TSM2N7002E

50V N-Channel Enhancement Mode MOSFET

SOT-23 / SOT-323

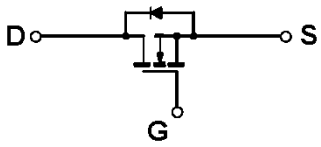
Pin assignment:
1. Gate
2. Source
3. Drain

V_{DS} = 50V
$R_{DS\ (on)}$, Vgs @ 10V, Ids @ 250mA = 3Ω
$R_{DS\ (on)}$, Vgs @ 5V, Ids @ 50mA = 4Ω

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

Part No.	Packing	Package
TSM2N7002ECX	T & R	SOT-23
TSM2N7002ECU	(3kpcs/Reel)	SOT-323

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

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	P_D	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

Thermal Performance

Parameter	Symbol	Limit	Unit
Lead Temperature (1/8" from case)	T_L	5	S
Junction to Ambient Thermal Resistance (PCB mounted)	Rθja	625	°C/W

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

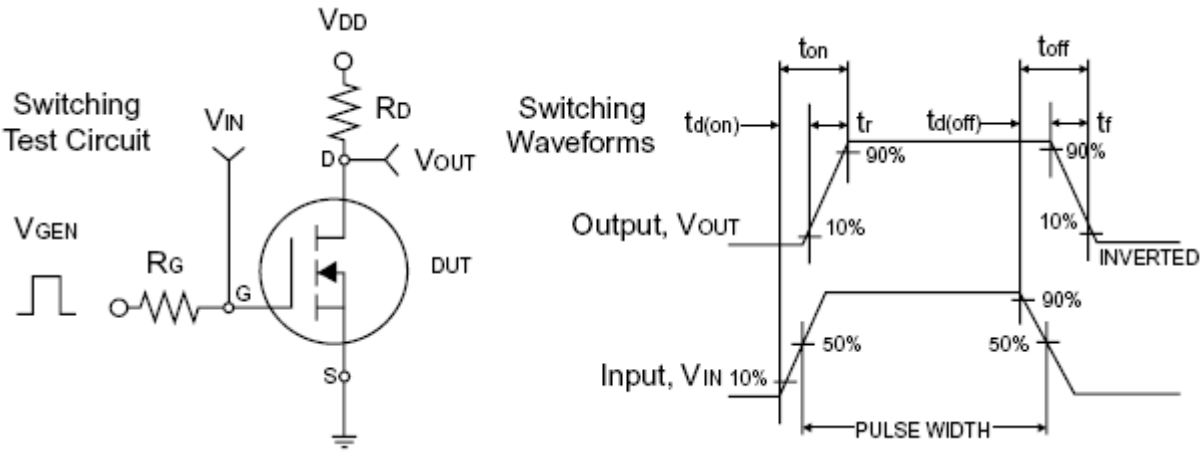
Electrical Characteristics

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

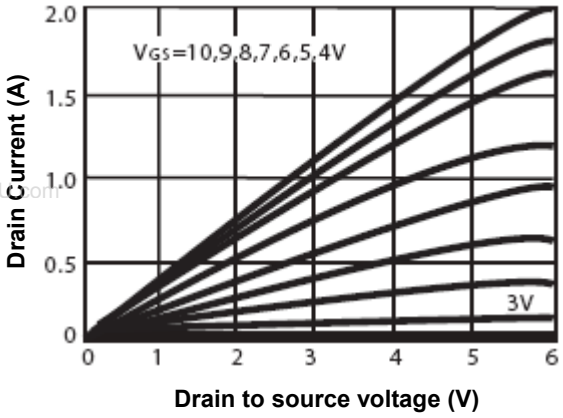
Note : pulse test: pulse width <=300uS, duty cycle <=2%

* Guaranteed by design, not subject to production testing.

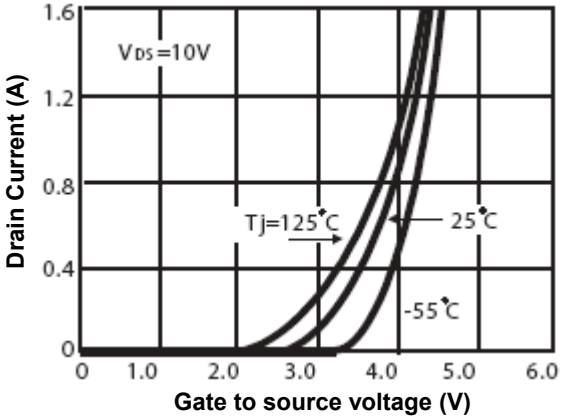


Typical Characteristics Curve (Ta = 25 °C unless otherwise noted)

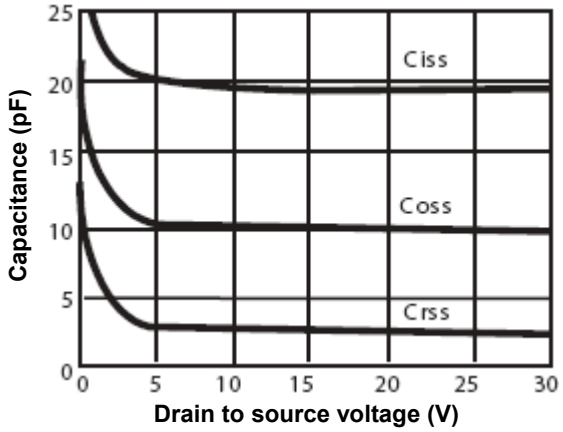
Output Characteristic



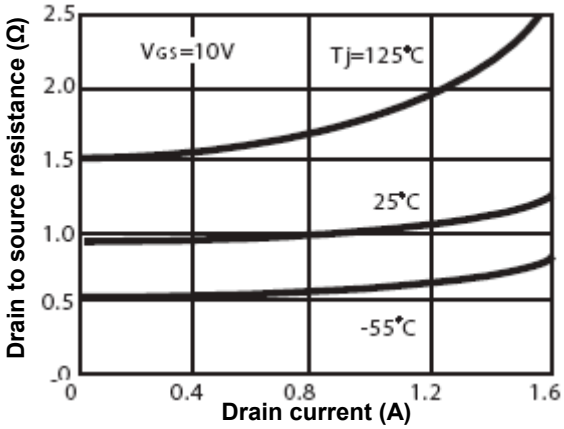
Transfer Characteristics



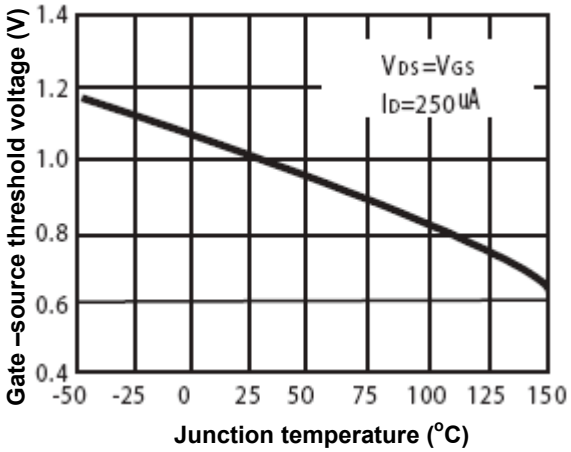
Capacitance



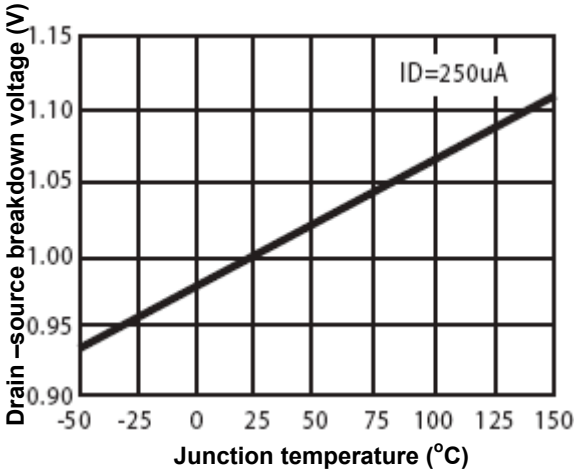
Rds(on) Variation with Drain Current



Vgs(th) with Temperature

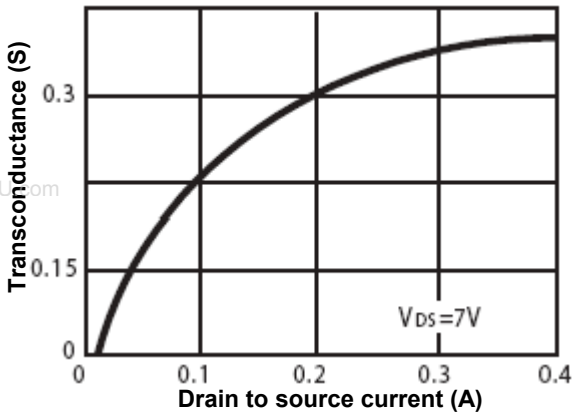


Vds breakdown with Temperature

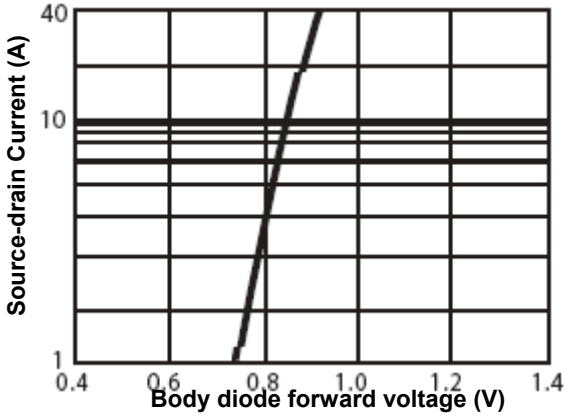


Typical Characteristics Curve (Ta = 25 °C unless otherwise noted)

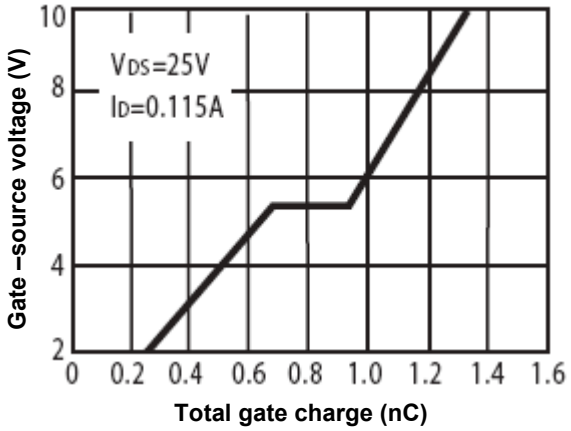
Transconductance Variation



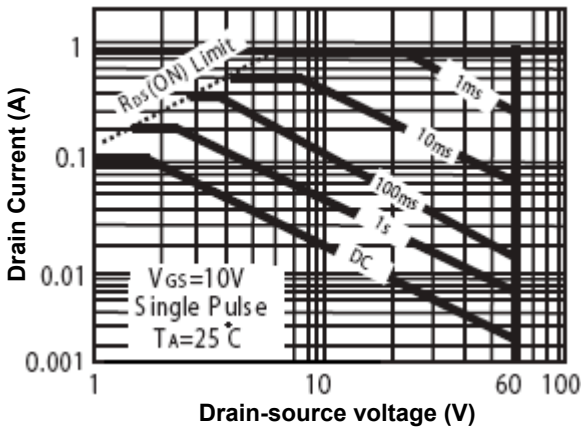
Body Diode Forward Voltage



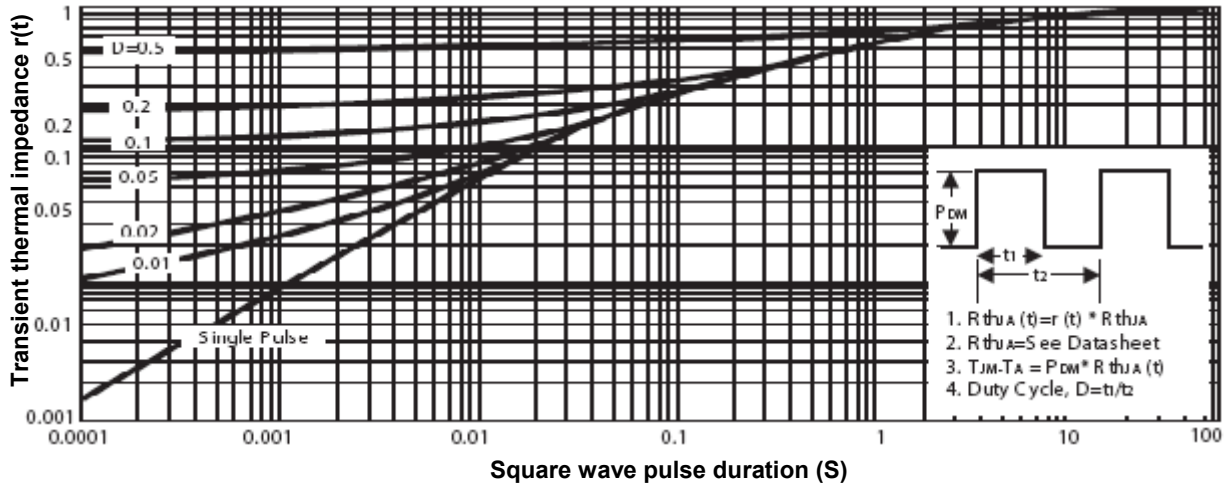
Gate Charge



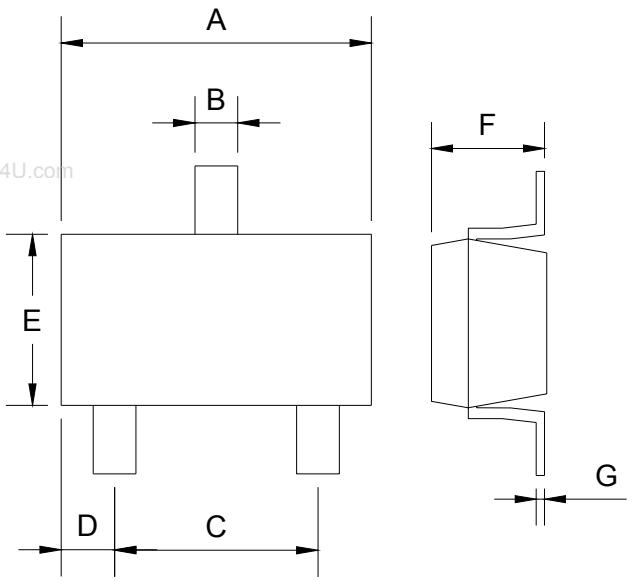
Maximum Safe Operating Area



Normalized Thermal Transient Impedance Curve

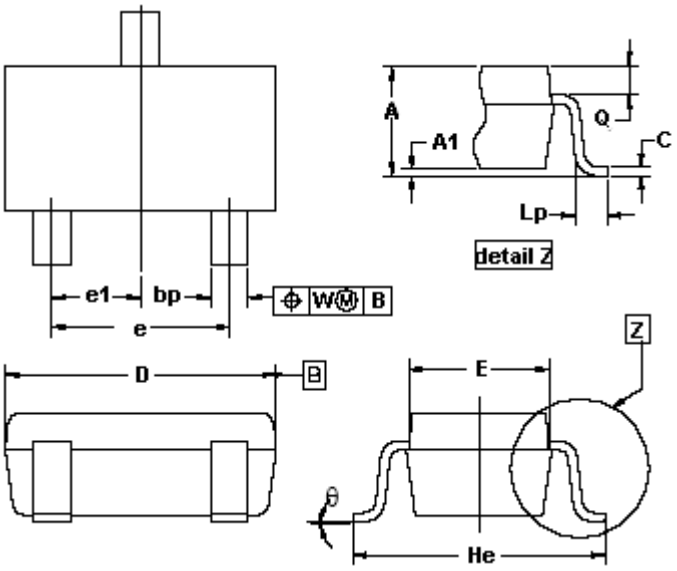


SOT-23 Mechanical Drawing



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^{o}	--	10^{o}	--