TSM2321

-20V P-Channel Enhancement Mode MOSFET

SOT-23

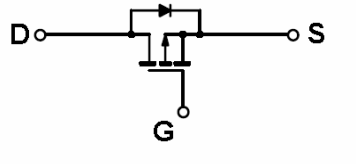
Pin assignment:
1. Gate
2. Source
3. Drain

V_{DS} = - 20V
$R_{DS\ (on)}$, Vgs @ -4.5V, Ids @ -3.2A = 65mΩ
$R_{DS\ (on)}$, Vgs @ -2.5V, Ids @ -2.0A = 90mΩ

Features

- ✧ Advanced trench process technology
- ✧ 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
TSM2321CX	Tape & Reel	SOT-23

Absolute Maximum Rating (Ta = 25 °C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-20V	V
Gate-Source Voltage		V_{GS}	±10	V
Continuous Drain Current		I_D	-3.2	A
Pulsed Drain Current		I_{DM}	-11	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)	Rθja	100	°C/W

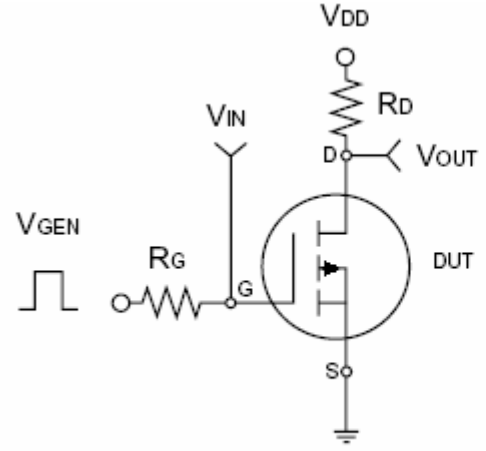
Note: Surface mounted on FR4 board t<=5sec.

Electrical Characteristics

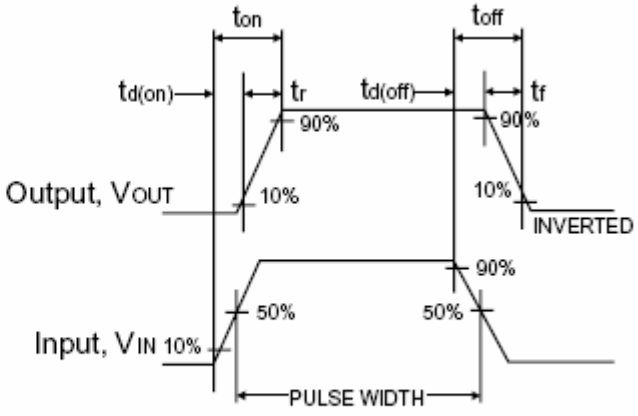
Ta = 25 °C, unless otherwise noted

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250uA	BV_{DSS}	-20	--	--	V
Drain-Source On-State Resistance	V_{GS} = -4.5V, I_D = -3.2A	$R_{DS(ON)}$	--	50	65	mΩ
Drain-Source On-State Resistance	V_{GS} = -2.5V, I_D = -2.0A	$R_{DS(ON)}$	--	75	90	
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250uA	$V_{GS(TH)}$	-0.6	-0.9	-1.5	V
Zero Gate Voltage Drain Current	V_{DS} = -16V, V_{GS} = 0V	I_{DSS}	--	--	-1.0	uA
Gate Body Leakage	V_{GS} = ±10V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
On-State Drain Current	V_{DS} = -5V, V_{GS} = -4.5V	$I_{D(ON)}$	-8	--	--	A
Forward Transconductance	V_{DS} = -5V, I_D = -3.2A	g_{fs}	--	8	--	S
Dynamic						
Total Gate Charge	V_{DS} = -10V, I_D = -3.2A, V_{GS} = -4.5V	Q_g	--	7.4	--	nC
Gate-Source Charge		Q_{gs}	--	1.2	--	
Gate-Drain Charge		Q_{gd}	--	2.8	--	
Turn-On Delay Time	V_{DD} = -10V, R_L = 10Ω, I_D = -1A, V_{GEN} = -4.5V, R_G = 6Ω	$t_{d(on)}$	--	13.9		nS
Turn-On Rise Time		t_r	--	7.1		
Turn-Off Delay Time		$t_{d(off)}$	--	75.2		
Turn-Off Fall Time		t_f	--	54		
Input Capacitance	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	610	--	pF
Output Capacitance		C_{oss}	--	155	--	
Reverse Transfer Capacitance		C_{rss}	--	105	--	
Source-Drain Diode						
Max. Diode Forward Current		I_S	--	--	-1.6	A
Diode Forward Voltage	I_S = - 1.6A, V_{GS} = 0V	V_{SD}	--	-0.78	-1.2	V

Note : pulse test: pulse width <=300uS, duty cycle <=2%



Switching Test Circuit



Switchin Waveforms

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

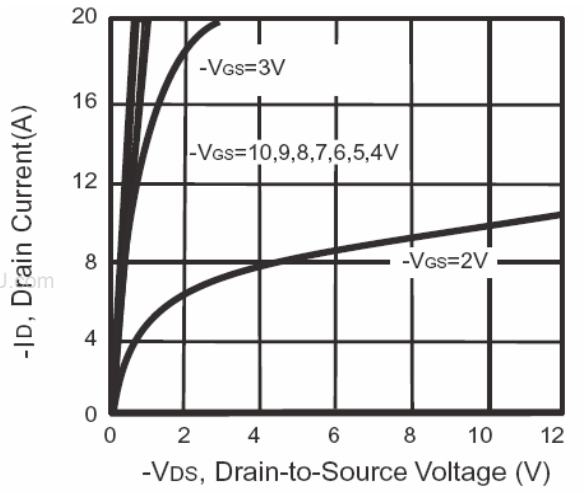


Figure 1. Output Characteristics

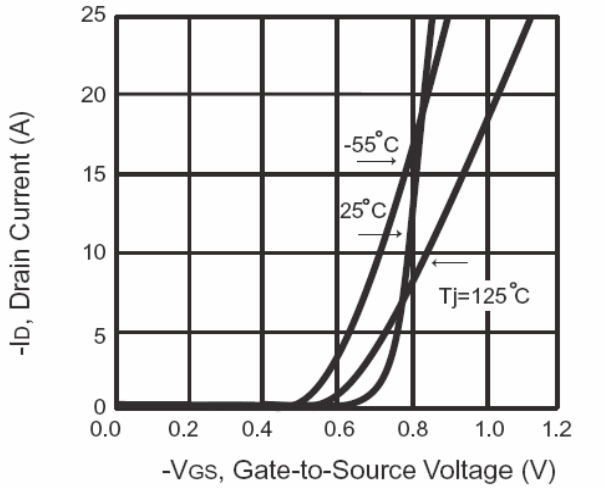


Figure 2. Transfer Characteristics

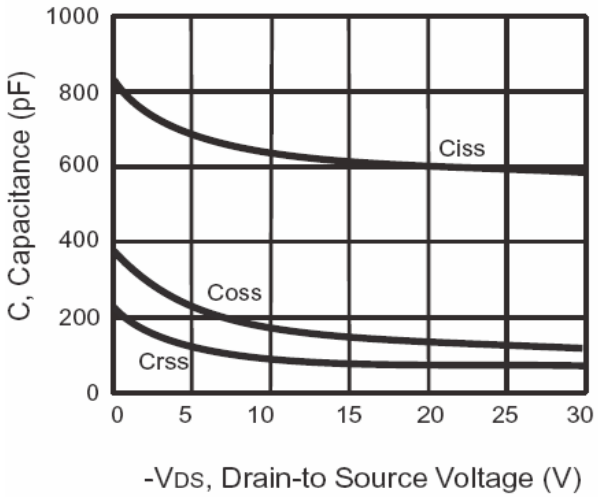


Figure 3. Capacitance

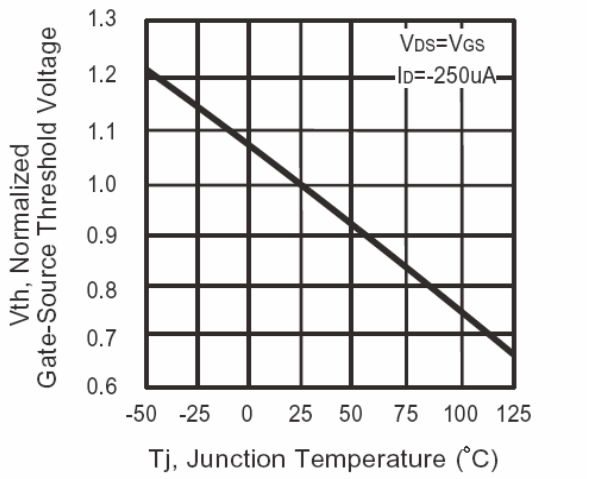


Figure 5. Threshold Voltage Variation with Temperature

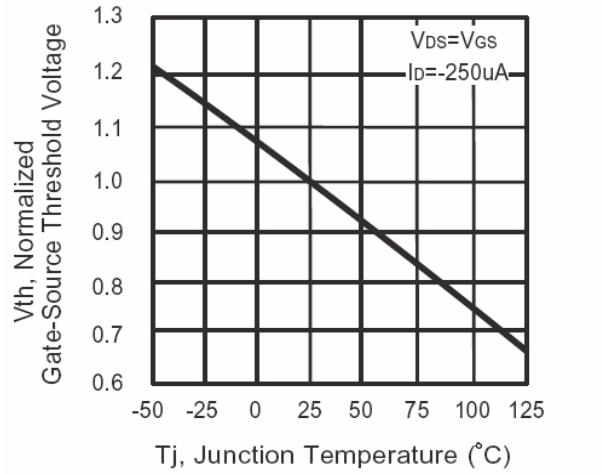


Figure 5. Threshold Voltage Variation with Temperature

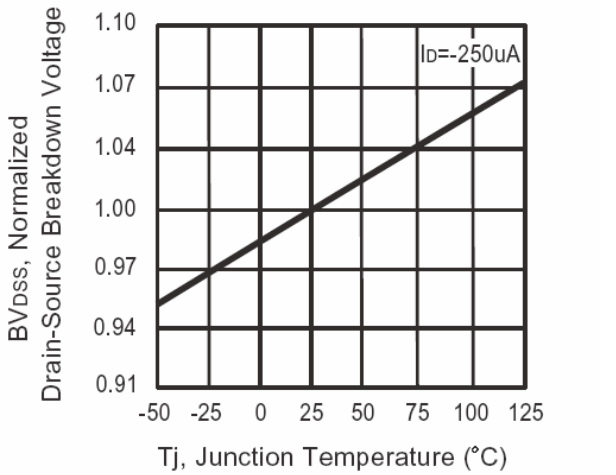


Figure 6. Breakdown Voltage Variation with Temperature

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

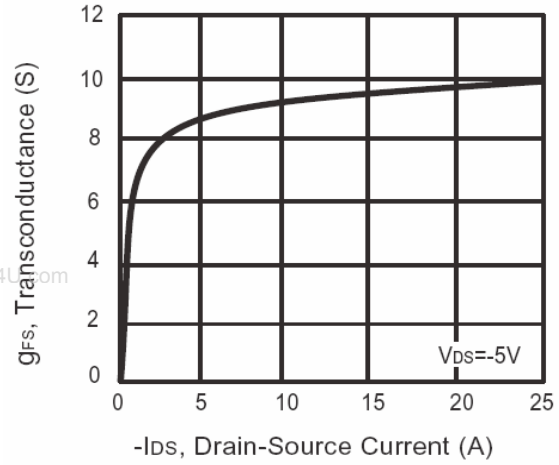


Figure 7. Transconductance Variation with Drain Current

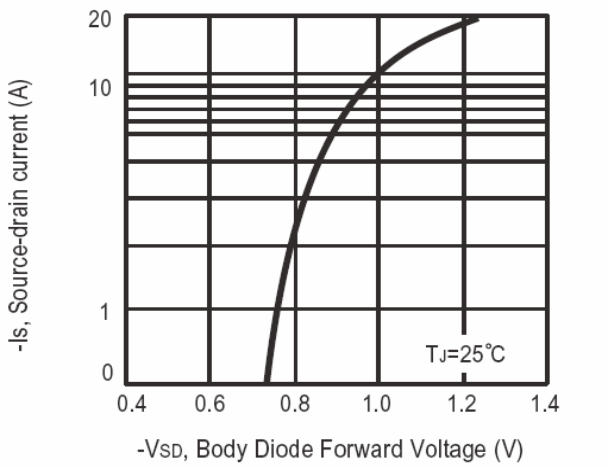


Figure 8. Body Diode Forward Voltage Variation with Source Current

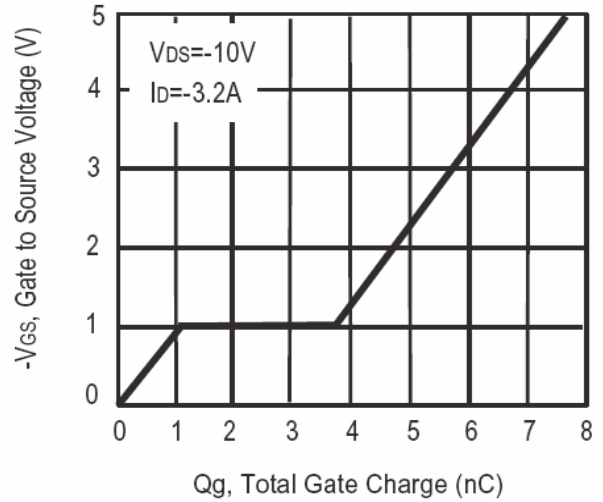


Figure 9. Gate Charge

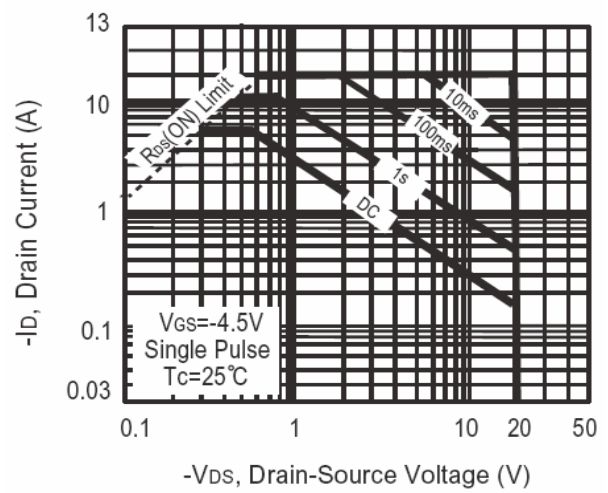
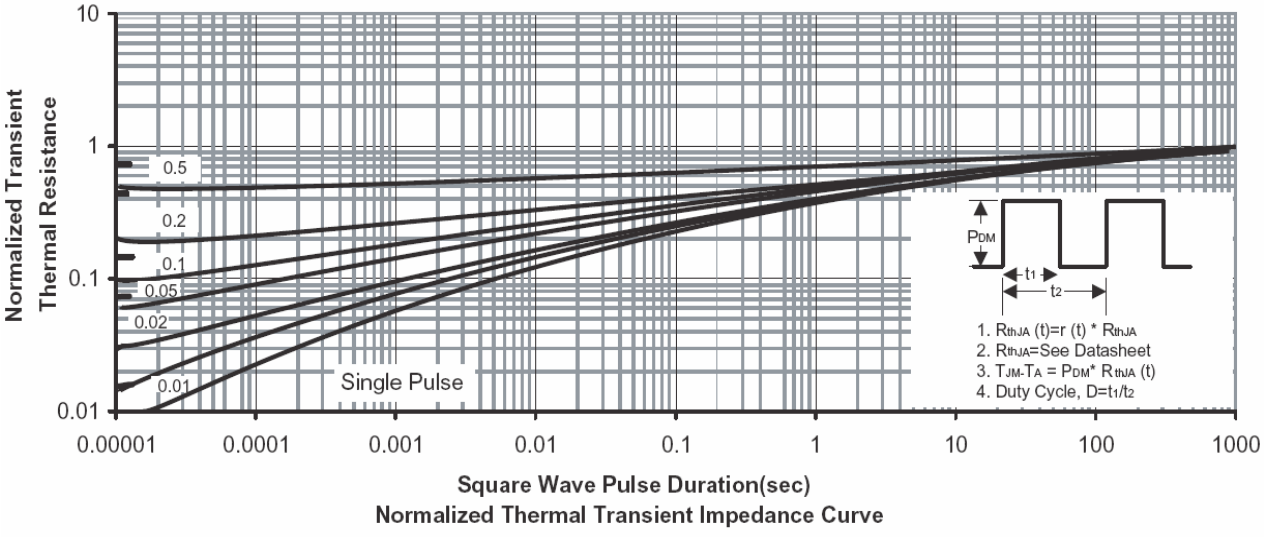
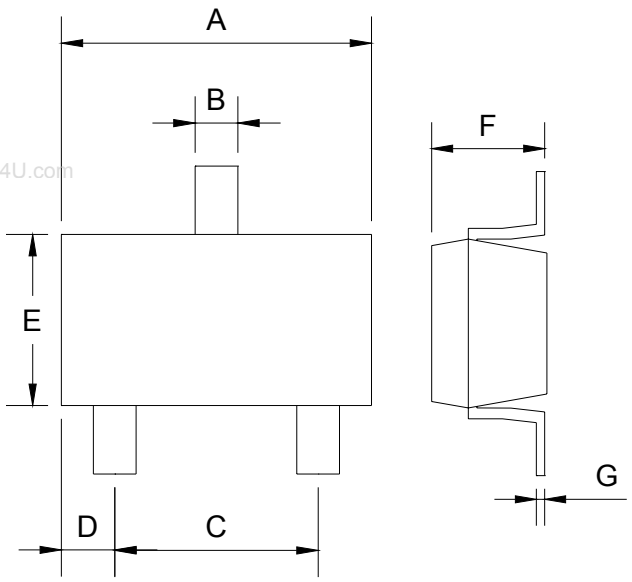


Figure 10. Maximum Safe Operating Area



Normalized Thermal Transient Impedance Curve

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