

2N7002T

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2N7002T

60V, 115mA N-Channel MOSFET

Features

- High density cell design for low $R_{DS(ON)}$.
- Voltage controlled small signal switch.
- Rugged and reliable.
- High saturation current capability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex. 2N7002T-H.

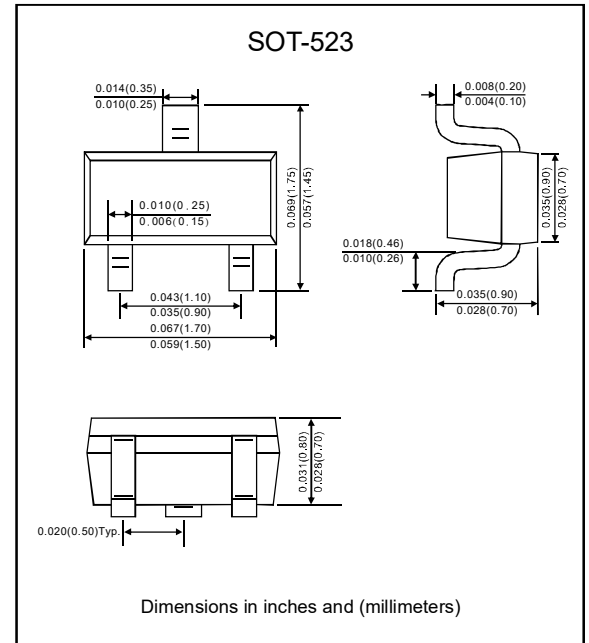
Application

- Load switch for portable devices.
- DC / DC Converter.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-523
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.003 gram

Package outline



Maximum ratings (At $T_A = 25^\circ\text{C}$ unless otherwise noted)

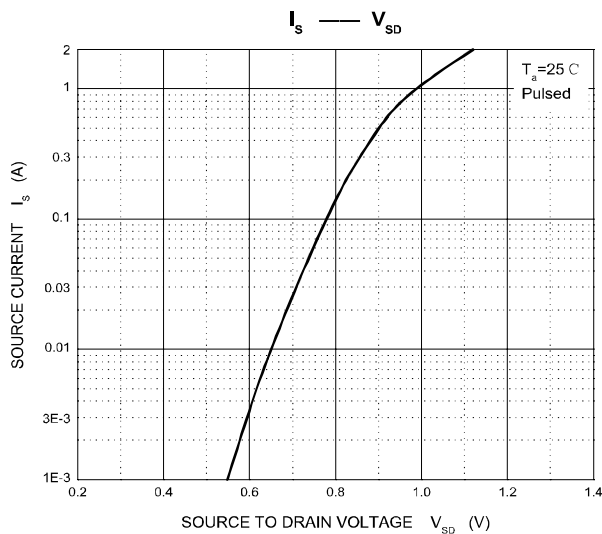
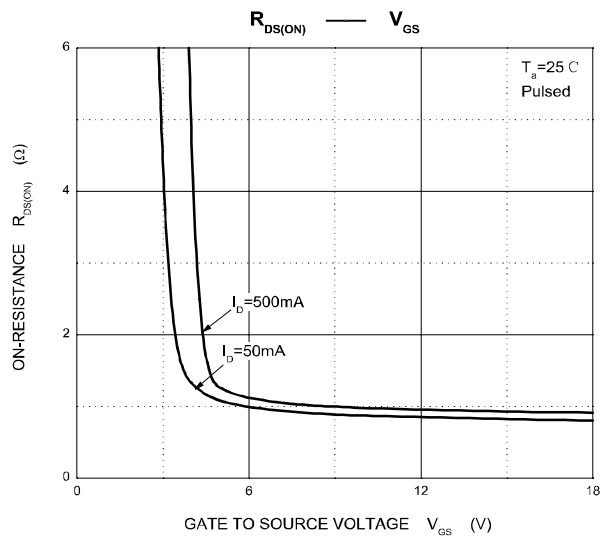
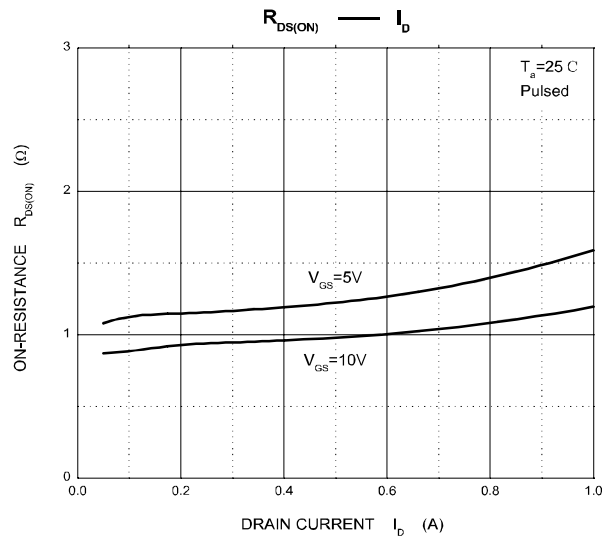
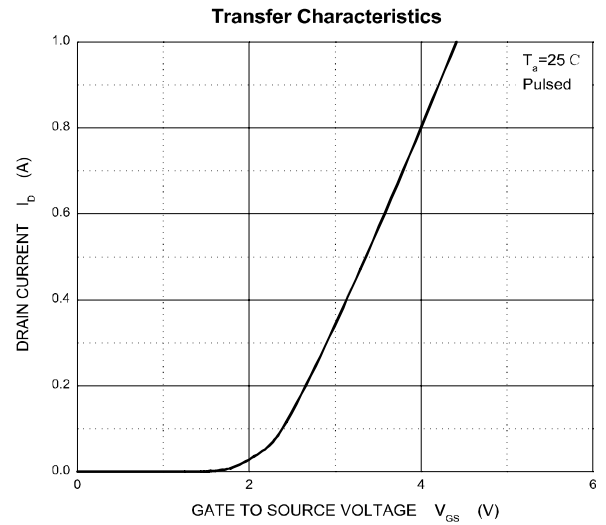
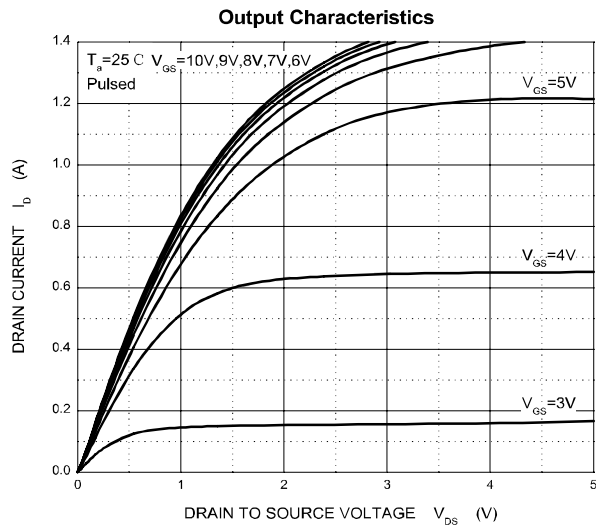
Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain Current	I_D	0.115	A
Power dissipation	P_D	0.2	W
Operating Junction temperature range	T_J	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$
Thermal resistance Junction to ambient	$R_{\theta JA}$	625	$^\circ\text{C}/\text{W}$

2N7002T**Electrical characteristics** (At $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60			V
Drain-source leakage current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			80	nA
Gate-source leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±80	nA
Gate threshold voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =100μA	1	1.6	2.5	V
On-state drain current	I _{D(on)}	V _{GS} =10V, V _{DS} =7V	500			mA
Static drain-source on-resistance ^a	R _{DS(ON)}	V _{GS} =10V, I _D =500mA		0.9	5	Ω
		V _{GS} =5V, I _D =50mA		1.1	7	Ω
Forward trans conductage	g _{FS}	V _{DS} =10V, I _D =200mA	80			mS
Drain source on-voltage	V _{DS(on)}	V _{GS} =10V, I _D =500mA			3.75	V
		V _{GS} =5V, I _D =50mA			0.375	
Diode forward voltage	V _{SD}	I _S =115mA, V _{GS} =0V	0.55		1.2	V
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f = 1MHz			50	pF
Output capacitance	C _{oss}				25	
Reverse transfer capacitance	C _{rss}				5	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{GEN} =10V, V _{DD} =25V I _D =500mA, R _G =25Ω, R _L =50Ω			20	ns
Turn-off delay time	t _{d(off)}				40	

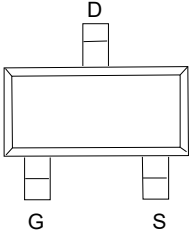
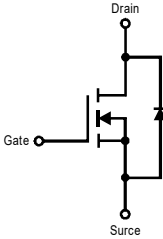
*These parameters have no way to verify.

Rating and characteristic curves (2N7002T)



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Pinning information

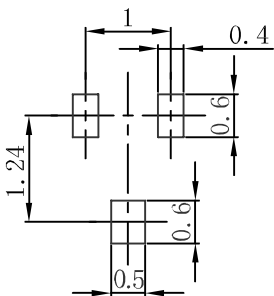
Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking code
2N7002T	K72

Suggested solder pad layout

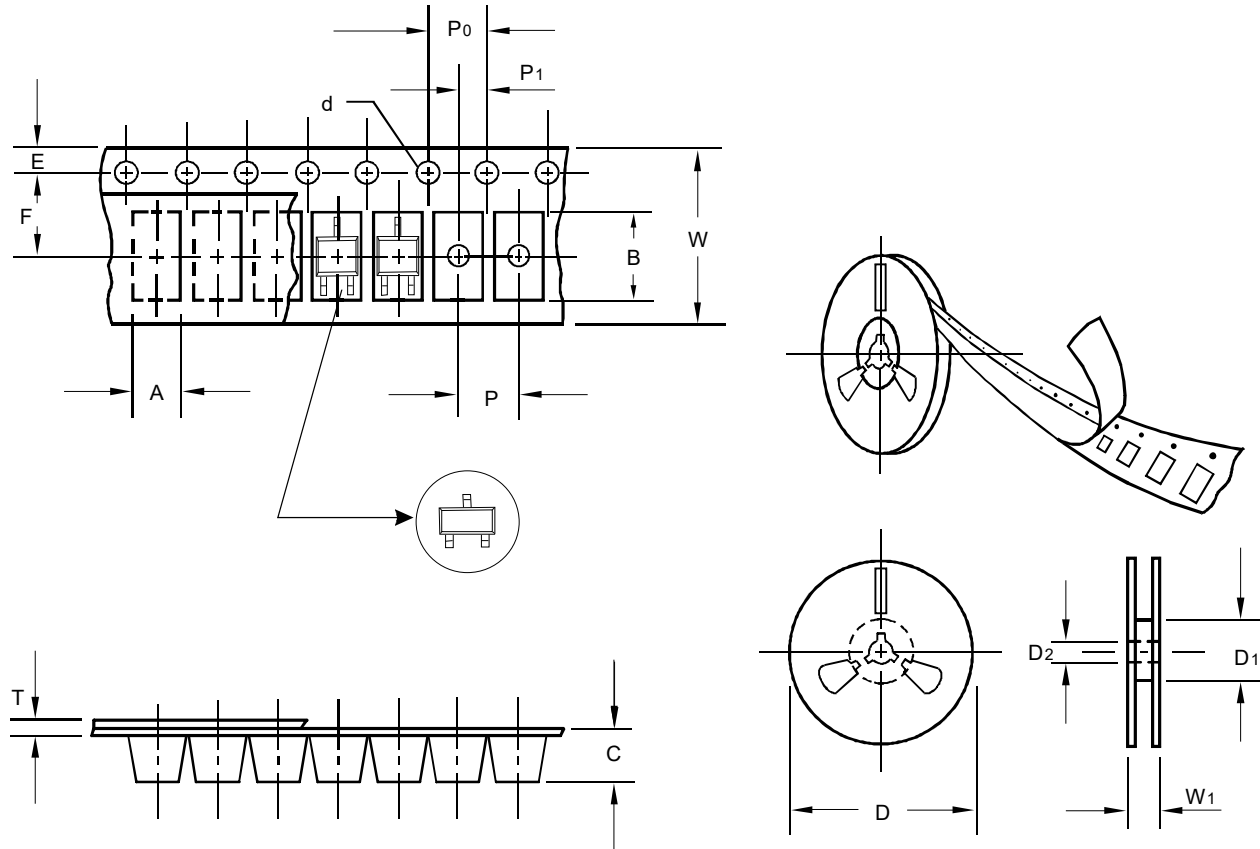
SOT-523



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-523
Carrier width	A	0.1	1.85
Carrier length	B	0.1	1.85
Carrier depth	C	0.1	0.875
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	54.40
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	12.30

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

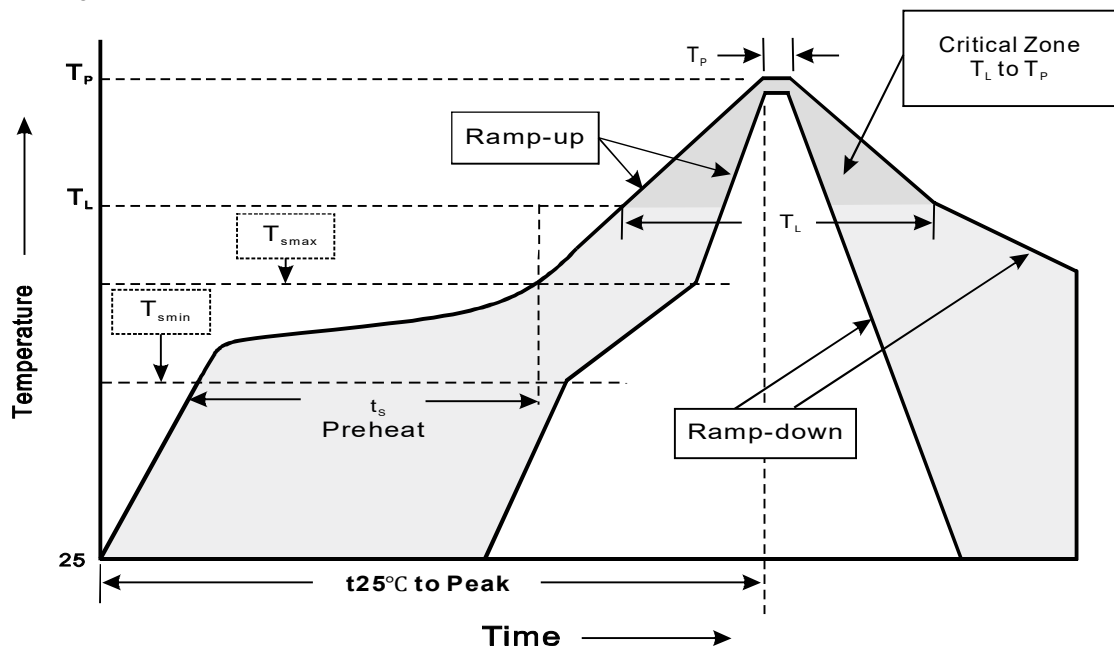
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-523	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6

Suggested thermal profiles for soldering processes

- 1.Storage environment : Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile feature	Soldering Condition
Average ramp-up rate (T_L to T_P)	< 3°C/sec
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (min to max) (t_s)	150°C 200°C 60 ~ 120sec
T_{smax} to T_L - Ramp-up rate	< 3°C/sec
Time maintained above: - Temperature (T_L) - Time(T_L)	217°C 60 ~ 260 sec
Peak Temperature(T_P)	255°C -0/+5°C
Time within 5°C of actual peak Temperature(T_P)	10 ~ 30sec
Ramp-down rate	< 6°C/sec
Time 25°C to peak temperature	< 6 minutes