TSM2320

20V N-Channel Enhancement Mode MOSFET

SOT-23

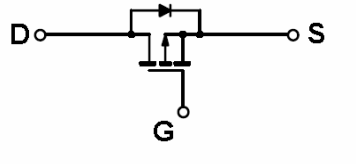
Pin assignment:
1. Gate
2. Source
3. Drain

V_{DS} = 20V
$R_{DS\ (on)}$, Vgs @ 4.5V, Ids @ 3.0A = 45mΩ
$R_{DS\ (on)}$, Vgs @ 2.5V, Ids @ 2.0A = 65mΩ

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
TSM2320CX	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	3.6	A
Pulsed Drain Current		I_{DM}	14	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

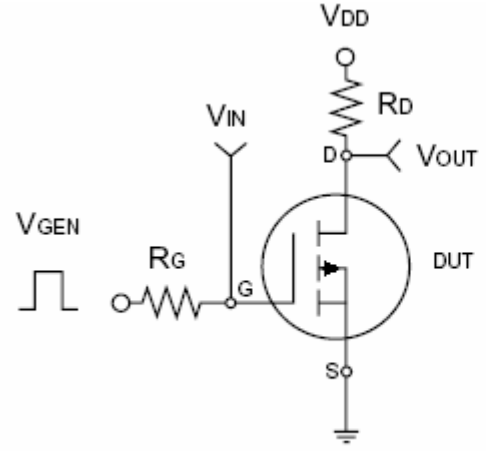
Note: Surface mounted on FR4 board t<=5sec.

Electrical Characteristics

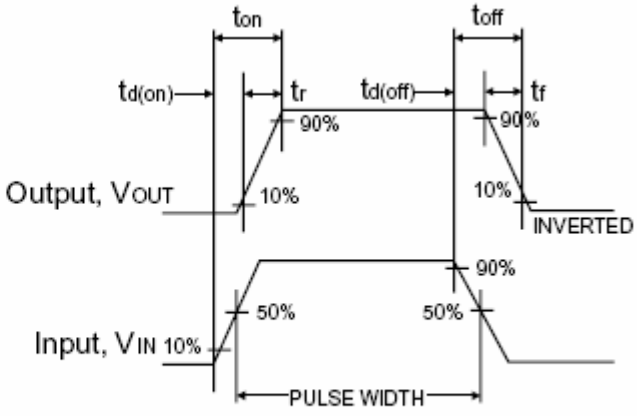
Ta = 25 °C, unless otherwise noted

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 = 3A	$R_{DS(ON)}$	--	32	45	mΩ
Drain-Source On-State Resistance	V_{GS} = 2.5V, I_D = 2A	$R_{DS(ON)}$	--	50	65	
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	$I_{D(ON)}$	10	--	--	A
Forward Transconductance	V_{DS} = 5V, I_D = 3A	g_{fs}	--	8	--	S
Dynamic						
Total Gate Charge	V_{DS} = 10V, I_D =3.5A, V_{GS} = 4.5V	Q_g	--	9.1	--	nC
Gate-Source Charge		Q_{gs}	--	1.4	--	
Gate-Drain Charge		Q_{gd}	--	3.2	--	
Turn-On Delay Time	V_{DD} = 10V, R_L = 10Ω, I_D = 1A, V_{GEN} = 4.5V, R_G = 6Ω	$t_{d(on)}$	--	19.6		nS
Turn-On Rise Time		t_r	--	4		
Turn-Off Delay Time		$t_{d(off)}$	--	26		
Turn-Off Fall Time		t_f	--	15.7		
Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	641	--	pF
Output Capacitance		C_{oss}	--	135	--	
Reverse Transfer Capacitance		C_{rss}	--	101	--	
Source-Drain Diode						
Max. Diode Forward Current		I_S	--	--	1.6	A
Diode Forward Voltage	I_S = 1.6A, V_{GS} = 0V	V_{SD}	--	0.81	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)

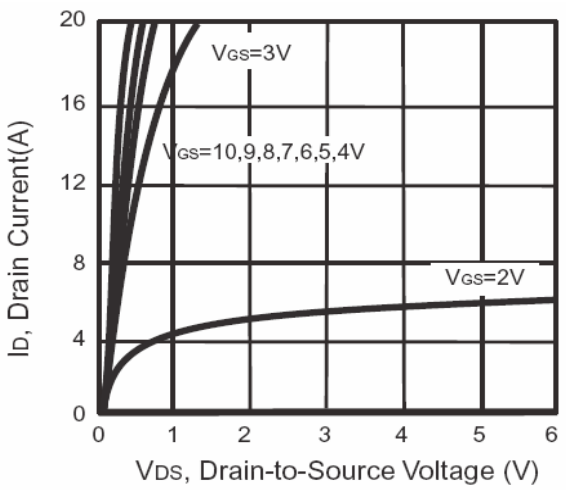


Figure 1. Output Characteristics

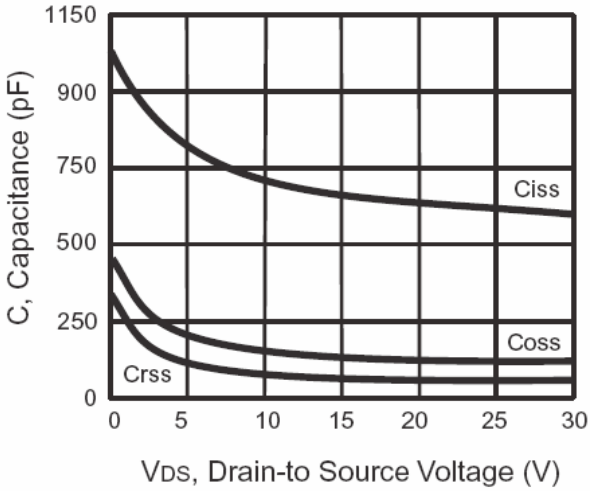


Figure 3. Capacitance

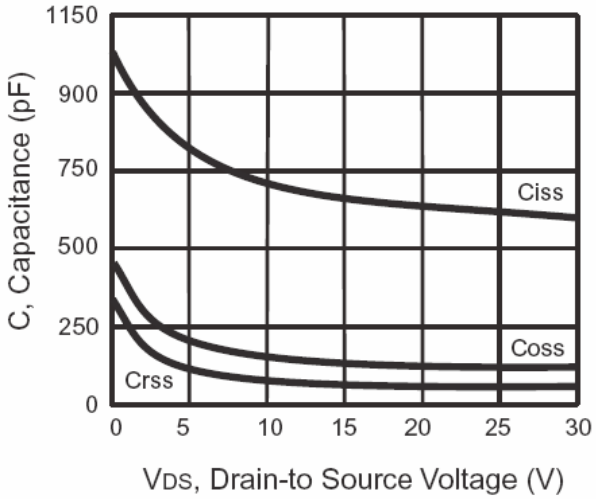


Figure 3. Capacitance

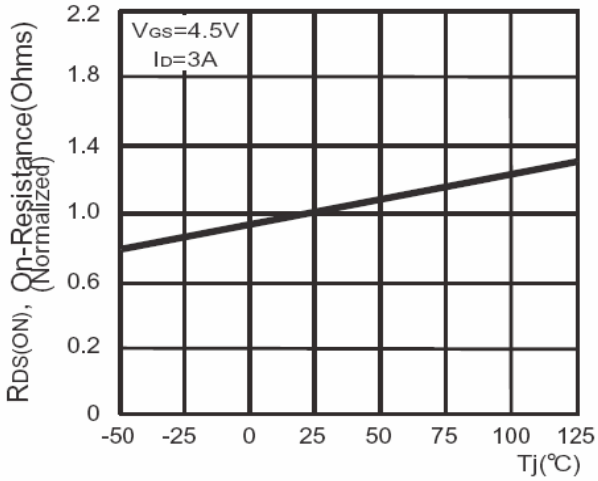


Figure 4. On-Resistance Variation with Temperature

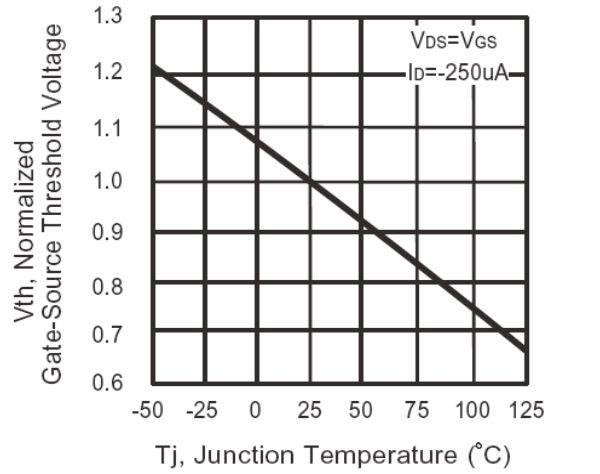


Figure 5. Threshold Voltage Variation with Temperature

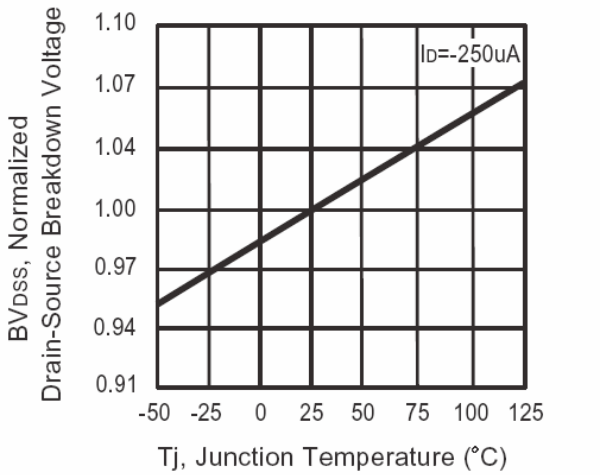


Figure 6. Breakdown Voltage Variation with Temperature

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

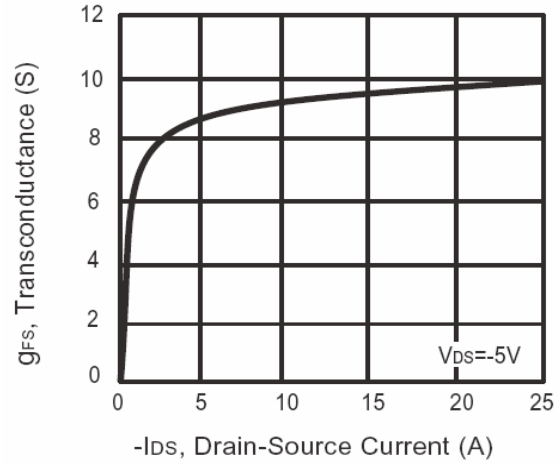


Figure 7. Transconductance Variation with Drain Current

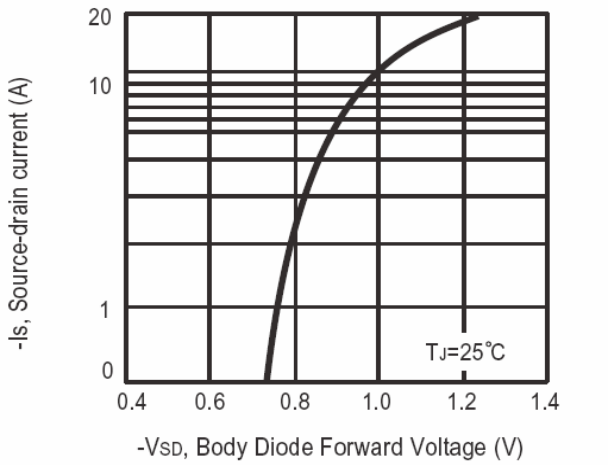
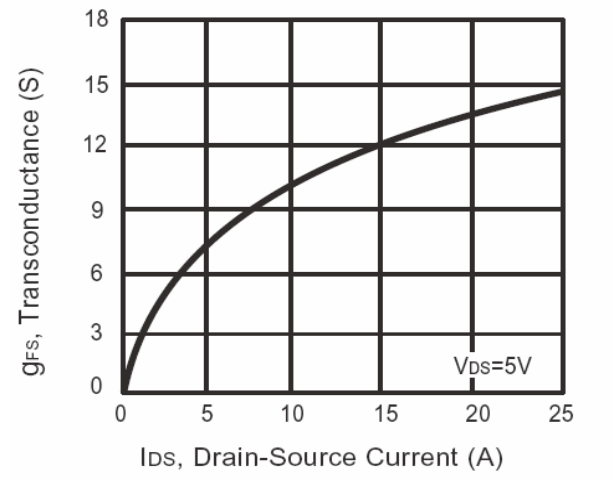


Figure 8. Body Diode Forward Voltage Variation with Source Current



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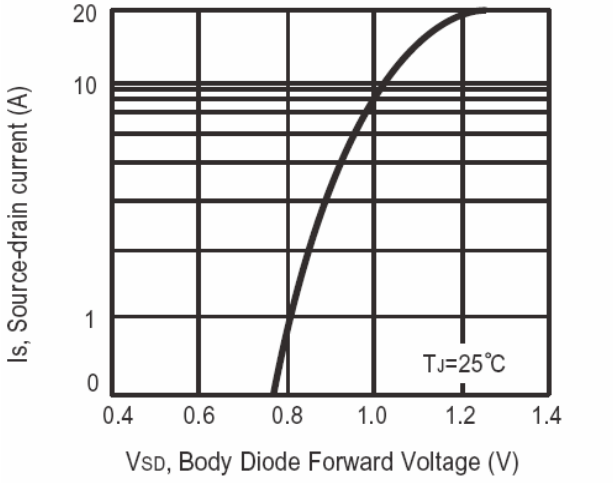

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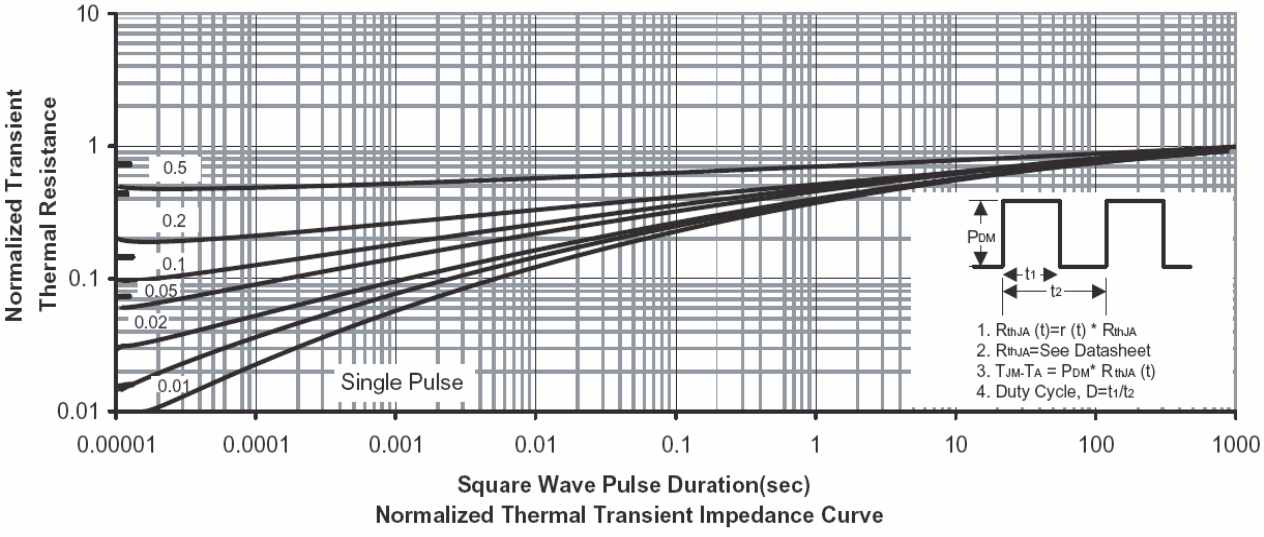
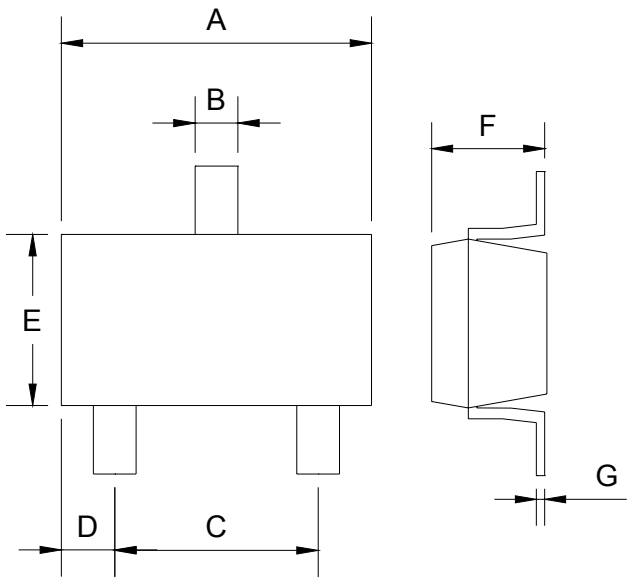


Normalized Thermal Transient Impedance Curve

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