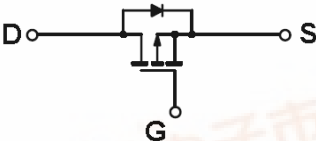


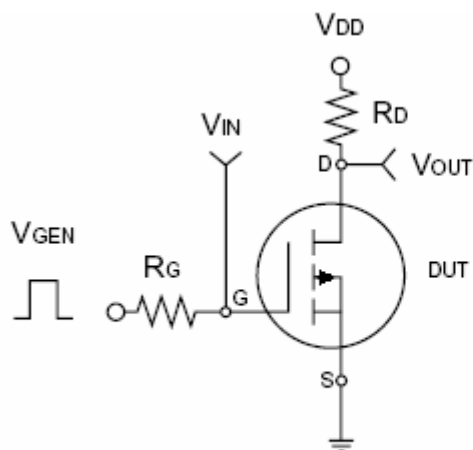
TSC 	TSM2320 20V N-Channel Enhancement Mode MOSFET																																																
SOT-23  Pin assignment: 1. Gate 2. Source 3. Drain	$V_{DS} = 20V$ $R_{DS(on)}, V_{GS} @ 4.5V, I_{DS} @ 3.0A = 45m\Omega$ $R_{DS(on)}, V_{GS} @ 2.5V, I_{DS} @ 2.0A = 65m\Omega$																																																
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 <table><tr><th>Part No.</th><th>Packing</th><th>Package</th></tr><tr><td>TSM2320CX</td><td>Tape & Reel</td><td>SOT-23</td></tr></table>			Part No.	Packing	Package	TSM2320CX	Tape & Reel	SOT-23																																								
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Absolute Maximum Rating (Ta = 25 °C unless otherwise noted) <table><tr><th>Parameter</th><th>Symbol</th><th>Limit</th><th>Unit</th></tr><tr><td>Drain-Source Voltage</td><td>V_{DS}</td><td>20V</td><td>V</td></tr><tr><td>Gate-Source Voltage</td><td>V_{GS}</td><td>±10</td><td>V</td></tr><tr><td>Continuous Drain Current</td><td>I_D</td><td>3.6</td><td>A</td></tr><tr><td>Pulsed Drain Current</td><td>I_{DM}</td><td>14</td><td>A</td></tr><tr><td rowspan="2">Maximum Power Dissipation</td><td>Ta = 25 °C</td><td>1.25</td><td rowspan="2">W</td></tr><tr><td>Ta = 75 °C</td><td>0.8</td></tr><tr><td>Operating Junction Temperature</td><td>T_J</td><td>+150</td><td>°C</td></tr><tr><td>Operating Junction and Storage Temperature Range</td><td>T_J, T_{STG}</td><td>-55 to +150</td><td>°C</td></tr></table> Thermal Performance <table><tr><th>Parameter</th><th>Symbol</th><th>Limit</th><th>Unit</th></tr><tr><td>Lead Temperature (1/8" from case)</td><td>T_L</td><td>5</td><td>S</td></tr><tr><td>Junction to Ambient Thermal Resistance (PCB mounted)</td><td>$R\theta_{ja}$</td><td>100</td><td>°C/W</td></tr></table>				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	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	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	°C/W
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Note: Surface mounted on FR4 board t<=5sec.

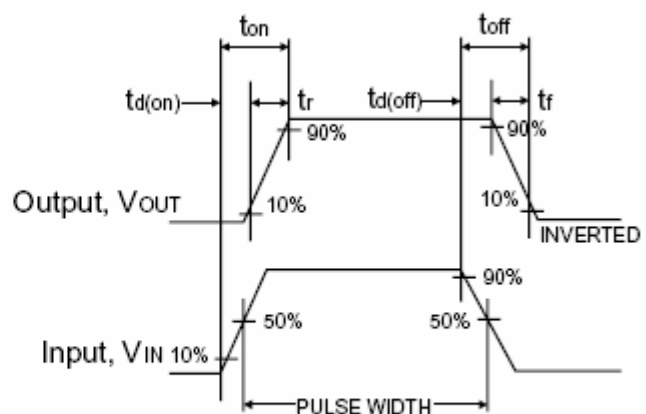


Electrical Characteristics						
Ta = 25 °C, unless otherwise noted						
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250uA	BV _{DSS}	20	--	--	V
Drain-Source On-State Resistance	V _{GS} = 4.5V, I _D = 3A	R _{DS(ON)}	--	32	45	mΩ
Drain-Source 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 $\leq 300\mu s$, duty cycle $\leq 2\%$



Switching Test Circuit



Switchin Waveforms

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

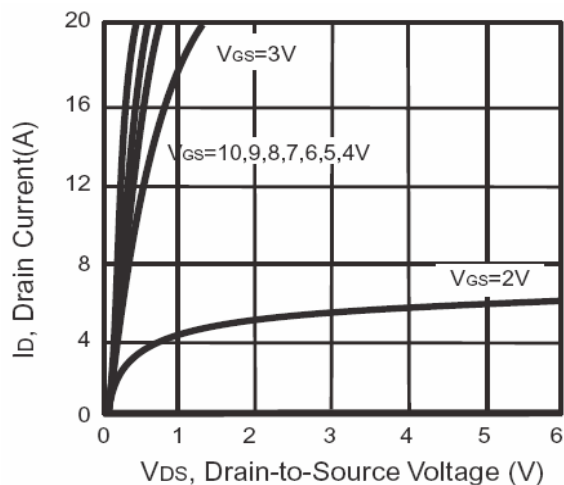


Figure 1. Output Characteristics

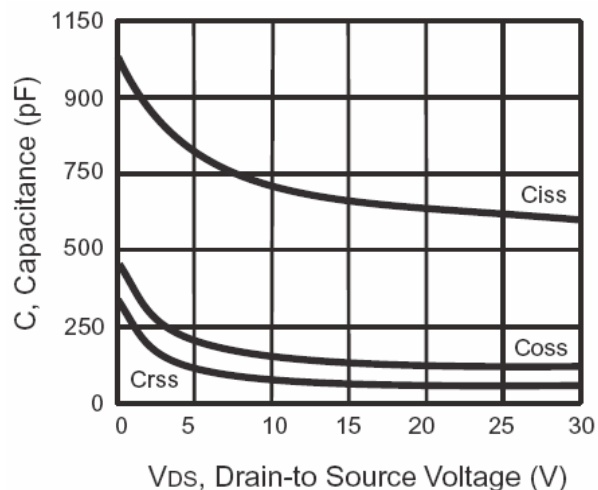


Figure 3. Capacitance

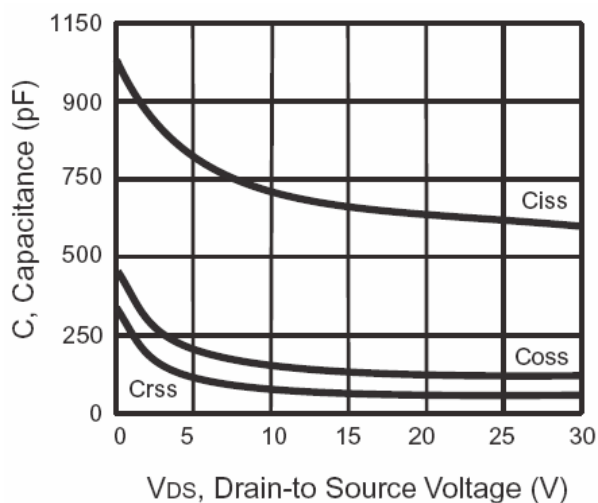


Figure 3. Capacitance

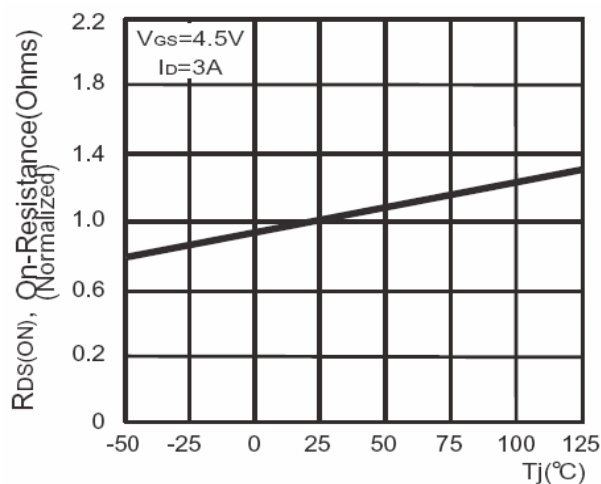


Figure 4. On-Resistance Variation with Temperature

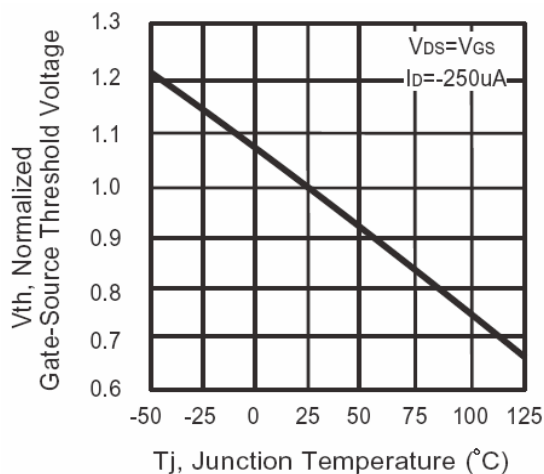


Figure 5. Threshold Voltage Variation with Temperature

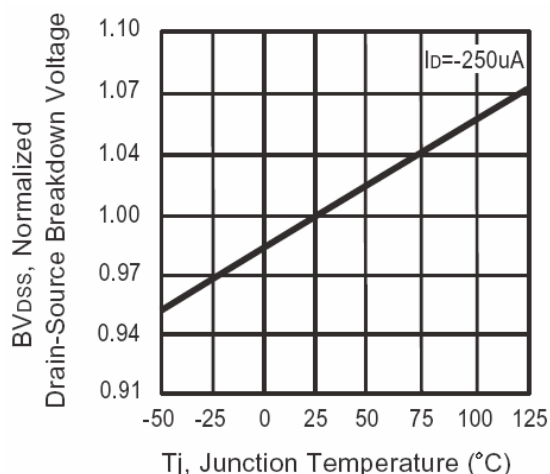


Figure 6. Breakdown Voltage Variation with Temperature

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

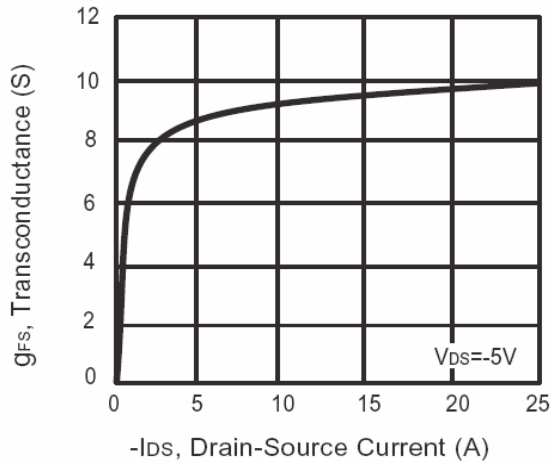


Figure 7. Transconductance Variation with Drain Current

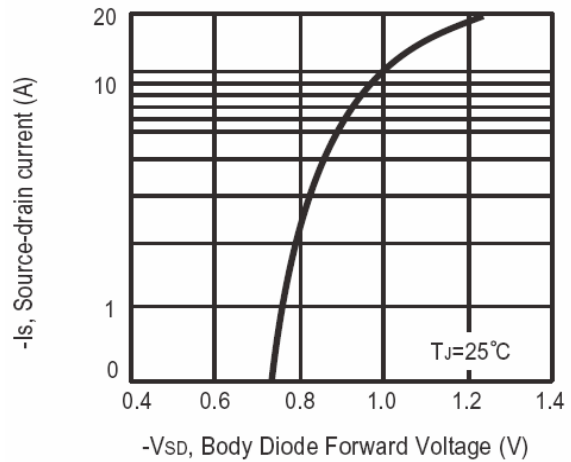


Figure 8. Body Diode Forward Voltage Variation with Source Current

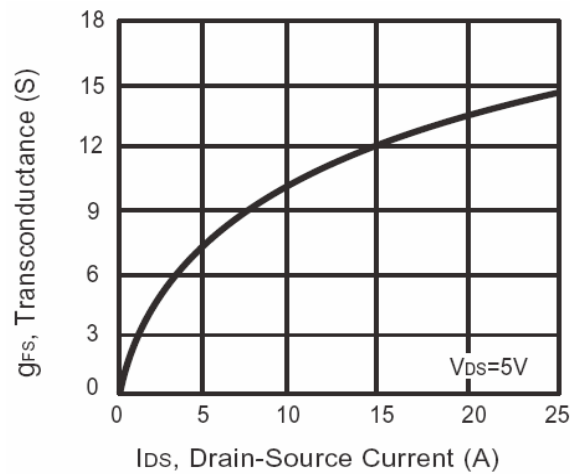


Figure 7. Transconductance Variation with Drain Current

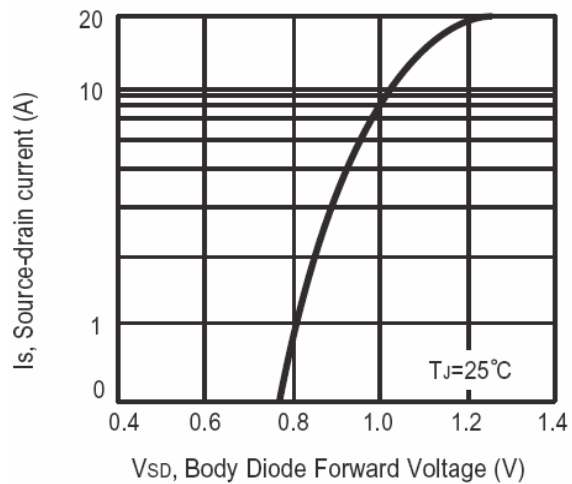
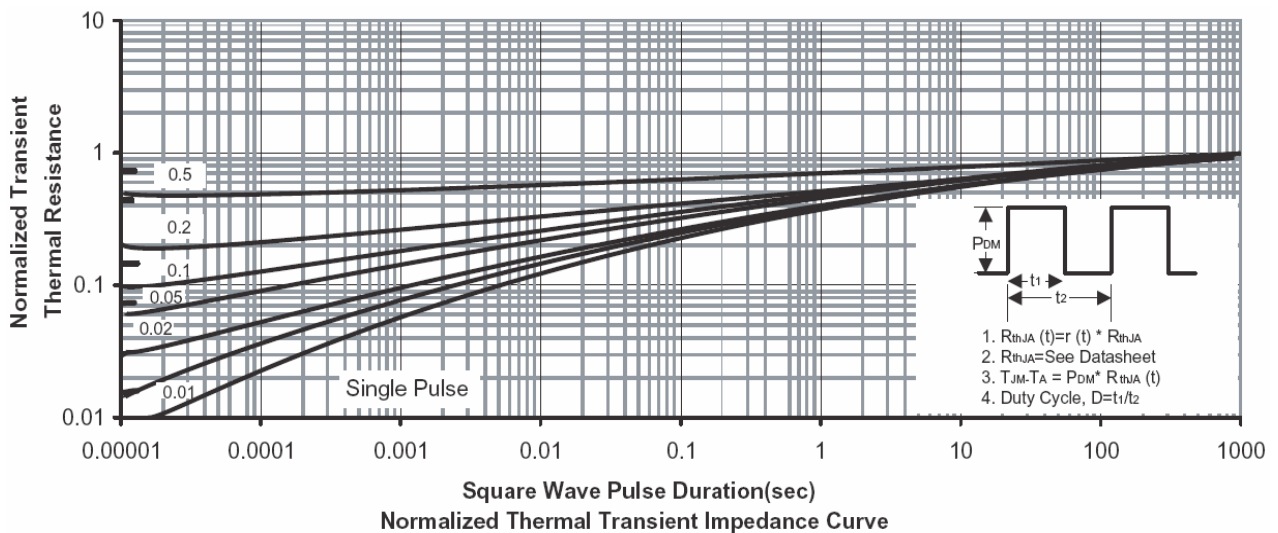
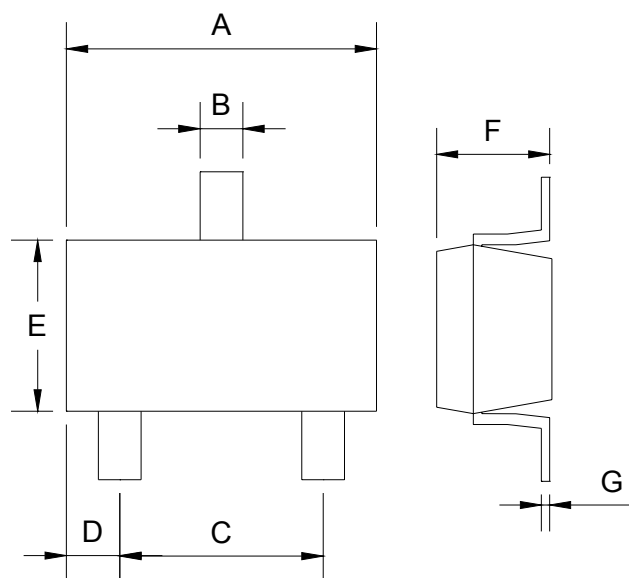


Figure 8. Body Diode Forward Voltage Variation with Source Current



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