TSM2N7002ED
50V Dual N-Channel Enhancement Mode MOSFET

SOT-363

Pin assignment:
1. Source (2)
2. Gate (2)
3. Drain (1)
6. Drain (2)
5. Gate (1)
4. Source (1)

V_{DS} = 50V

$R_{DS (on)}$, Vgs @ 10V, Ids @ 250mA = 3Ω

$R_{DS (on)}$, Vgs @ 5V, Ids @ 50mA = 4Ω

Features

- ✧ Dual N-channel in package.
- ✧ 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

Ordering Information

Part No.	Packing	Package
TSM2N7002EDCU6	T & R (3kpcs/Rell)	SOT-363

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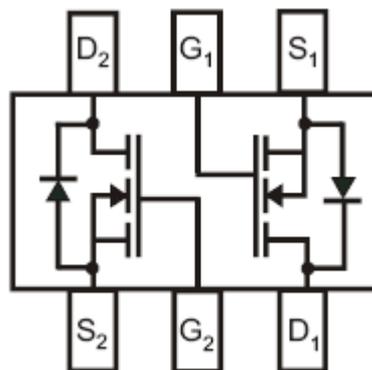
Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

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 ^{o}C	P_D	200	mW
	Ta = 75 ^{o}C		150	
Operating Junction Temperature		T_J	+150	^{o}C
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	^{o}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	^{o}C/W

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

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Electrical Characteristics (Single Channel)

Tj = 25 $^{\circ}$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	$V_{DS} \geq$ 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,	$T_{D(ON)}$	--	7.5	20	nS
Turn-On Rise Time	I_D = 100mA, V_{GEN} = 10V,	t_r	--	6	--	
Turn-Off Delay Time	R_G = 10Ω	$T_{D(OFF)}$	--	7.5	20	
Turn-Off Fall Time		t_f	--	3	--	
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V,	C_{iss}	--	19	50	pF
Output Capacitance	f = 1.0MHz	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.

![TSC logo]
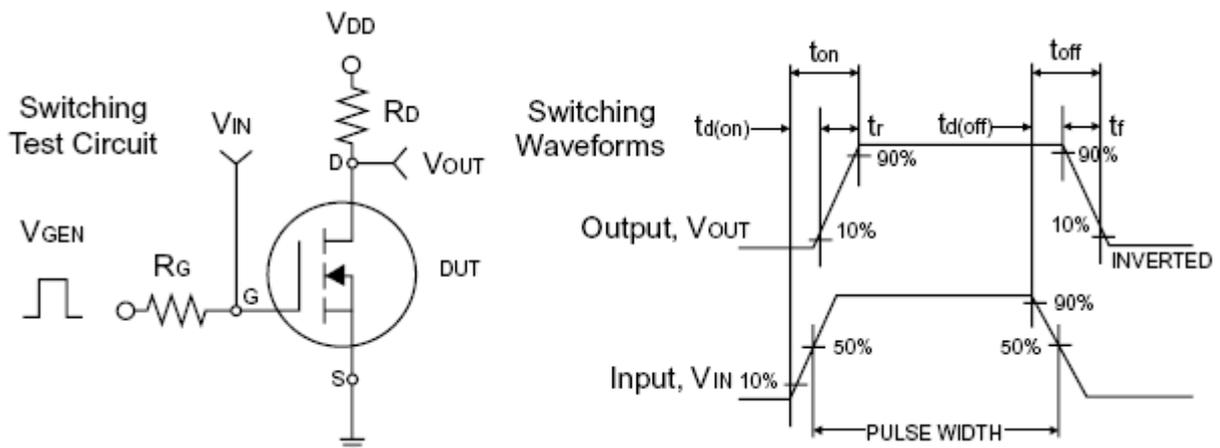
## Typical Characteristics Curve - Single Channel (Ta = 25 °C unless otherwise noted)

Output Characteristic

V_{GS}=10,9,8,7,6,5,4V

3V

Drain Current (A) vs Drain to source voltage (V)
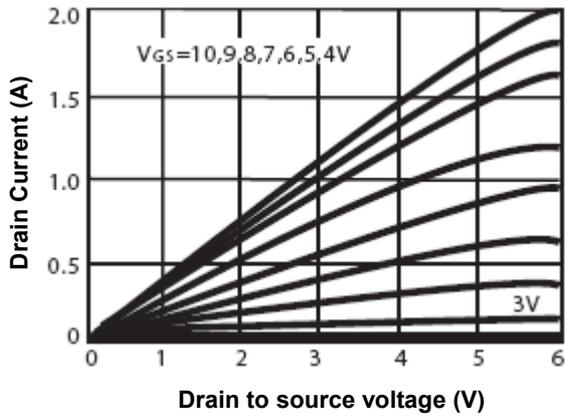
Transfer Characteristics

V_{DS}=10V

Tj=125°C 25°C

-55°C

Drain Current (A) vs Gate to source voltage (V)

Capacitance

Ciss

Coss

Crss

Capacitance (pF) vs Drain to source voltage (V)
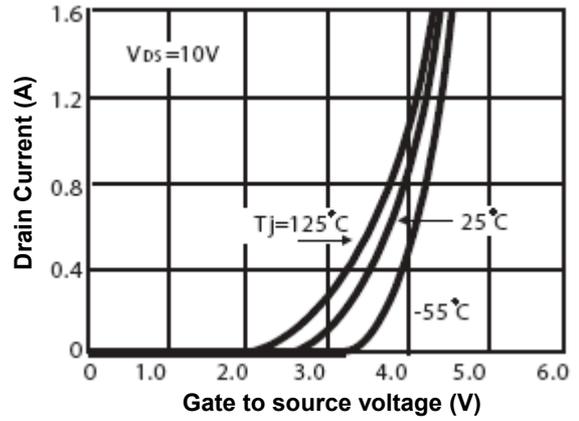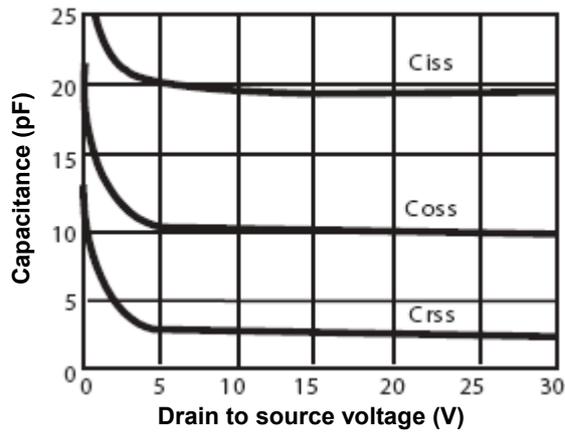
Rds(on) Variation with Drain Current

V_{GS}=10V   Tj=125°C

25°C

-55°C

Drain to source resistance (Ω) vs Drain current (A)
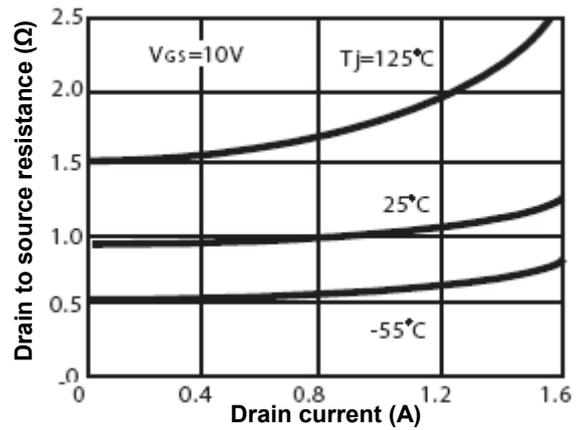
Vgs(th) with Temperature

V_{DS}=V_{GS}
I_D=250uA

Gate –source threshold voltage (V) vs Junction temperature (°C)
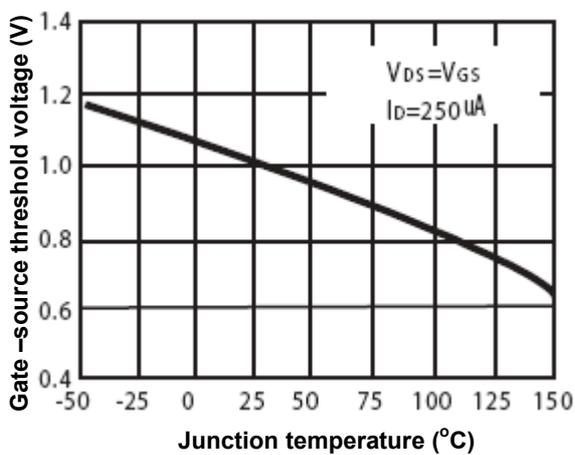
Vds breakdown with Temperature

ID=250uA

Drain –source breakdown voltage (V) vs Junction temperature (°C)

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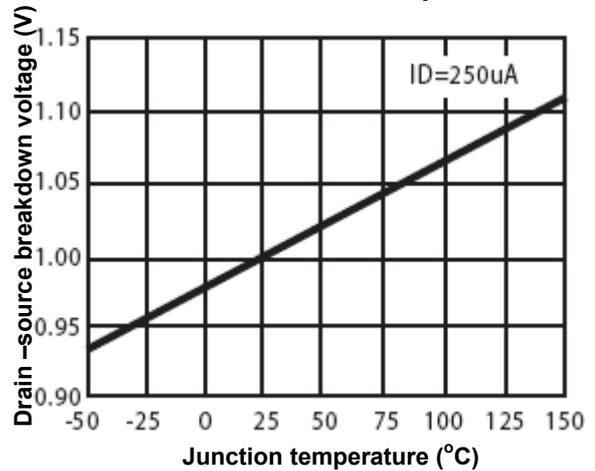
Typical Characteristics Curve (Ta = 25 ^{o}C unless otherwise noted)

Transconductance Variation

Transconductance (S) vs Drain to source current (A)

V_{DS}=7V

Body Diode Forward Voltage

Source-drain Current (A) vs Body diode forward voltage (V)

Gate Charge

Gate –source voltage (V) vs Total gate charge (nC)

V_{DS}=25V
I_D=0.115A
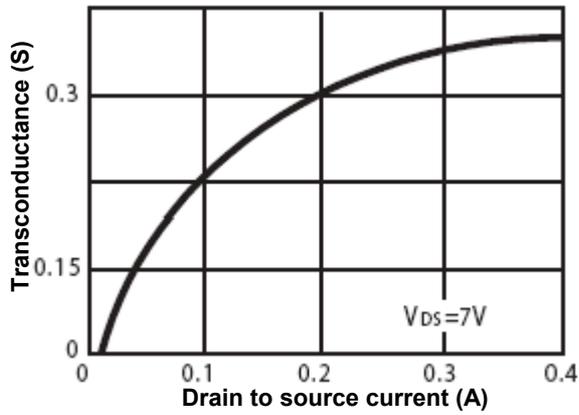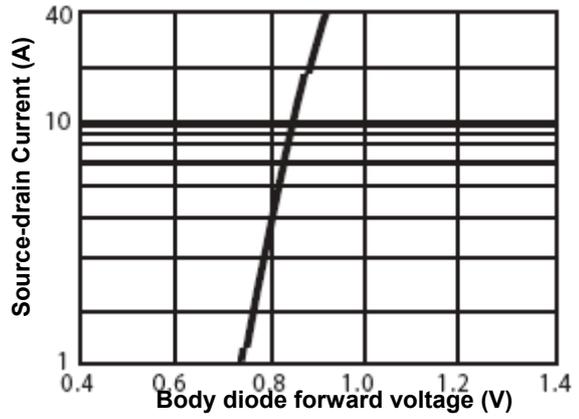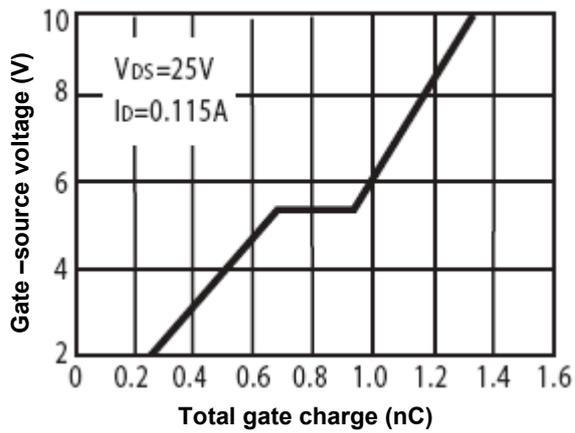
Maximum Safe Operating Area

Drain Current (A) vs Drain-source voltage (V)

$R_{DS(ON)}$ Limit
1ms
10ms
100ms
1s
DC

V_{GS}=10V
Single Pulse
T_A=25 $^{\circ}$C
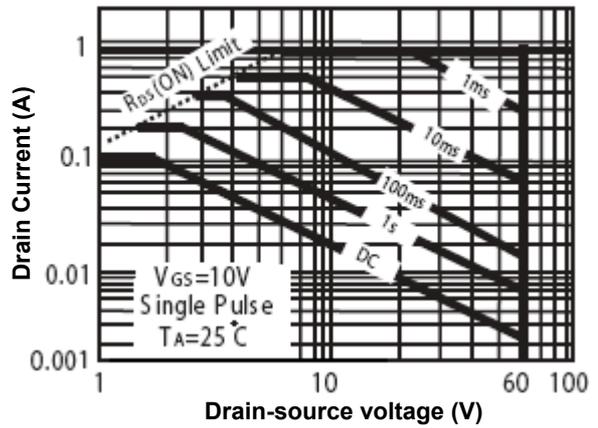
Normalized Thermal Transient Impedance Curve

Transient thermal impedance r(t) vs Square wave pulse duration (S)

D=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse

P_{DM}
t1
t2

1. R thJA (t)=r (t) * R thJA
2. R thJA=See Datasheet
3. TJM-TA = PDM* R thJA (t)
4. Duty Cycle, D=t1/t2

TSC
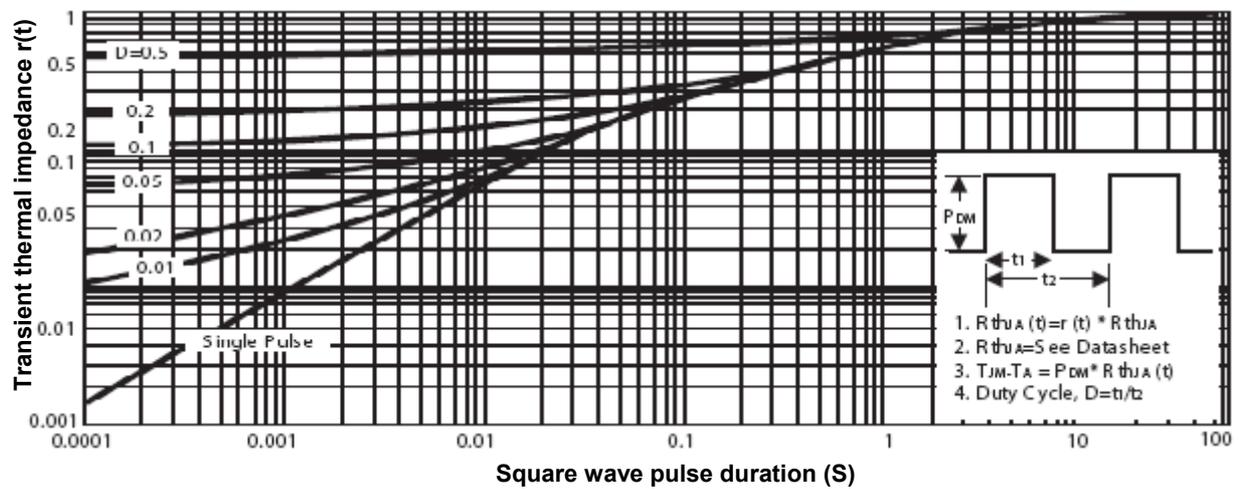
SOT-363 Mechanical Drawing
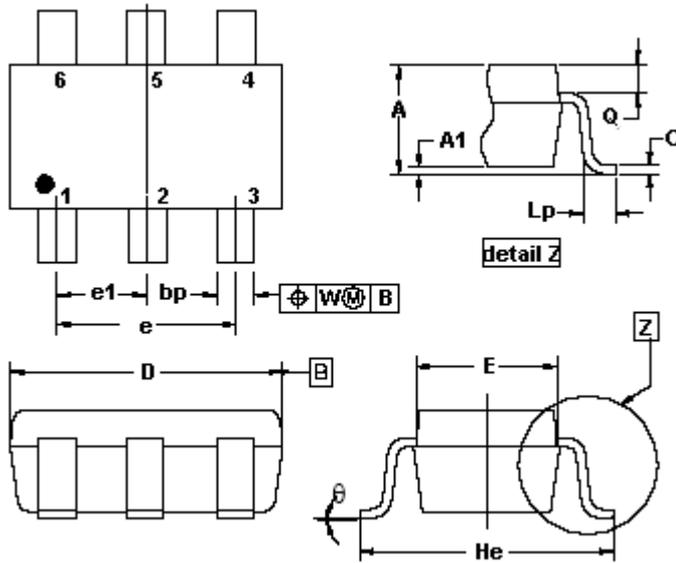
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.10	0.031	0.043
A1	--	0.10	--	0.004
bp	0.10	0.30	0.004	0.012
C	0.10	0.25	0.004	0.010
D	1.80	2.20	0.071	0.087
E	1.15	1.35	0.045	0.053
e	1.30 (typ)		0.052 (typ)	
e1	0.65 (typ)		0.026(typ)	
He	2.00	2.20	0.079	0.087
Lp	0.10	0.3	0.004	0.012
Q	0.20 (typ)		0.008 (typ)	
W	0.20 (typ)		0.008 (typ)	
Θ	10° (typ)		10° (typ)	

(table title: SOT-363 DIMENSION)