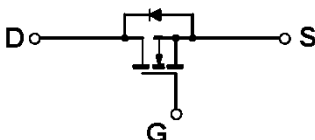


TSC 	TSM2N7002E 50V N-Channel Enhancement Mode MOSFET																																				
SOT-23  SOT-323  Pin assignment: 1. Gate 2. Source 3. Drain		$V_{DS} = 50V$ $R_{DS(on)}, V_{GS} @ 10V, I_{ds} @ 250mA = 3\Omega$ $R_{DS(on)}, V_{GS} @ 5V, I_{ds} @ 50mA = 4\Omega$																																			
Features ✧ Advanced trench process technology ✧ High density cell design for ultra low on-resistance ✧ High input impedance ✧ High speed switching ✧ No minority carrier storage time ✧ CMOS logic compatible input ✧ No secondary breakdown ✧ Compact and low profile SOT-363 package																																					
Block Diagram 		Ordering Information <table><tr><th>Part No.</th><th>Packing</th><th>Package</th></tr><tr><td>TSM2N7002ECX</td><td>T & R</td><td>SOT-23</td></tr><tr><td>TSM2N7002ECU</td><td>(3kpcs/Reel)</td><td>SOT-323</td></tr></table>		Part No.	Packing	Package	TSM2N7002ECX	T & R	SOT-23	TSM2N7002ECU	(3kpcs/Reel)	SOT-323																									
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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>50</td><td>V</td></tr><tr><td>Gate-Source Voltage</td><td>V_{GS}</td><td>± 20</td><td>V</td></tr><tr><td>Continuous Drain Current</td><td>I_D</td><td>250</td><td>mA</td></tr><tr><td>Pulsed Drain Current</td><td>I_{DM}</td><td>1.0</td><td>A</td></tr><tr><td rowspan="2">Maximum Power Dissipation</td><td>Ta = 25 °C</td><td>200</td><td rowspan="2">mW</td></tr><tr><td>Ta = 75 °C</td><td>150</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>				Parameter	Symbol	Limit	Unit	Drain-Source Voltage	V_{DS}	50	V	Gate-Source Voltage	V_{GS}	± 20	V	Continuous Drain Current	I_D	250	mA	Pulsed Drain Current	I_{DM}	1.0	A	Maximum Power Dissipation	Ta = 25 °C	200	mW	Ta = 75 °C	150	Operating Junction Temperature	T_J	+150	°C	Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	°C
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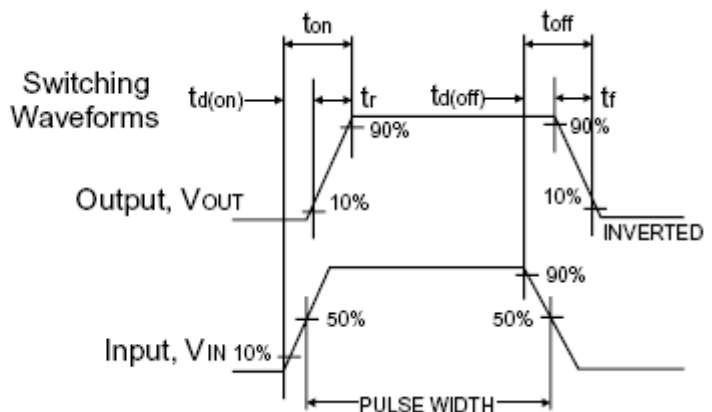
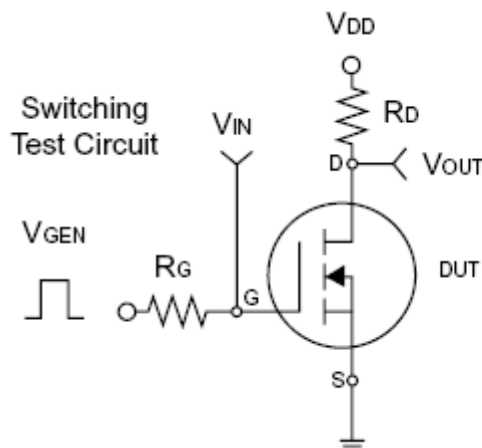
Note: Surface mounted on FR4 board t<=5sec.



Electrical Characteristics						
Tj = 25 °C unless otherwise noted						
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 10uA	BV _{DSS}	50	--	--	V
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 250mA	R _{DS(ON)}	--	--	3	Ω
Drain-Source On-State Resistance	V _{GS} = 5V, I _D = 50mA	R _{DS(ON)}	--	--	4	
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250uA	V _{GS(TH)}	1.0	2.0	2.5	V
Zero Gate Voltage Drain Current	V _{DS} = 50V, V _{GS} = 0V	I _{DSS}	--	--	1.0	uA
Gate Body Leakage	V _{GS} = ± 20V, V _{DS} = 0V	I _{GSS}	--	--	± 100	nA
On-State Drain Current	V _{DS} ≥ 7V, V _{GS} = 10V	I _{D(ON)}	500	--	--	mA
Forward Transconductance	V _{DS} = 7V, I _D = 200mA	g _{fs}	80	--	--	mS
Dynamic *						
Turn-On Delay Time	V _{DD} = 30V, I _D = 100mA, V _{GEN} = 10V, R _G = 10Ω	T _{D(ON)}	--	7.5	20	nS
Turn-On Rise Time		t _r	--	6	--	
Turn-Off Delay Time		T _{D(OFF)}	--	7.5	20	
Turn-Off Fall Time		t _f	--	3	--	
Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	19	50	pF
Output Capacitance		C _{oss}	--	10	25	
Reverse Transfer Capacitance		C _{rss}	--	3	5	
Source-Drain Diode						
Max. Diode Forward Current		I _S	--	--	115	mA
Diode Forward Voltage	I _S = 115mA, V _{GS} = 0V	V _{SD}	--	0.76	1.5	V

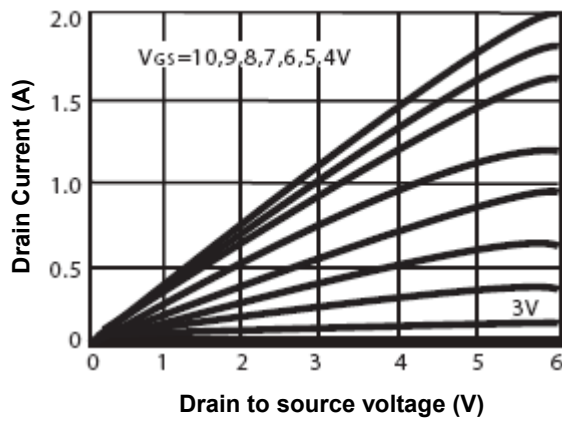
Note : pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

* Guaranteed by design, not subject to production testing.

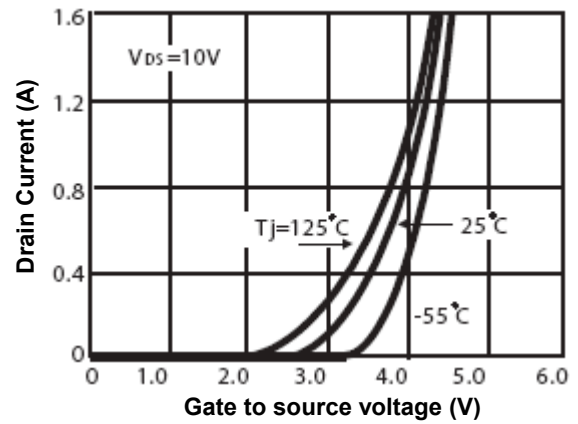


Typical Characteristics Curve (Ta = 25 °C unless otherwise noted)

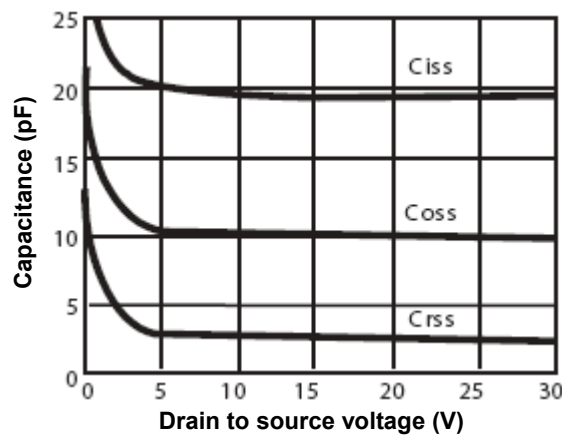
Output Characteristic



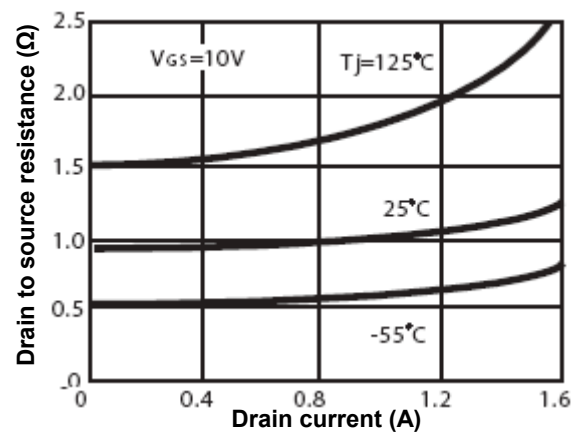
Transfer Characteristics



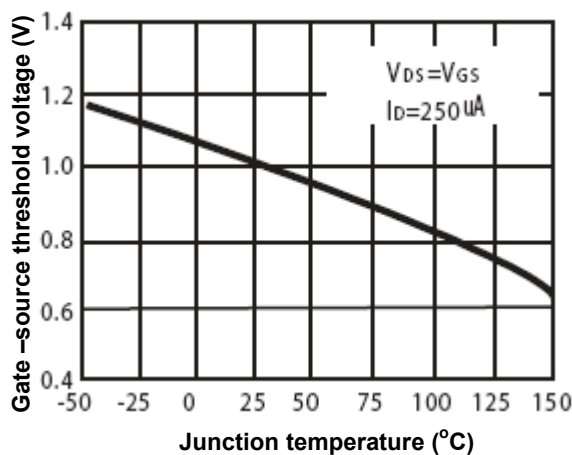
Capacitance



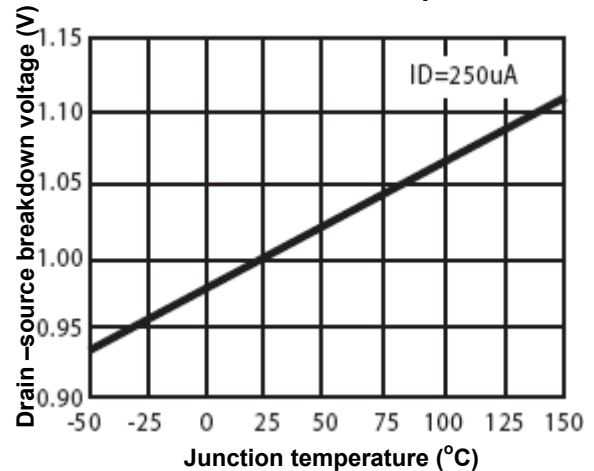
Rds(on) Variation with Drain Current



Vgs(th) with Temperature

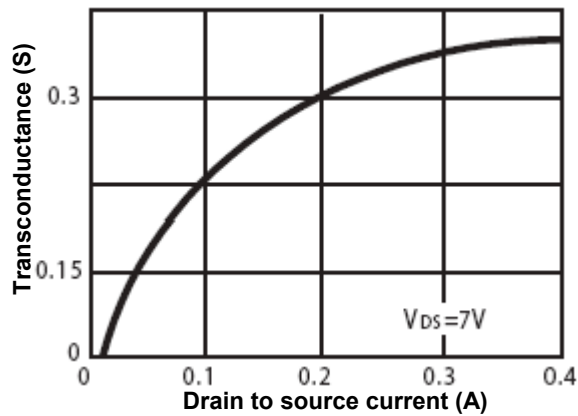


Vds breakdown with Temperature

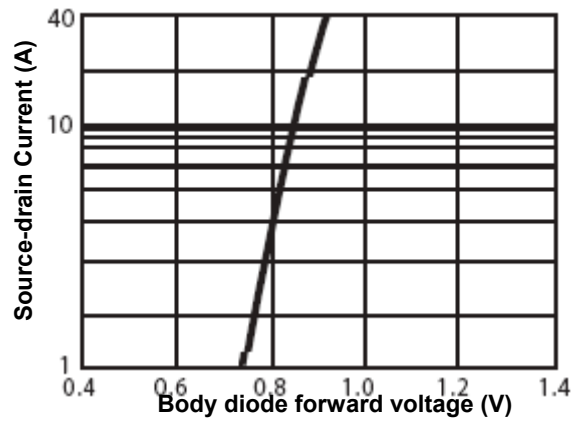


Typical Characteristics Curve ($T_a = 25^\circ\text{C}$ unless otherwise noted)

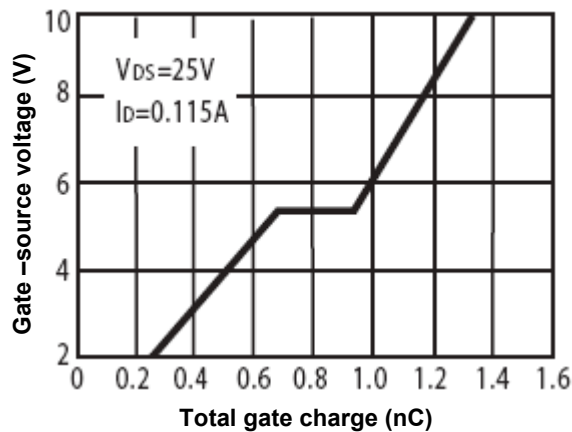
Transconductance Variation



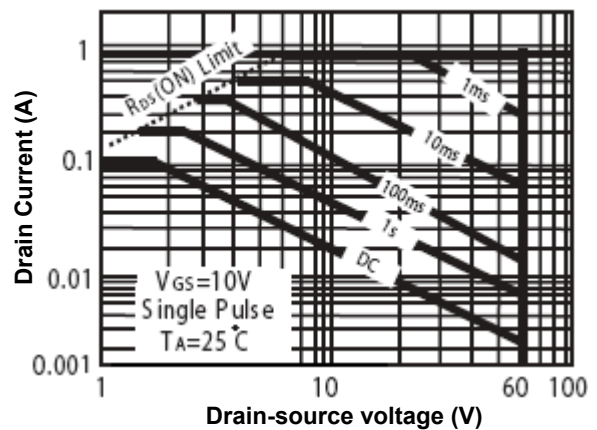
Body Diode Forward Voltage



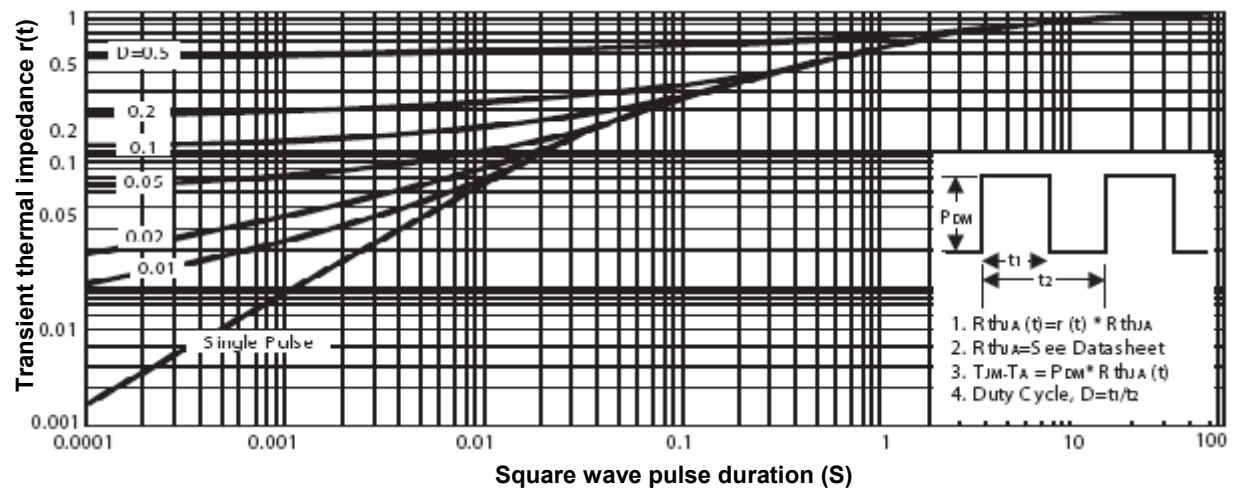
Gate Charge



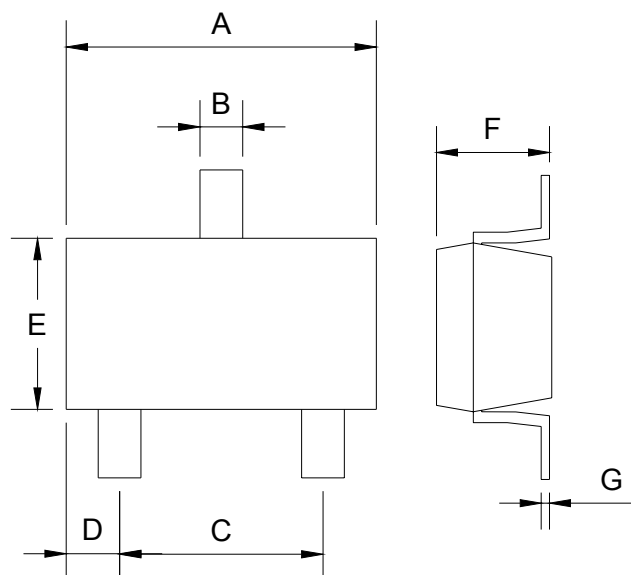
Maximum Safe Operating Area



Normalized Thermal Transient Impedance Curve

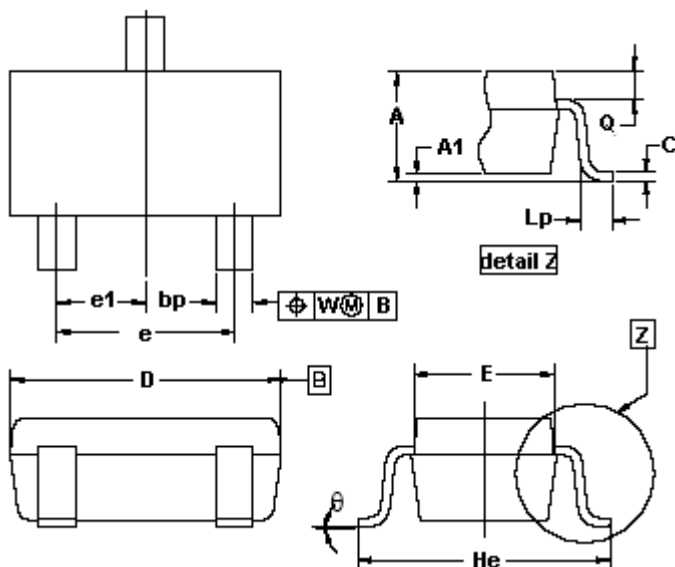


SOT-23 Mechanical Drawing



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

SOT-323 Mechanical Drawing



SOT-323 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.10	0.0315	0.0433
A1	--	0.10	--	0.0039
bp	0.30	0.40	0.0118	0.0157
C	0.10	0.25	0.0039	0.0098
D	1.80	2.20	0.0709	0.0866
E	1.15	1.35	0.0453	0.0531
e	1.30	--	0.0512	--
e1	0.65	--	0.0256	--
He	2.00	2.20	0.0787	0.0866
Lp	0.15	0.45	0.0059	0.0177
Q	0.13	0.23	0.0051	0.0091
W	0.20	--	0.0079	--
Θ	10°	--	10°	--

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