Elektronische Bauelemente

SMS7401

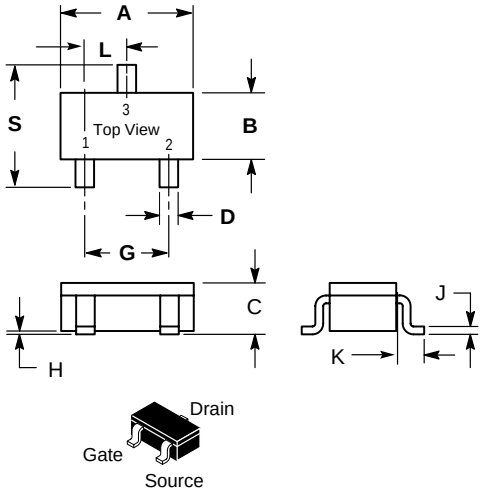
-2.8A, -30V,$R_{DS(ON)}$ 115mΩ

P-Channel Enhancement Mode Power Mos.FET

RoHS Compliant Product

Description

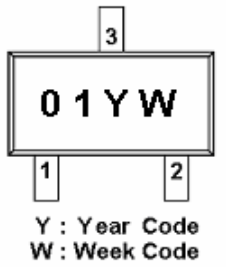
The SMS7401 is the P-channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching, and low in-line power loss are needed in a very small outline surface mount package.



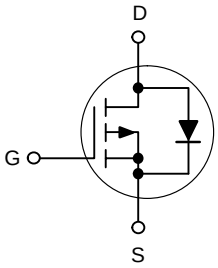
SOT-23		
Dim	Min	Max
A	2.800	3.040
B	1.200	1.400
C	0.890	1.110
D	0.370	0.500
G	1.780	2.040
H	0.013	0.100
J	0.085	0.177
K	0.450	0.600
L	0.890	1.020
S	2.100	2.500
V	0.450	0.600
All Dimension in mm		

Features

* -30V/-2.8A,$R_{DS(ON)}$=115mΩ @V_{GS}=-10V
* -30V/-2.5A,$R_{DS(ON)}$=125mΩ @V_{GS}=-4.5V
* -30V/-1.5A,$R_{DS(ON)}$=170mΩ @V_{GS}=-2.5V
* -30V/-1.0A,$R_{DS(ON)}$=240mΩ @V_{GS}=-1.8V
* Super High Density Cell Design For Extremely Low $R_{DS(ON)}$
* Exceptional On-Resistance And Max. DC Current Capability



*week code: A~Z(1~26),a~z(27~52)



Applications

* DC/DC Converter
* Power Management in Notebook
* DSC
* LCD Display Inverter
* Portable Equipment
* Battery Powered System
* Load Switch

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current@T_J=150°C	I_D@T_A= 25°C	-2.8	A
	I_D@T_A= 70°C	-2.1	
Drain-Source Diode Forward Current	I_S	-1.4	A
Pulsed Drain Current	I_{DM}	- 8	A
Total Power Dissipation	P_D@T_A=25°C	0.33	W
	P_D@T_A=70°C	0.21	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150	°C

Thermal Data

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-ambient	Rthj-a	105	°C/W

Electrical Characteristics(Tj=25°C Unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	BV_{DSS}	-30	–	–	V	V_{GS}=0V, I_D=-250uA
Forward On Voltage	V_{SD}	–	-0.8	-1.2	V	I_D=-1.2A,V_{GS}=0V.
Gate Threshold Voltage	$V_{GS(th)}$	-0.4	–	-1	V	V_{DS}=V_{GS}, I_D=-250uA
Gate-Source Leakage Current	I_{GSS}	–	–	±100	nA	V_{GS}=±12V,V_{DS}=0V
Drain-Source Leakage Current	I_{DSS}	–	–	-1	uA	V_{DS}=-24V,V_{GS}=0V
		–	–	-5	uA	V_{DS}=-24V,V_{GS}=0V,Tj=85℃
Static Drain-Source On-Resistance	$R_{DS(ON)}$	–	0.105	0.115	Ω	V_{GS}=-10V, I_D=-2.8A
		–	0.125	0.135		V_{GS}=-4.5V, I_D=-2.5A
		–	0.155	0.17		V_{GS}=-2.5V, I_D=-1.5A
		–	0.21	0.24		V_{GS}=-1.8V, I_D=-1A
On-State Drain Current	$I_{D(ON)}$	-4	–	–	A	V_{DS}=-5V,V_{GS}=-4.5V
Turn-on Delay Time	$Td_{(ON)}$	–	6	–	nS	V_{DD}=-15V I_D=-1A V_{GEN}=-10V R_G=3Ω R_L=15Ω
Rise Time	Tr	–	3.9	–		
Turn-off Delay Time	$Td_{(Off)}$	–	40	–		
Fall Time	Tf	–	15	–		
Total Gate Charge	Qg	–	5.8	–	nC	V_{GS}=-4.5V V_{DS}=-15V I_D=-2A
Gate-Source Chagre	Qgs	–	0.8	–		
Gate-Drain Chagre	Qgd	–	1.5	–		
Input Capacitance	Ciss	–	380	–	pF	V_{GS}=0V V_{DS}=-15V f=1.0MHz
Output Capacitance	Coss	–	55	–		
Reverse Transfer Capacitance	Crss	–	40	–		
Forward Transconductance	Gfs	–	4	–	S	V_{DS}=-10V, I_D=-2.8A

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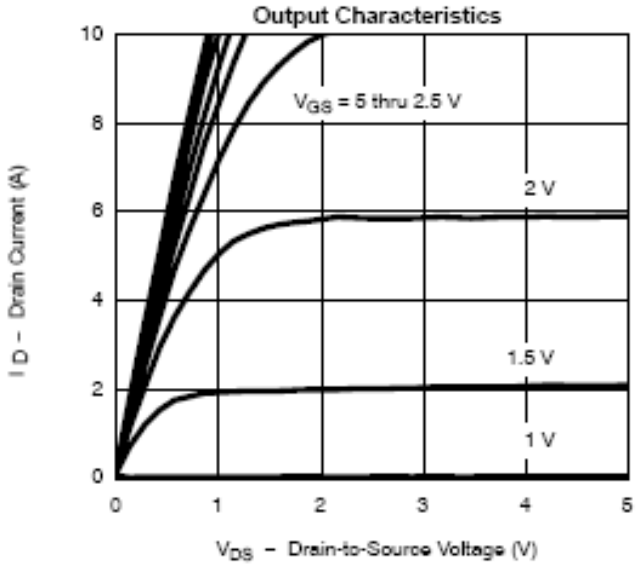
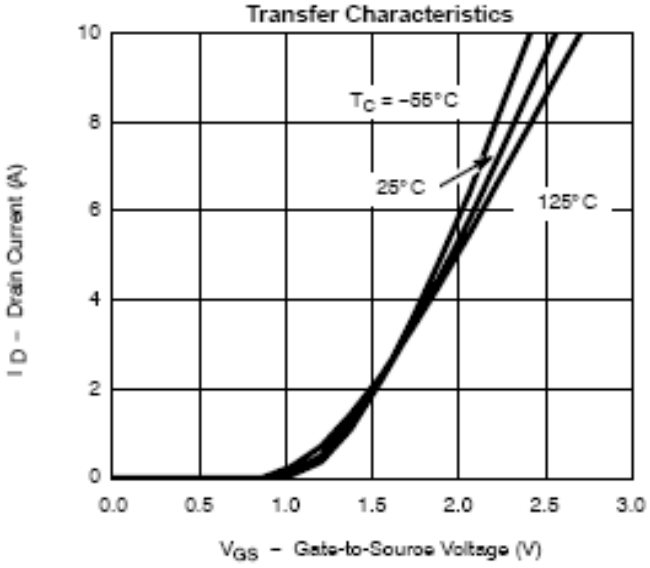
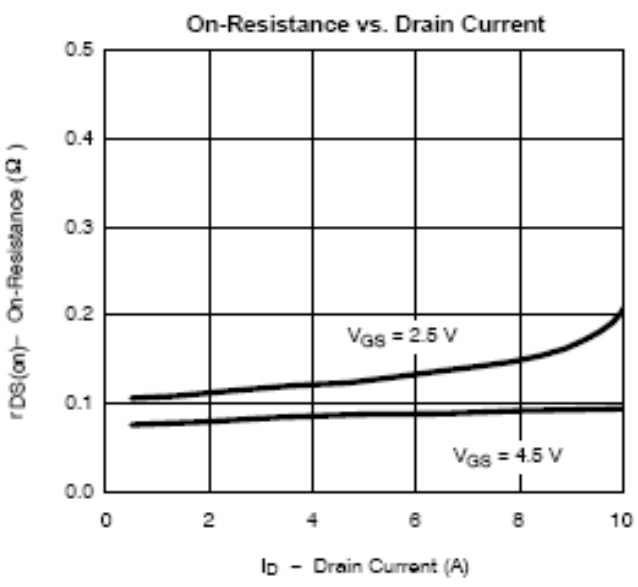
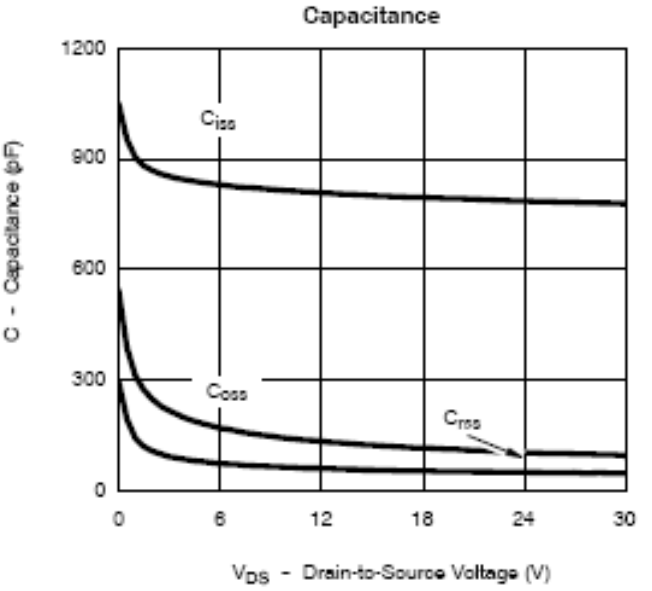
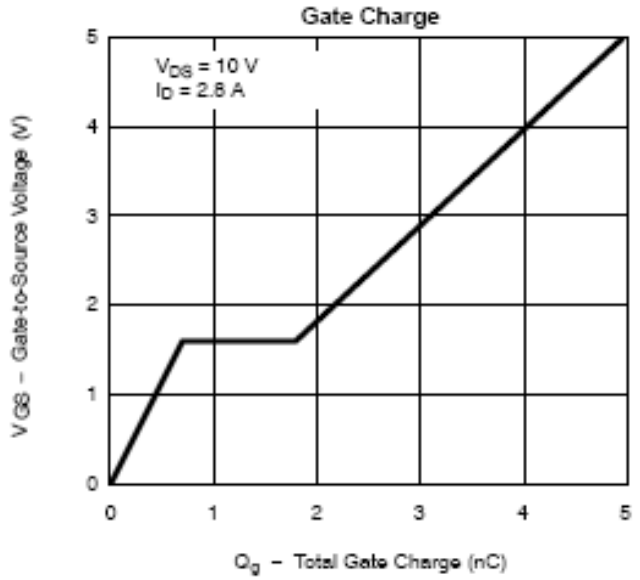
Characteristics Curve

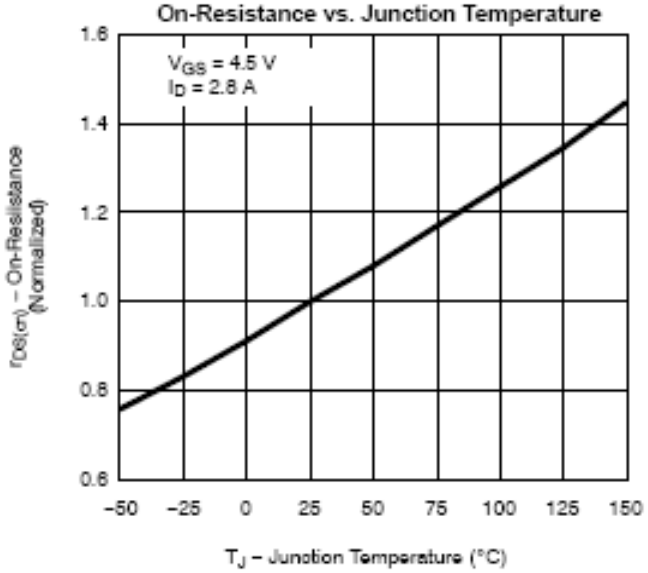


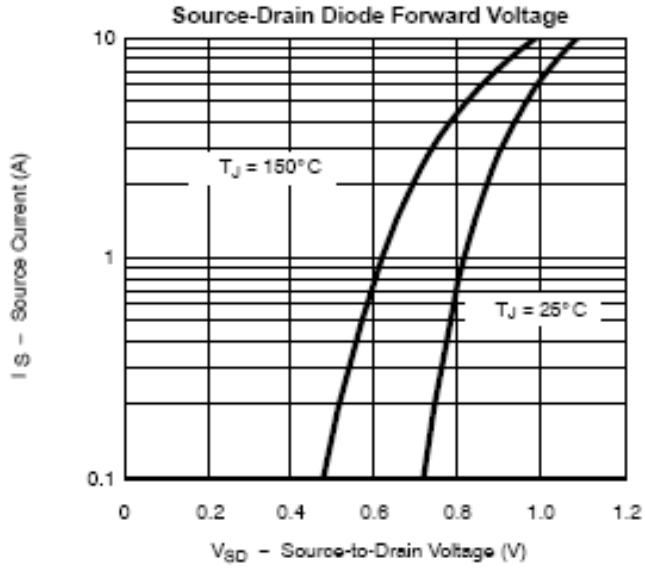


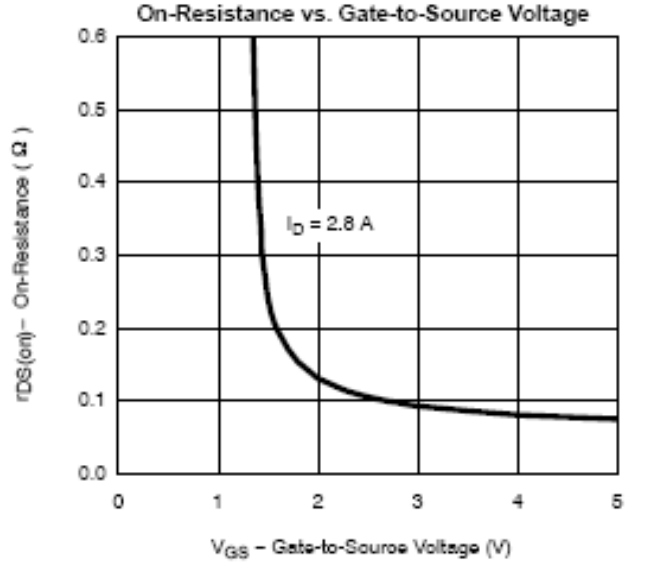


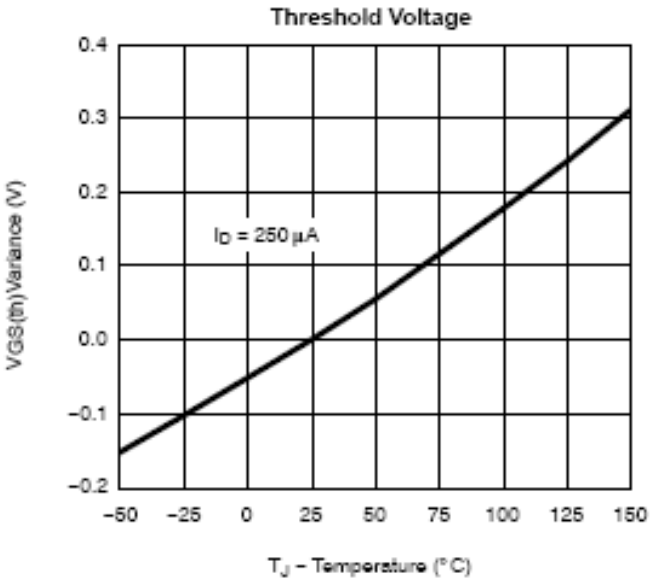


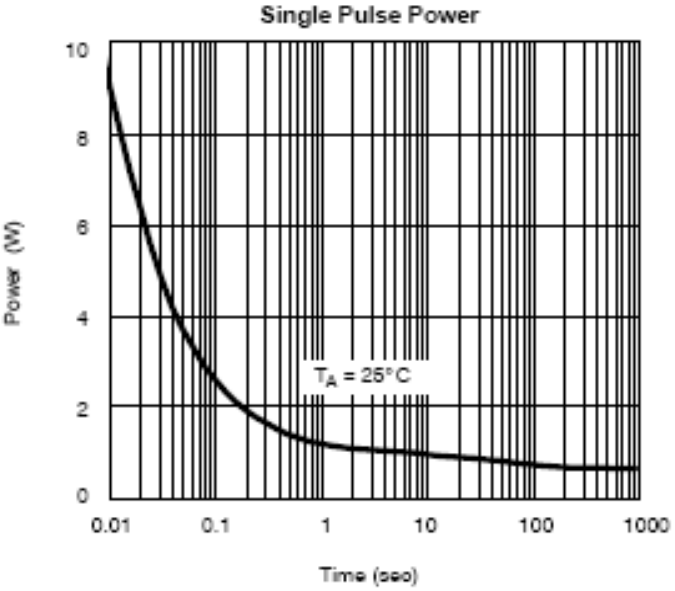

Gate Charge
V_{DS} = 10 V
I_D = 2.8 A
V_{GS} – Gate-to-Source Voltage (V)
Q_g – Total Gate Charge (nC)

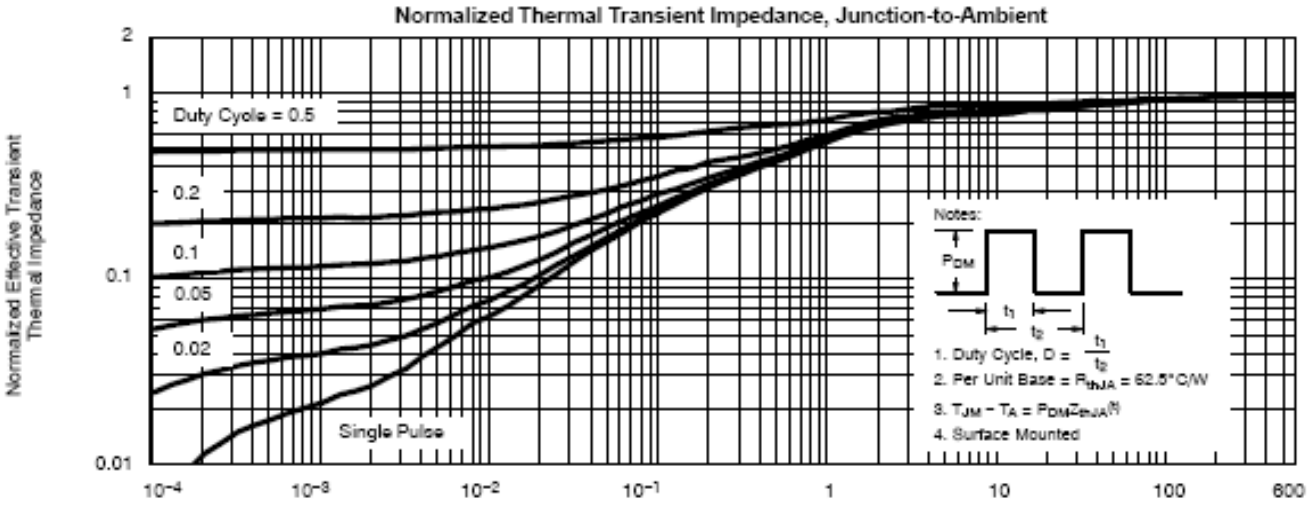

On-Resistance vs. Junction Temperature
V_{GS} = 4.5 V
I_D = 2.8 A
$r_{DS(on)}$ – On-Resistance (Normalized)
T_J – Junction Temperature (°C)


Source-Drain Diode Forward Voltage
T_J = 150°C
T_J = 25°C
I_S – Source Current (A)
V_{SD} – Source-to-Drain Voltage (V)


On-Resistance vs. Gate-to-Source Voltage
I_D = 2.8 A
$r_{DS(on)}$ – On-Resistance (Ω)
V_{GS} – Gate-to-Source Voltage (V)


Threshold Voltage
VGS(th)Variance (V)
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
I_D = 250 µA
−50 −25 0 25 50 75 100 125 150
T_J – Temperature (°C)


Single Pulse Power
Power (W)
10
8
6
4
2
0
T_A = 25°C
0.01 0.1 1 10 100 1000
Time (sec)


Normalized Thermal Transient Impedance, Junction-to-Ambient
Normalized Effective Transient Thermal Impedance
2
1
0.1
0.01
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
Single Pulse
Notes:
P_{DM}
t_1
t_2
1. Duty Cycle, D = t_1/t_2
2. Per Unit Base = R_{thJA} = 62.5°C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}(t)$
4. Surface Mounted
10^{-4} 10^{-3} 10^{-2} 10^{-1} 1 10 100 600