

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

2N7002DW-7-F-MS

Product specification


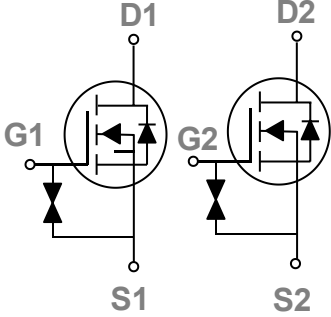

General Features

- 60V,0.3A,RDS(ON)=1.8Ω@VGS=10V
Improved dv/dt capability
- Fast switching
- Green Device Available
- G-S ESD Protection Diode Embedded

Application

- Motor Drive
- Power Tools
- LED Lighting

Reference News

PACKAGE OUTLINE	Pin Configuration	Marking
		
<p>SOT-363</p>		

Absolute Maximum Ratings (TA=25°C unless otherwise)

Symbol	Parameter	Rating	Units
V _{DS}	Drain- Source Voltage	60	V
V _{GS}	Gate- Source Voltage	±20	V
I _D	Drain Current – Continuous (T _A =25°C)	0.3	A
	Drain Current – Continuous (T _A =70°C)	0.24	A
I _{DM}	Drain Current – Pulsed ¹	1.2	A
P _D	Power Dissipation (T _A =25°C)	0.28	W
	Power Dissipation – Derate above 25°C	0.002	W/°C
T _{STG}	Storage Temperature Range	-50 to 150	°C
T _J	Operating Junction Temperature Range	-50 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	---	450	°C/W

Electrical Characteristics (T_J=25 °C , unless otherwise noted) Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain- Source Breakdown Voltage	V _{GS} =0V , I _D =250μA	60	---	---	V
ΔBVDSS/ ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C , I _D =1mA	---	0.04	---	V/°C
IDSS	Drain- Source Leakage Current	V _{DS} =60V , V _{GS} =0V , T _J =25°C	---	---	1	A
		V _{DS} =48V , V _{GS} =0V , T _J =125°C	---	---	100	A
IGSS	Gate- Source Leakage Current	V _{GS} = ±20V , V _{DS} =0V	---	---	±10	A

On Characteristics

R _{DS(ON)}	Static Drain- Source On-Resistance	V _{GS} =10V , I _D =0.3A	---	1.8	2.8	Ω
		V _{GS} =4.5V , I _D =0.2A	---	2.2	3	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	1	1.6	2.5	V
ΔV _{GS(th)})	V _{GS(th)} Temperature Coefficient		---	-4	---	MV/°C
g _{fs}	Forward Transconductance	V _{DS} =10V , I _D =0.1A	---	0.24	---	S

Dynamic and switching Characteristics

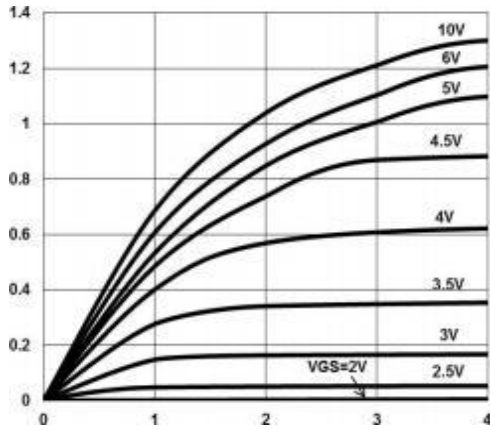
Qg	Total Gate Charge ^{2, 3}	VDS=30V , VGS=10V , ID=0.2A	---	1.1		nC
Qgs	Gate-Source Charge ^{2, 3}		---	0.1		
Qgd	Gate-Drain Charge ^{2, 3}		---	0.23		
Td(on)	Turn-On Delay Time ^{2, 3}	VDD=30V , VGS=10V , RG=6Ω ID=0.2A	---	3		nS
Tr	Rise Time ^{2, 3}		---	5		
Td(off)	Turn-Off Delay Time ^{2, 3}		---	14		
Tf	Fall Time ^{2, 3}		---	9		
Ciss	Input Capacitance	VDS=10V , VGS=0V , F=1MHz	---	30.6		pF
Coss	Output Capacitance		---	5.5		
Crss	Reverse Transfer Capacitance		---	4		

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
IS	Continuous Source Current	VG=VD=0V , Force Current	---	---	0.3	A
ISM	Pulsed Source Current		---	---	0.6	A
VSD	Diode Forward Voltage	VGS=0V , IS=1A , TJ=25C	---	---	1.2	V

Note :

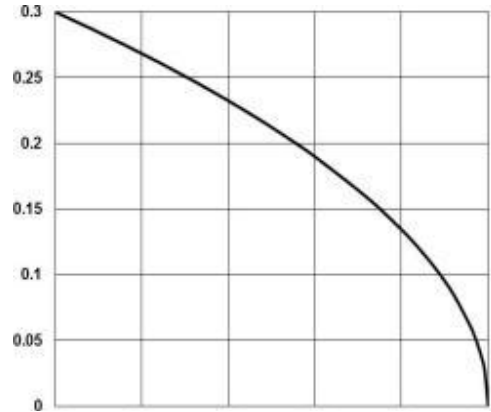
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width \cong 300us , duty cycle \cong 2%.
3. Essentially independent of operating temperature.

I_D , Continuous Drain Current (A)



V_{DS} , Drain to Source Voltage (V)

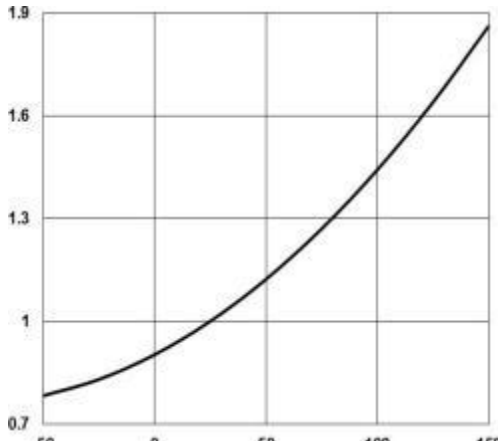
Fig. 1 Output Characteristics



T_J , Junction Temperature ($^{\circ}C$)

Fig. 2 Continuous Drain Current vs. T_J

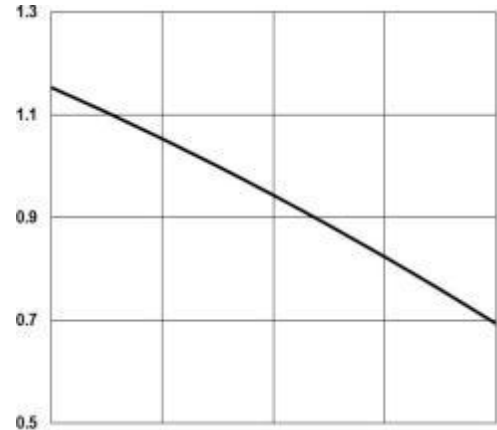
Normalized On Resistance



T_J , Junction Temperature ($^{\circ}C$)

Fig. 3 Normalized $R_{DS(ON)}$ vs. T_J

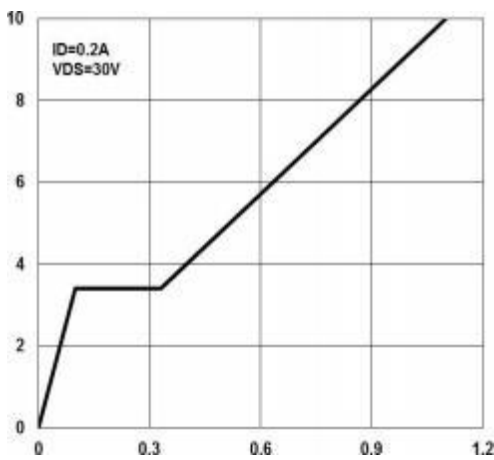
Normalized Gate Threshold Voltage (V)



T_J , Junction Temperature ($^{\circ}C$)

Fig. 4 Normalized V_{th} vs. T_J

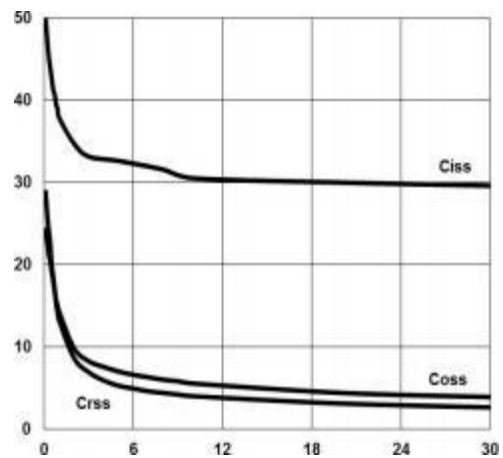
V_{GS} , Gate to Source Voltage (V)



Q_g , Gate Charge (nC)

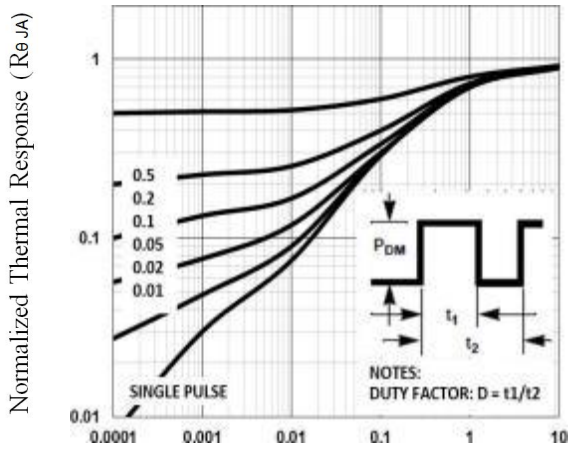
Fig. 5 Gate Charge Waveform

C , Capacitance (pF)



V_{DS} , Drain to Source Voltage (V)

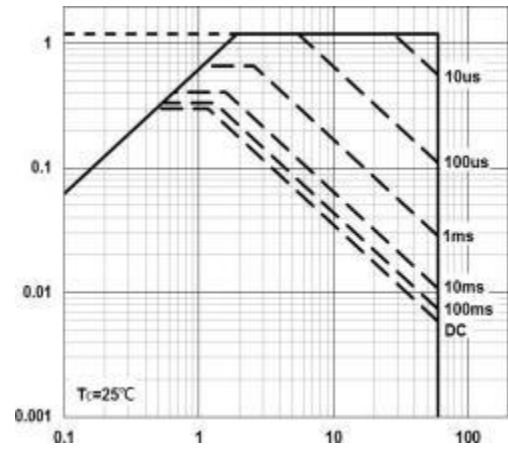
Fig. 6 Capacitance Characteristics



Square Wave Pulse Duration (s)

Fig. 7 Normalized Transient Impedance

I_D , Continuous Drain Current (A)



VDS , Drain to Source Voltage(V)

Fig. 8 Maximum Safe Operation Area

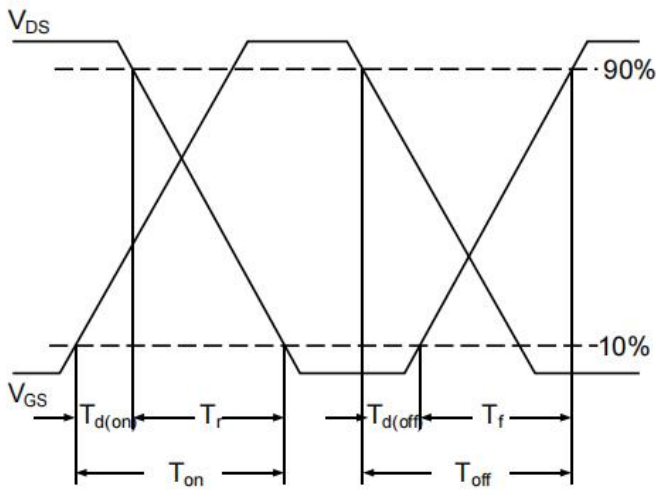
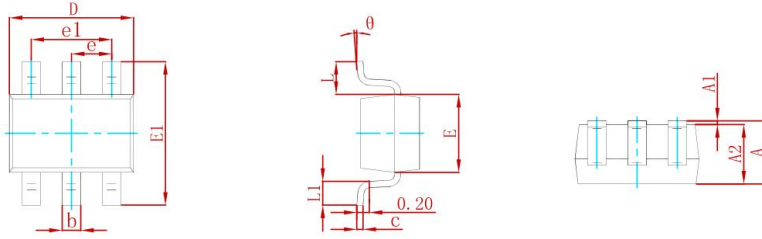


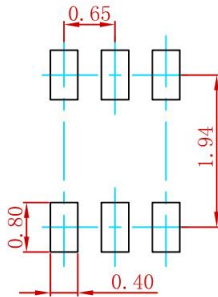
Fig.9 Switching Time Waveform

PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.100	0.150	0.004	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.400	0.085	0.094
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

Suggested Pad Layout



Note:

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

REEL

P/N	PKG	QTY
2N7002DW-7-F-MS	SOT-363	3000

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