



2N7002AKWD
0.3A 60V N-CHANNEL MOSFET

Features

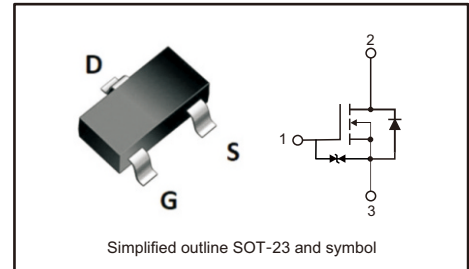
- Low On-Resistance
- low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD Protected Gate : 2000V
- Totally Lead-Free & Fully RoHs Compliant(Note 4)
- Halogen and Antimony Free. “Green” Device (Note3)

Applications

- Motor Control
- Power Management Functions

PINNING

PIN	DESCRIPTION
1	GATE
2	DRAIN
3	SOURCE



MAXIMUM RATINGS (Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	60	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current	I _D	0.3	A
Continuous Drain Current		0.2	A
Pulsed Drain Current(Note1)	I _{DM}	1.2	A
Power Dissipation	P _D	0.35	W
Thermal Resistance-Junction to Ambient	R _{θJA}	357	°C/W
Operation Junction Temperature	T _j	-55 to +150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%
3. Halogen free “GREEN” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br+Cl) and <1000ppm antimony compounds.
4. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.



ELECTRICAL CHARACTERISTICS(Ta=25°C unless otherwise noted.)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V,I _D = 250uA	60			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 60V,V _{GS} = 0V			1	uA
Gate- Source Leakage Current	I _{GSS}	V _{GS} = ±20V,V _{DS} = 0V			±10	uA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} ,I _D = 250uA	1	1.5	2.5	V
Static Drain-Source On-State Resistance(Note2)	R _{DS(on)}	V _{GS} = 10V,I _D = 0.3A		1.69	2.2	Ω
		V _{GS} = 4.5V,I _D = 0.2A		2.05	2.87	
Dynamic Characteristics						
Input Capacitance	C _{ISS}	V _{DS} = 25V V _{GS} = 0V f =1MHz		28		pF
Output Capacitance	C _{OSS}			11		
Reverse Transfer Capacitance	C _{RSS}			4		
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} = 10V V _{GS} = 4.5V I _D = 0.3A		1.7		nC
Gate-Source Charge	Q _{gs}			0.3		
Gate-Drain Charge	Q _{gd}			0.6		
Turn-On Delay Time	t _{d(on)}	V _{DD} =10V, R _{GEN} =10Ω, V _{GS} =10V, I _D =0.2A		2		ns
Turn-On Rise Time	t _{rr}			15		
Turn-Off Delay Time	t _{d(off)}			7		
Turn-Off Fall Time	t _f			20		
Body Diode Characteristics						
Drain-Source Diode Forward Voltage	V _{SD}	I _S = 0.3A,V _{GS} = 0V			1.2	V
Diode Forward Current	I _S				0.3	A



Typical Performance Characteristics

Fig 1. Output Characteristics

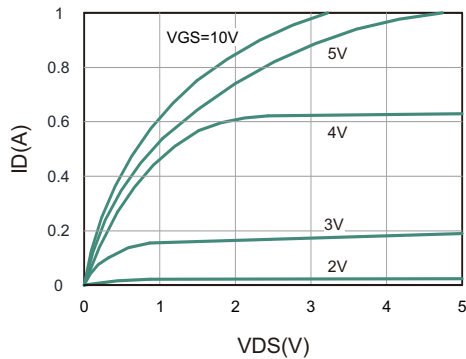


Fig 2. Typical Transfer Characteristics

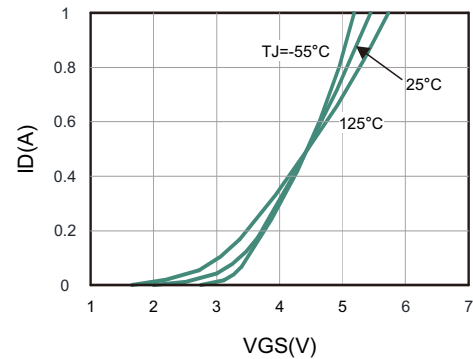


Fig 3. On-resistance vs. Drain Current

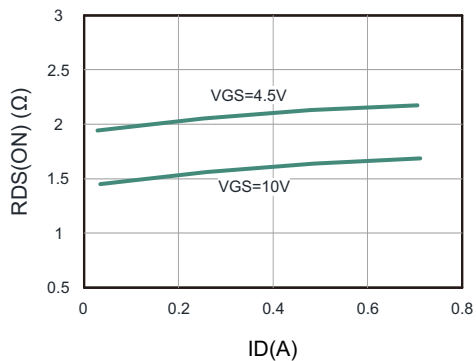


Fig 4. Body Diode Characteristics

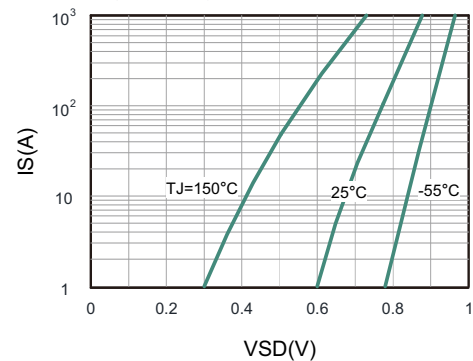


Fig 5. Gate Charge Characteristics

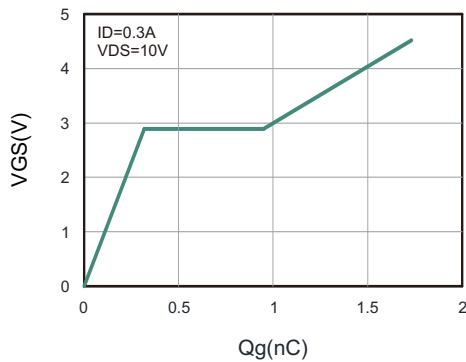


Fig 6. Capacitance Characteristics

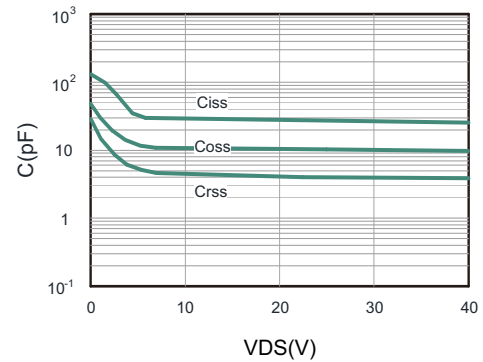


Fig 7. Normalized Breakdown Voltage vs. Junction Temperature

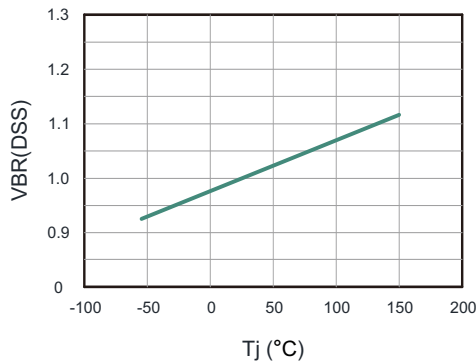


Fig 8. Normalized on Resistance vs. Junction Temperature

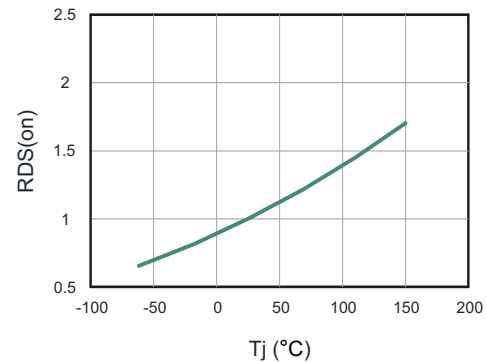




Fig 9. Maximum Safe Operating Area

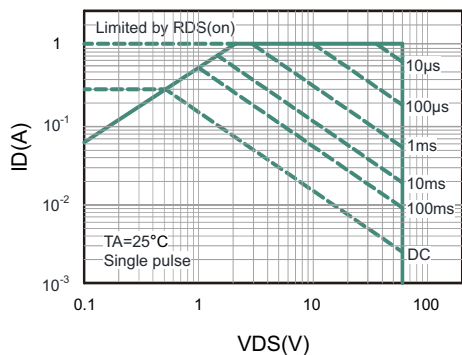


Fig 10. Maximum Continuous Drain Current vs.Ambient Temperature

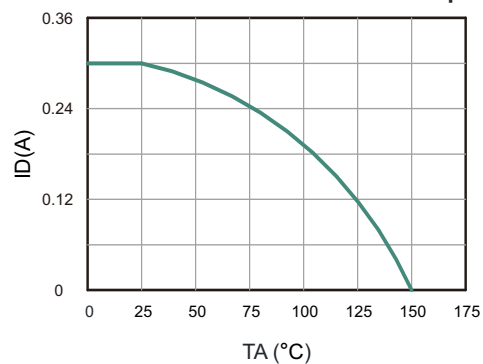
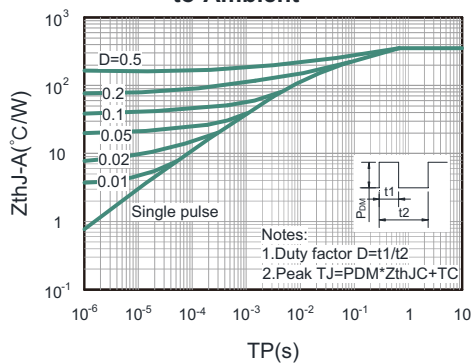
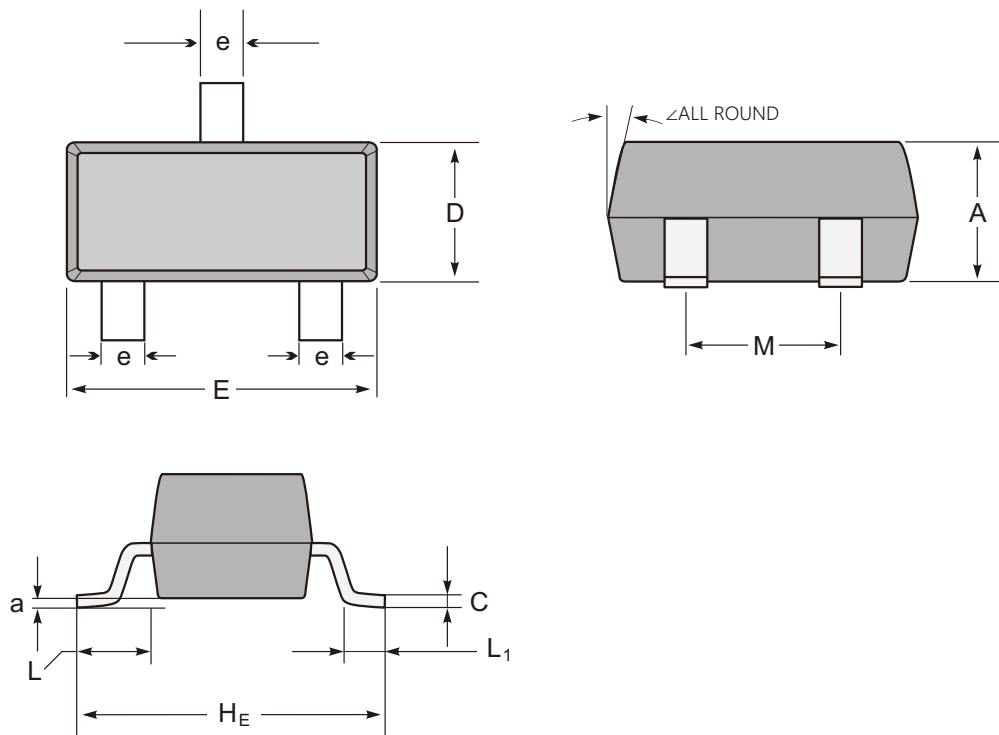


Fig 11. Maximum Effective Transient Thermal Impedance, Junction -to-Ambient





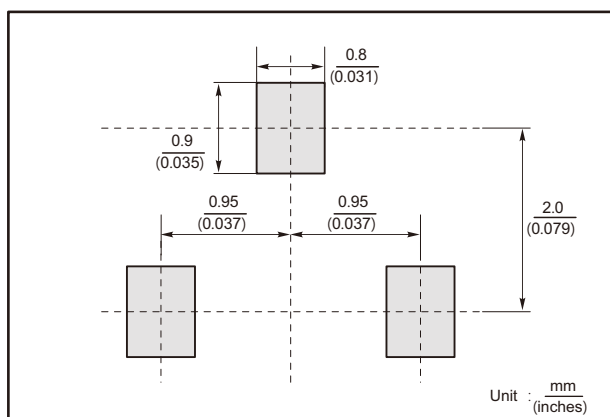
SOT-23 Package Outline Dimensions



SOT-23 mechanical data

UNIT		A	C	D	E	HE	e	M	L	L1	a	∠
mm	max	1.1	0.20	1.4	3.0	2.6	0.6	1.95	0.55 (ref)	0.36 (ref)	0.15	12°
	min	0.9	0.08	1.2	2.8	2.2	0.35	1.7			0.0	
mil	max	43	7.9	55	118	102	24	77	22 (ref)	14 (ref)	6	
	min	35	3.1	47	110	87	13	67			0.0	

The recommended mounting pad size



Marking

Type number	Marking code
2N7002AKWD	72AK



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