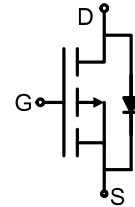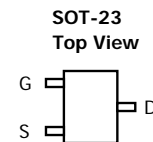# SM3401

P-Channel Enhancement Mode Power MOSFET

◆ **Features**

● High power and current handing capability

● Lead free product is acquired

● Surface mount package

Schematic diagram

SOT-23
Top View

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(on)}$ **(m-ohm) Max**
-30V	**-4.4A**	**52@ VGS = -10V**
		65**@ VGS = -4.5V**
		85 @ VGS =- 2.5V

◆ **Ordering Information**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
SM3401SR L	SM3401SR G	SOT-23	G	S	D	Tape Reel

SM3401 X X X

(1)Package Type

(2)Packing Type

(3)Lead Free

(1) S：SOT-23；

(2) R：Tape Reel

(3) G：Halogen Free；L：Lead Free

◆ **Absolute Maximum Ratings** (T_A=25°C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-4.4	A
Drain Current-Pulsed (Note 1)	I_{DM}	-30	A
Maximum Power Dissipation	P_D	1.3	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

a:Fused current that based on wire numbers and diameter

b:Repetitive Rating: Pulse width limited by the maximum junction temperature

c:1-in^2 2oz Cu PCB board

◆ **Electrical Characteristics** (T_A=25°C, unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250µA	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V,V_{GS}=0V	-	-	-1	µA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250µA	-0.6	-1	-1.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4.4A	-	42	52	mΩ
		V_{GS}=-4.5V, I_D=-4A	-	48	65	mΩ
		V_{GS}=-2.5V, I_D=-2A		68	85	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-1A	-	10	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{Iss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	950	-	PF
Output Capacitance	C_{oss}		-	115	-	PF
Reverse Transfer Capacitance	C_{rss}		-	75	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V,I_D=-4A V_{GS}=-10V,R_{GEN}=6Ω	-	7	-	nS
Turn-on Rise Time	t_r		-	3	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	12	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-4A,V_{GS}=-4.5V	-	9.5	-	nC
Gate-Source Charge	Q_{gs}		-	2	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-4.4A	-	-	-1.2	V

Note: Pulse Test: Pulse Width ≤300us, Duty Cycle≤2%

　　　d: Guaranteed by design: not subject to production testing

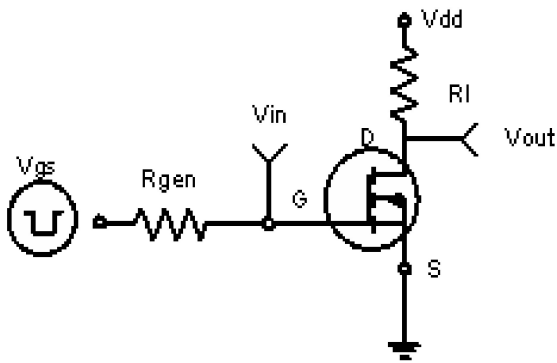## Typical Electrical and Thermal Characteristics
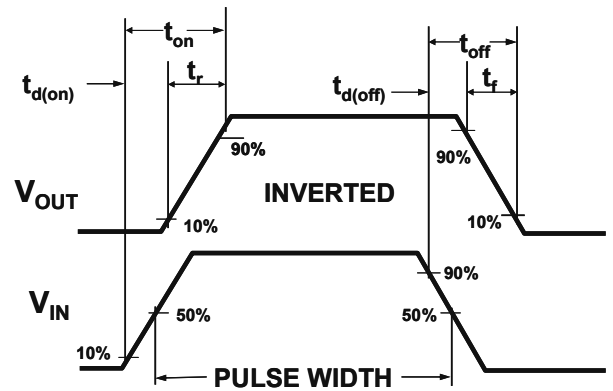
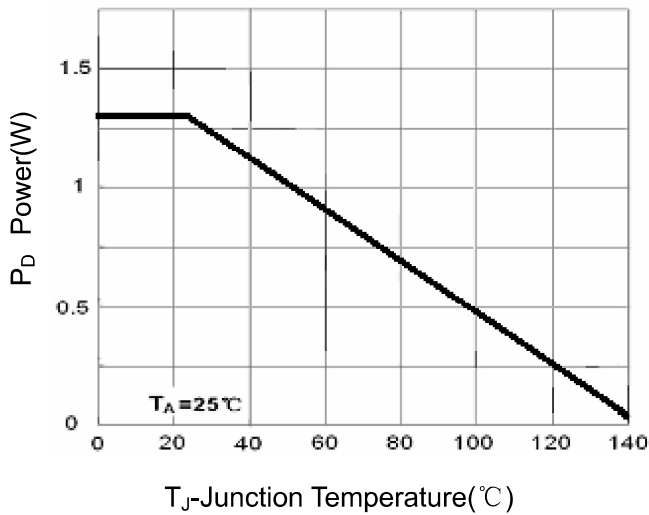**Figure 1:Switching Test Circuit**

Figure 2:Switching Waveforms
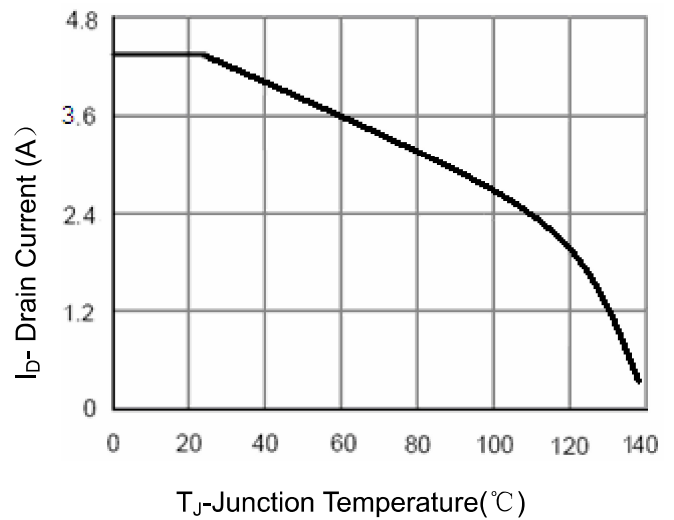
Figure 3 Power Dissipation
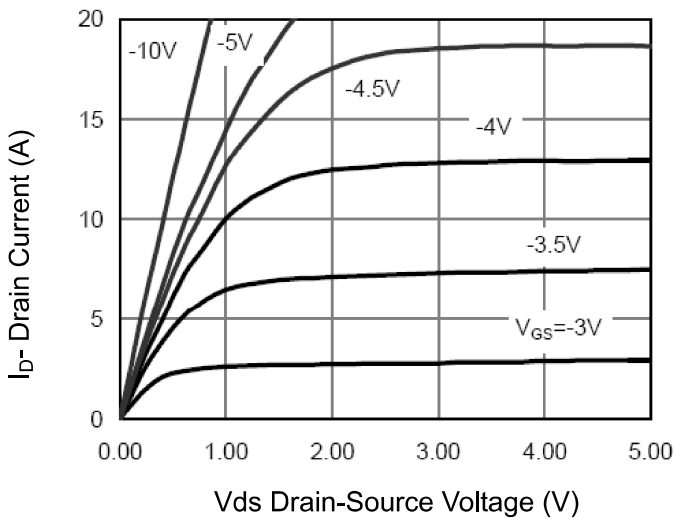
Figure 4 Drain Current
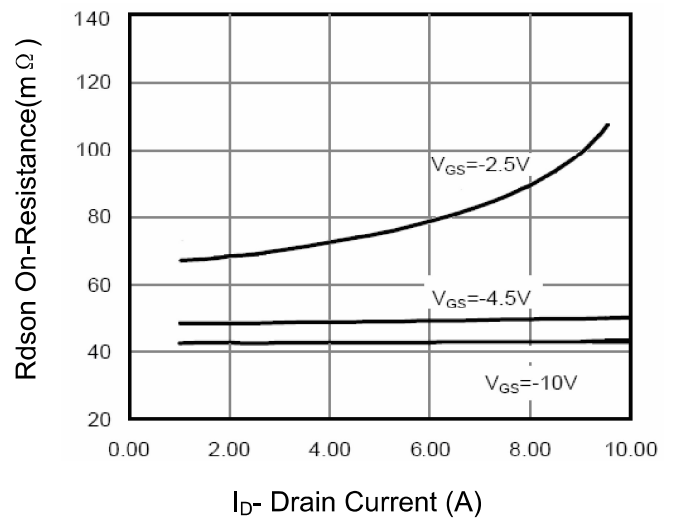
Figure 5 Output Characteristics

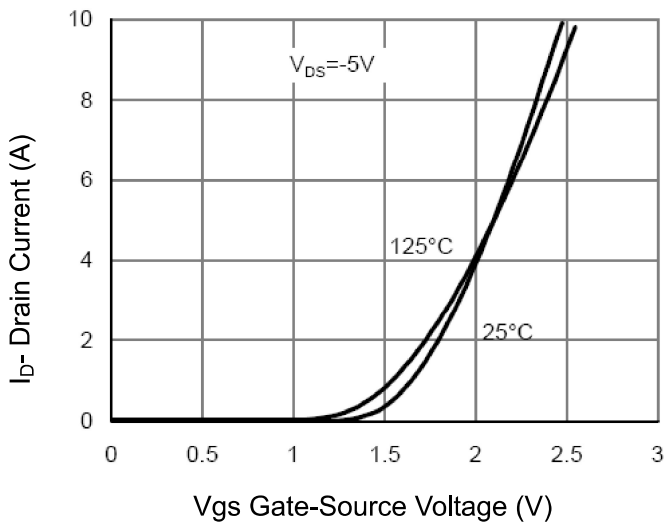**Figure 6 Drain-Source On-Resistance**

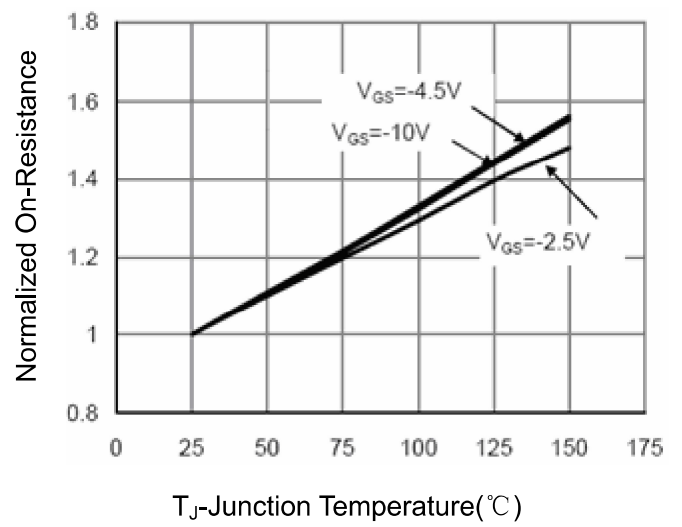**Figure 7 Transfer Characteristics**
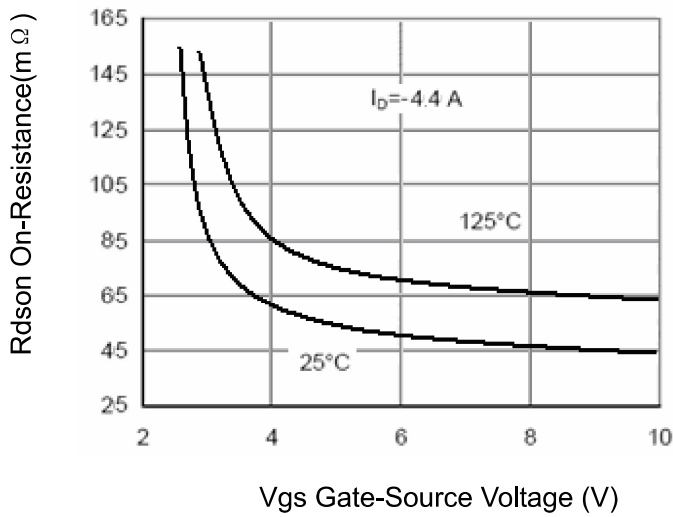
Figure 8 Drain-Source On-Resistance
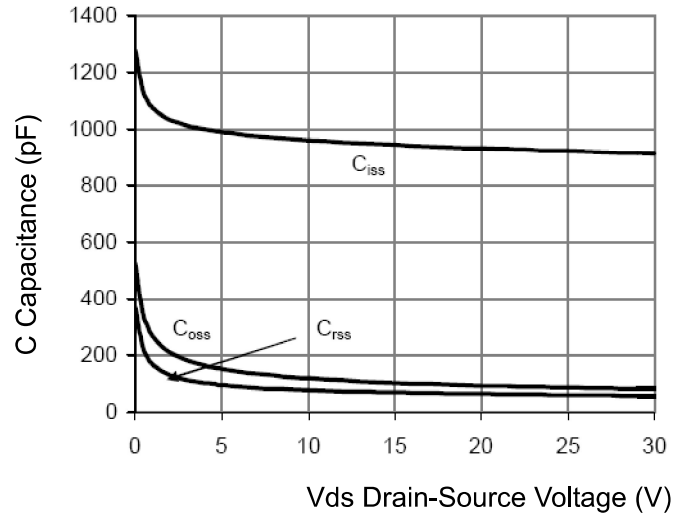
Figure 9 Rdson vs Vgs

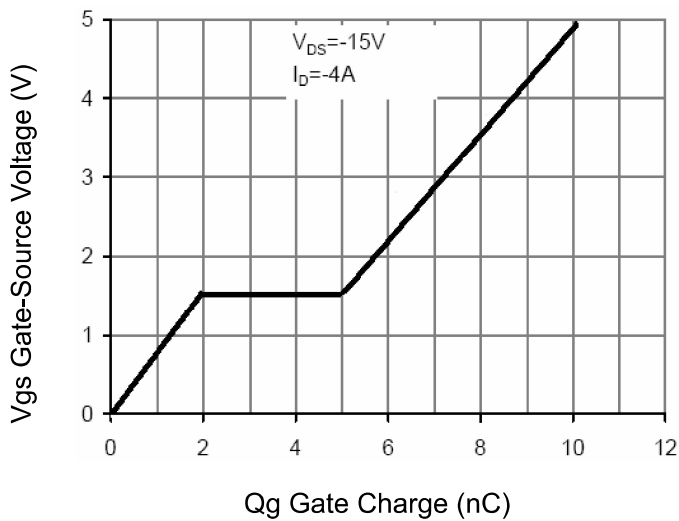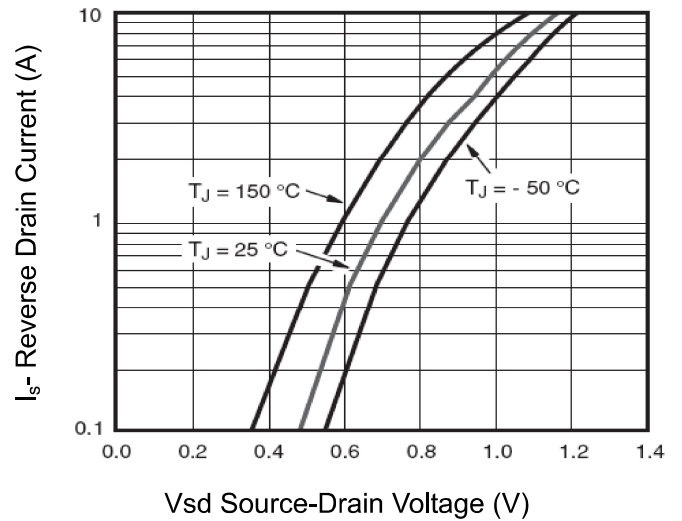**Figure 10 Capacitance vs Vds**

Figure 11 Gate Charge

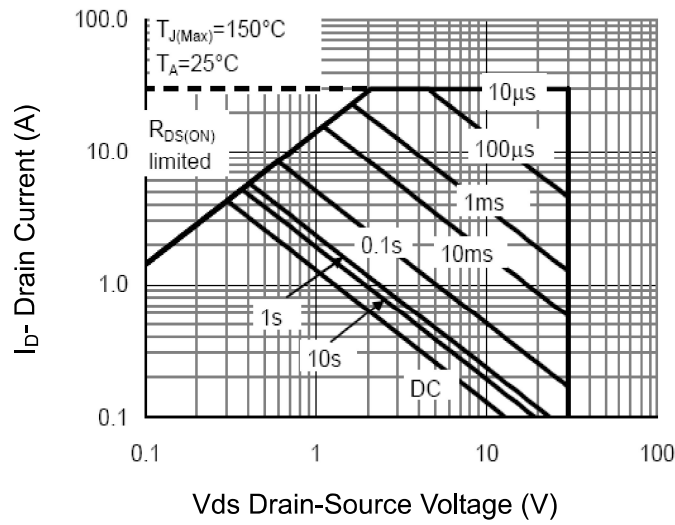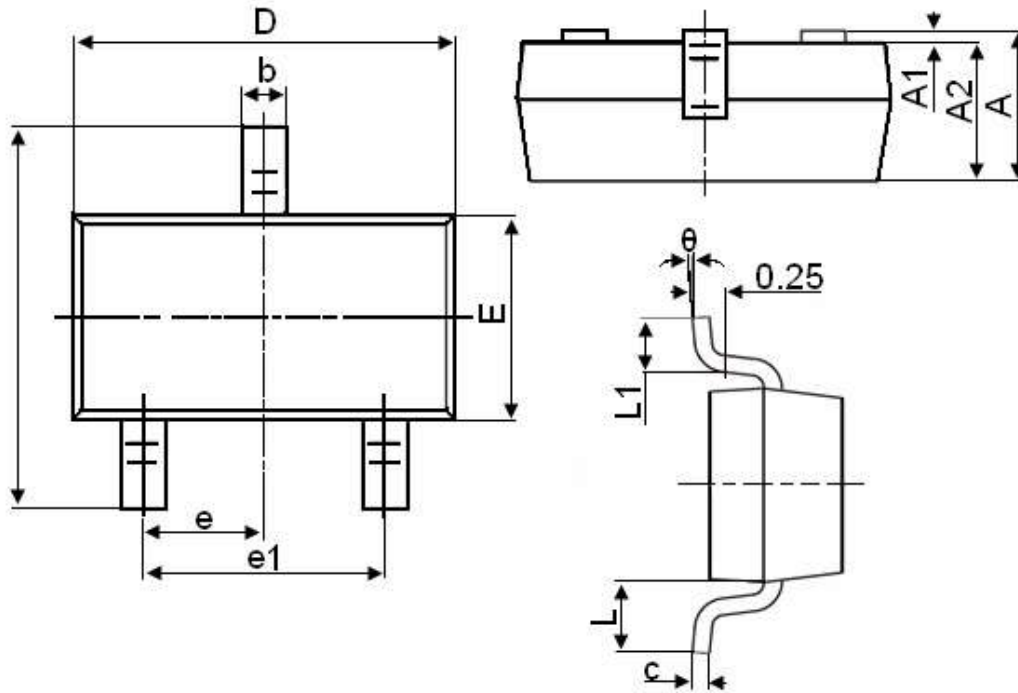**Figure 12 Source- Drain Diode Forward**

Figure 13 Safe Operation Area
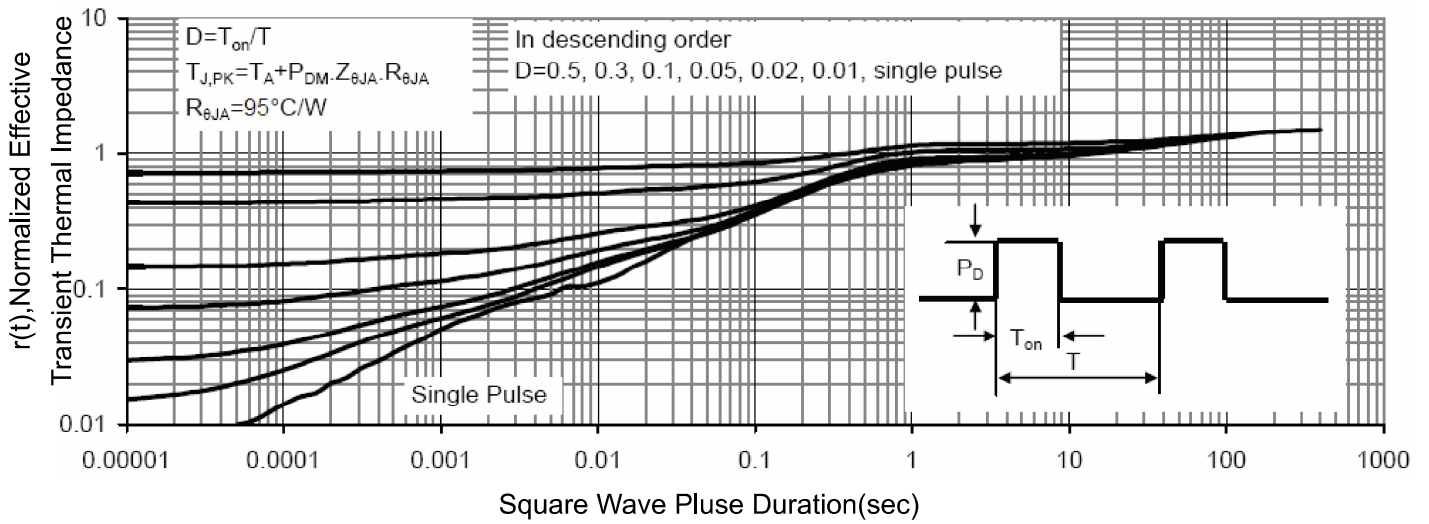
Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information

Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Notes

1. All dimensions are in millimeters.

2. Tolerance ±0.10mm (4 mil) unless otherwise specified

3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.

4. Dimension L is measured in gauge plane.

5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.