



TSM3401

-30V P-Channel Enhancement Mode MOSFET

SOT-23



Pin assignment:

1. Gate
2. Source
3. Drain

$V_{DS} = -30V$

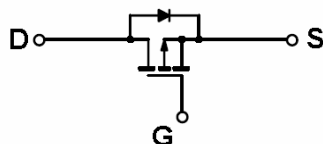
$R_{DS(on)}, V_{GS} @ -4.5V, I_{DS} @ -2A = 100m\Omega$

$R_{DS(on)}, V_{GS} @ -10V, I_{DS} @ -3A = 75m\Omega$

Features

- ✧ Rugged and reliable
- ✧ High density cell design for ultra low on-resistance
- ✧ Excellent thermal and electrical capabilities
- ✧ Compact and low profile SOT-23 package

Block Diagram



Ordering Information

Part No.	Packing	Package
TSM3401CX	Tape & Reel	SOT-23

Absolute Maximum Rating ($T_a = 25^\circ C$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	- 30V	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current		I_D	- 3	A
Pulsed Drain Current		I_{DM}	- 10	A
Maximum Power Dissipation	Ta = 25 °C	P_D	1.25	W
	Ta = 75 °C		0.8	
Operating Junction Temperature		T_J	+150	°C
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Lead Temperature (1/8" from case)	T_L	5	S
Junction to Ambient Thermal Resistance (PCB mounted)	$R_{\theta ja}$	100	$^\circ C/W$

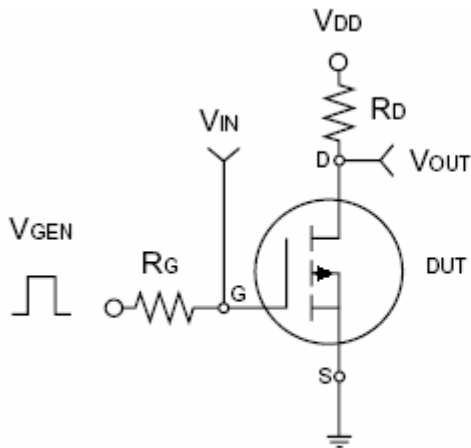
Note: Surface mounted on FR4 board $t \leq 5sec$.

Electrical Characteristics

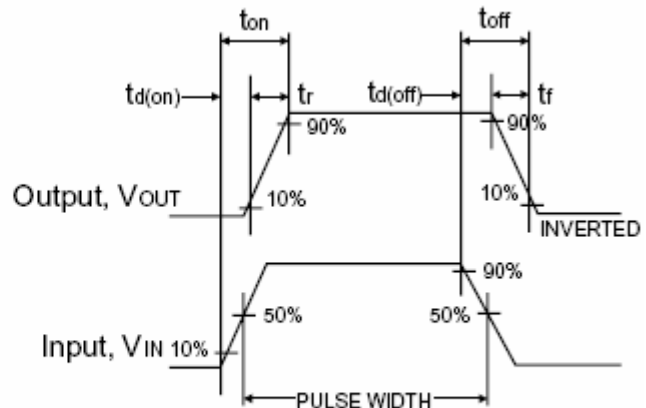
Ta = 25 °C, unless otherwise noted

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	BV_{DSS}	-30	--	--	V
Drain-Source On-State Resistance	$V_{GS} = -10V, I_D = -3A$	$R_{DS(ON)}$	--	--	75	mΩ
Drain-Source On-State Resistance	$V_{GS} = -4.5V, I_D = -2A$	$R_{DS(ON)}$	--	--	100	
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	-1	-1.5	-2.5	V
Zero Gate Voltage Drain Current	$V_{DS} = -24V, V_{GS} = 0V$	I_{DSS}	--	--	-1.0	μA
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	±100	nA
On-State Drain Current	$V_{DS} = -5V, V_{GS} = -10V$	$I_{D(ON)}$	6	--	--	A
Forward Transconductance	$V_{DS} = -5V, I_D = -3A$	g_{fs}	--	5	--	S
Dynamic						
Total Gate Charge	$V_{DS} = -15V, I_D = -3A, V_{GS} = -10V$	Q_g	--	13.5	--	nC
	$V_{DS} = -15V, I_D = -3A, V_{GS} = -4.5V$		--	7	--	
Gate-Source Charge	$V_{DS} = -15V, I_D = -3A, V_{GS} = -10V$	Q_{gs}	--	2.3	--	
Gate-Drain Charge		Q_{gd}	--	2.8	--	
Turn-On Delay Time	$V_{DD} = -15V, R_L = 15\Omega, I_D = -1A, V_{GEN} = -10V, R_G = 6\Omega$	$t_{d(on)}$	--	13	--	nS
Turn-On Rise Time		t_r	--	7	--	
Turn-Off Delay Time		$t_{d(off)}$	--	58	--	
Turn-Off Fall Time		t_f	--	26	--	
Input Capacitance	$V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz$	C_{iss}	--	653	--	pF
Output Capacitance		C_{oss}	--	130	--	
Reverse Transfer Capacitance		C_{rss}	--	97	--	
Source-Drain Diode						
Diode Forward Voltage	$I_S = -1.6A, V_{GS} = 0V$	V_{SD}	--	-0.8	-1.2	V

Note : pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$



Switching Test Circuit



Switchin Waveforms

Typical Characteristics Curve ($T_a = 25^\circ\text{C}$ unless otherwise noted)

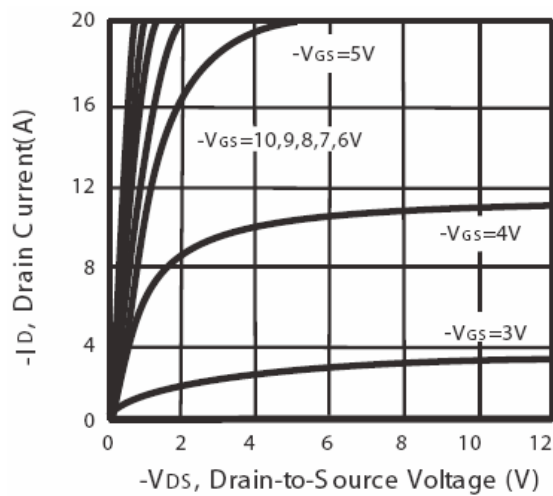


Figure 1. Output Characteristics

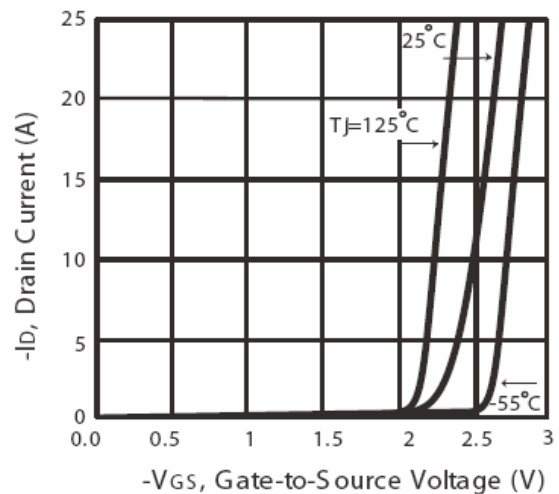


Figure 2. Transfer Characteristics

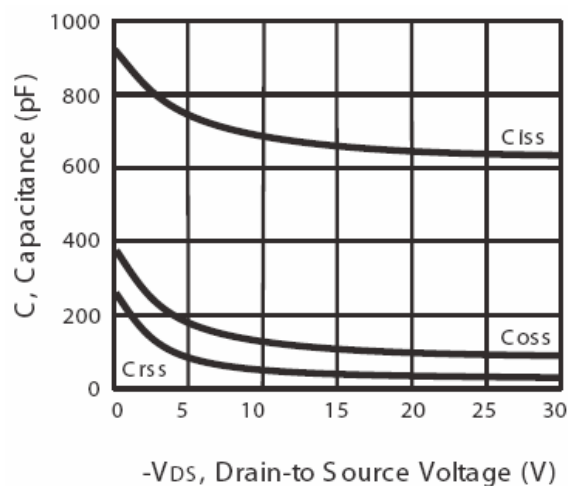


Figure 3. Capacitance

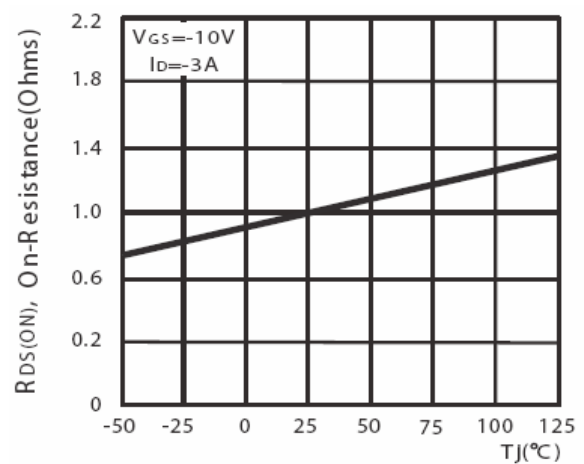


Figure 4. On-Resistance Variation with Temperature

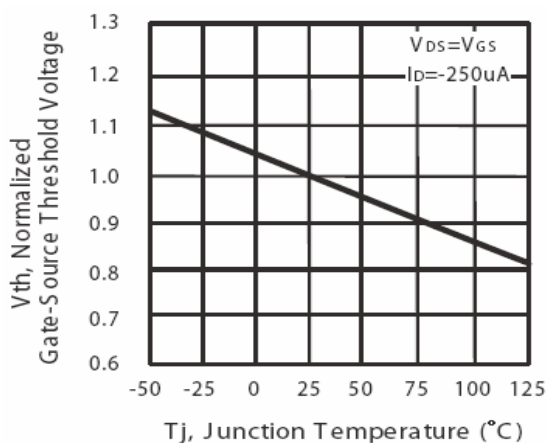


Figure 5. Gate-Source Threshold Voltage with Temperature

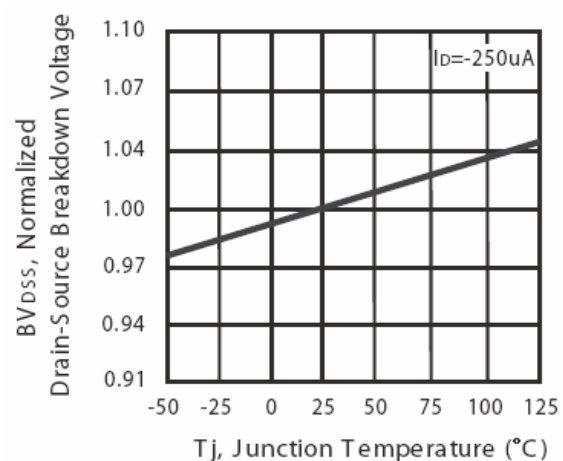


Figure 6. Breakdown Voltage Variation with Temperature

Typical Characteristics Curve ($T_a = 25^\circ\text{C}$ unless otherwise noted)

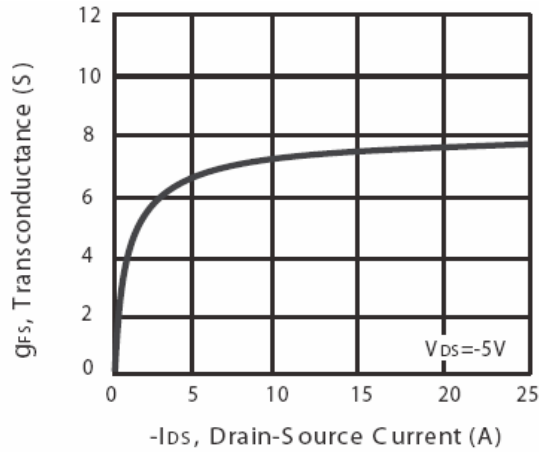


Figure 7. Transconductance Variation with Drain Current

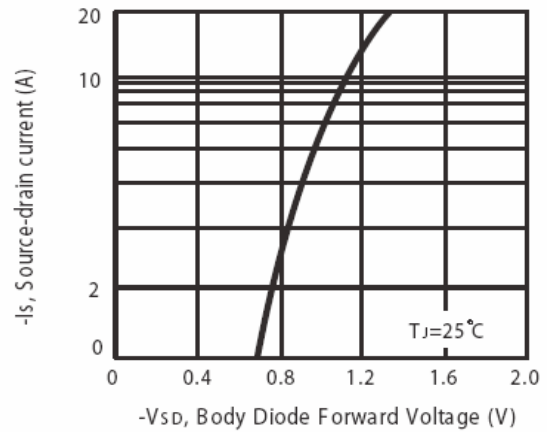


Figure 8. Body Diode Forward Voltage Variation with Source Current

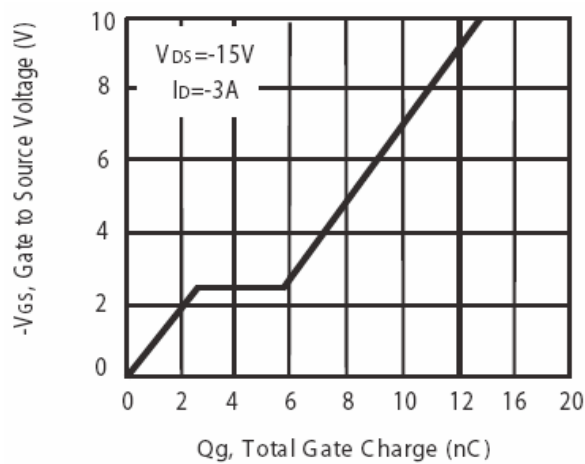


Figure 9. Gate Charge

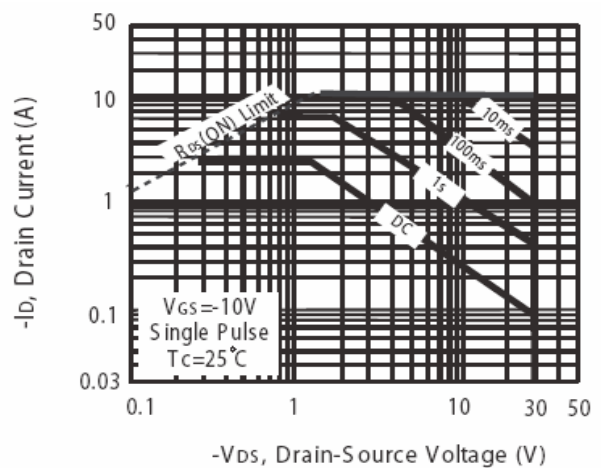
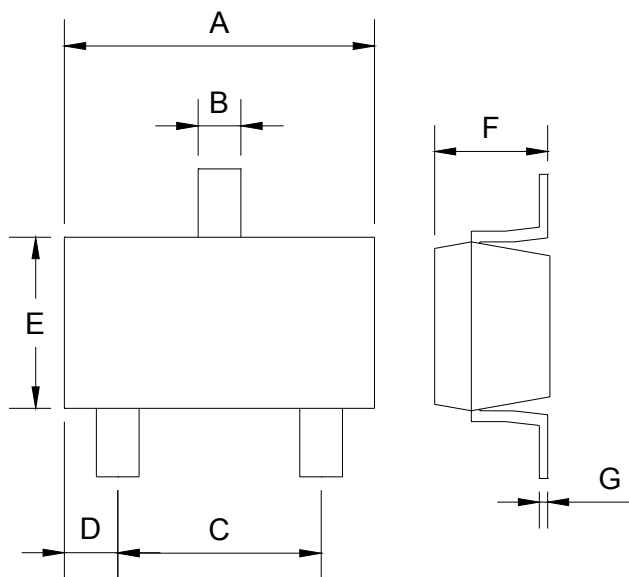


Figure 10. Maximum Safe Operating Area

SOT-23 Mechanical Drawing



SOT-23 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.88	2.91	0.113	0.115
B	0.39	0.42	0.015	0.017
C	1.78	2.03	0.070	0.080
D	0.51	0.61	0.020	0.024
E	1.59	1.66	0.063	0.065
F	1.04	1.08	0.041	0.043
G	0.07	0.09	0.003	0.004