	0.800TYP	
θ	7° REF	