

SMN01Z30Q

Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATIONS

Features

• High Voltage : $BV_{DSS}=300V(Min.)$

• Low C_{rss} : C_{rss} =3.2pF(Typ.)

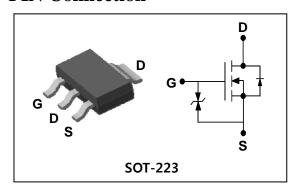
• Low gate charge : Qg=2.9nC(Typ.)

• Low $R_{DS(on)}$: $R_{DS(on)}=8\Omega(Max.)$

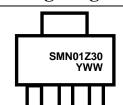
Ordering Information

Type No.	Marking	Package Code
SMN01Z30Q	SMN01Z30	SOT-223

PIN Connection



Marking Diagram



Column 1 : Device Code

Column 2: Production Information

e.g.) YWW

-. Y : Year Code -. WW : Week Code

Absolute maximum ratings (T_C=25°C unless otherwise noted)

Characteristic		Symbol		Rating	Unit		
Drain-source voltage		V_{DSS}		300	V		
Gate-source voltage		V_{GSS}		V_{GSS}		±20	V
Drain current (DC) *		т	T _C =25°C	1.3	Α		
Drain current (DC)		I_D	T _C =100°C	0.78	Α		
Drain current (Pulsed) *		I_{DM}		5.2	Α		
Power dissipation		P _D		2.1	W		
Avalanche current (Single)	2	I_{AS}		1.3	Α		
Single pulsed avalanche energy	2	E _{AS}		182.6	mJ		
Avalanche current (Repetitive)	①	I_{AR}		1.3	Α		
Repetitive avalanche energy	①	E _{AR}		0.2	mJ		
Junction temperature		Tı		150	°C		
Storage temperature range		T _{stg}		-55~150	٠		

^{*} Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max.	Unit	
Thermal resistance	Junction-ambient	$R_{th(\mathtt{J-A})}$	-	60	°C/W	

KSD-T5A005-000

$\boldsymbol{Electrical\ Characteristics}\ (T_{\text{C}}\text{=}25^{\circ}\text{C}\ unless\ otherwise\ noted})$

Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	I _D =250uA, V _{GS} =0V	300	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250uA$, $V_{DS}=V_{GS}$	1.5	2.0	2.5	V
Drain-source cut-off current	I_{DSS}	V _{DS} =300V, V _{GS} =0V	-	-	1	uA
Gate leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±15V	-	-	±10	uA
Drain-source on-resistance ④	R _{DS(on)}	V _{GS} =10V, I _D =650mA	-	6.9	8	Ω
Forward transfer conductance ④	g _{fs}	V_{DS} =10V, I_{D} =650mA	-	0.4	-	S
Input capacitance	C _{iss}		-	101	130	
Output capacitance	C _{oss}	V _{GS} =0V, V _{DS} =25V f=1 MHz	-	15	20	pF
Reverse transfer capacitance	C _{rss}		-	3.2	5.0	
Turn-on delay time	t _{d(on)}		-	5	20	
Rise time	t _r	$V_{DD} = 150V, I_{D} = 1.3A$	-	17	44	nc
Turn-off delay time	t _{d(off)}	$R_G=25\Omega$ 3.4	-	21	52	ns
Fall time	t _f		-	35	80	
Total gate charge	Q_g	V _{DS} =240V, V _{GS} =10V	-	2.9	4.5	
Gate-source charge	Q_{gs}	I _D =1.3A	-	0.4	-	nC
Gate-drain charge	Q_{gd}	34	-	0.7	-	

Source-Drain Diode Ratings and Characteristics (T_C=25°C unless otherwise noted)

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Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode	-	-	1.3	^
Source current (Pulsed)	I_{SM}	in the MOSFET	-	-	5.2	Α
Forward voltage 4	V_{SD}	V_{GS} =0V, I_{S} =1.3A	-	-	1.4	V
Reverse recovery time	t _{rr}	I _S =1.3A, V _{GS} =0V	-	270	-	ns
Reverse recovery charge	Q _{rr}	dI _F /dt=100A/us	-	0.27	-	uC

Gate to Source Zener Diode (T_C=25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Gate-Source Breakdown Voltage	$\pm BV_{GSO}$	$I_G=\pm 1$ mA, $V_{DS}=0$ V	±20	±24	-	V

Note;

① Repetitive rating: Pulse width limited by maximum junction temperature

② L=180mH, I_{AS} =1.3A, V_{DD} =50V, R_{G} =25 Ω , Starting T_{J} =25 $^{\circ}$ C

③ Pulse Test : Pulse width≤300us, Duty cycle≤2%

4 Essentially independent of operating temperature

Electrical Characteristic Curves

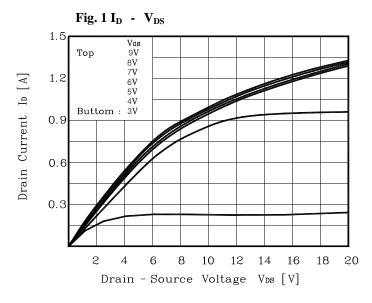


Fig. 2 I_D - V_{GS}

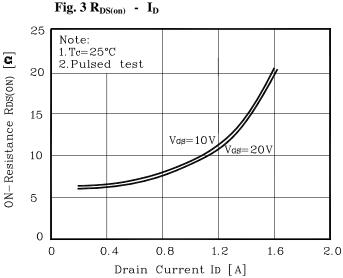
10

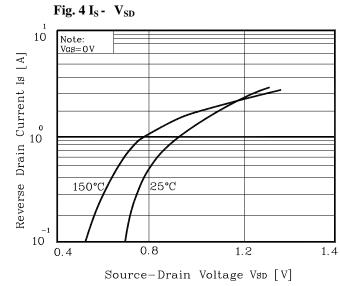
Note:
1. V_{DS}=10V
2. Pulse test

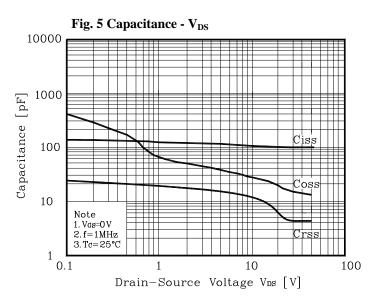
150°C

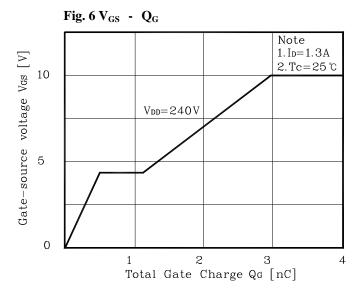
2 4 6 8 10

Gate-Source Voltage VGS [V]









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Electrical Characteristic Curves

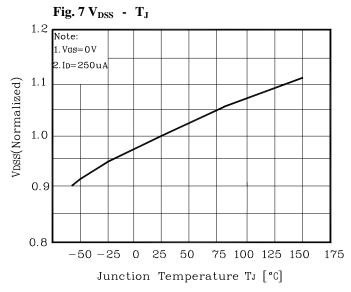


Fig. 9 I_D - T_C

1.6

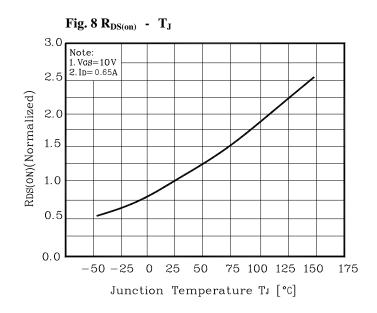
[V] 1.2

0.8

0.4

0 25 50 75 100 125 150

Case Temperature Tc [°C]



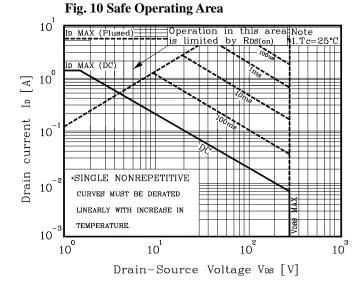


Fig. 11 Gate Charge Test Circuit & Waveform

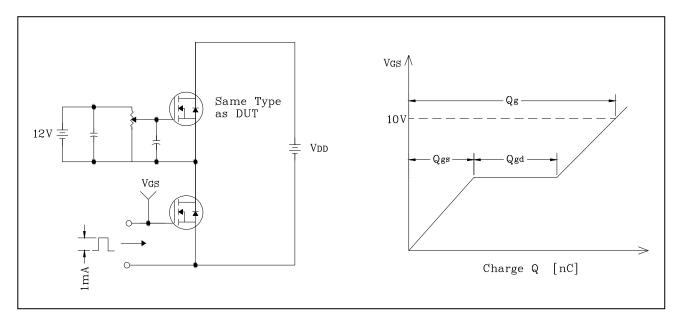


Fig. 12 Switching Time Test Circuit & Waveform

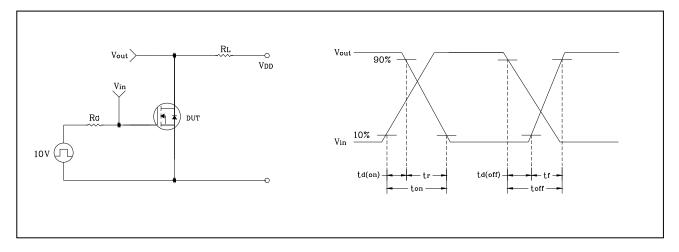


Fig. 13 E_{AS} Test Circuit & Waveform

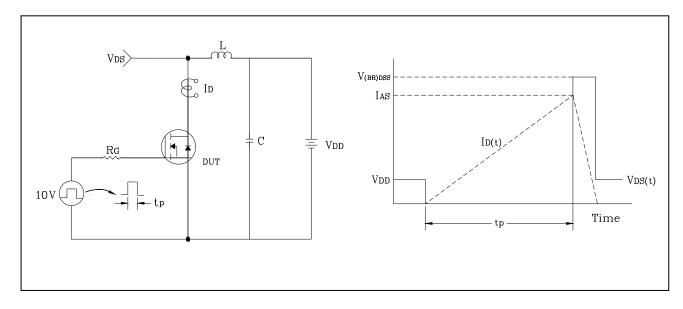
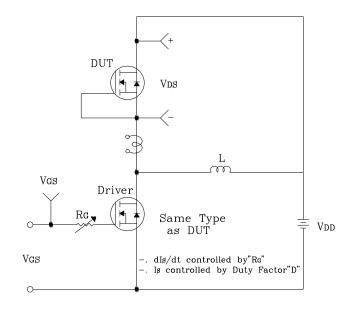
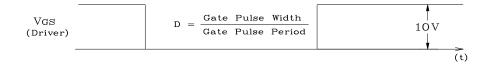
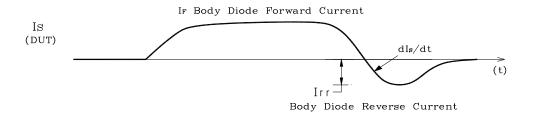
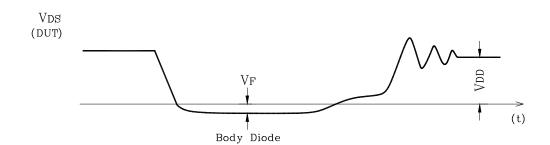


Fig. 14 Peak Diode Recovery dv/dt Test Circuit & Waveform



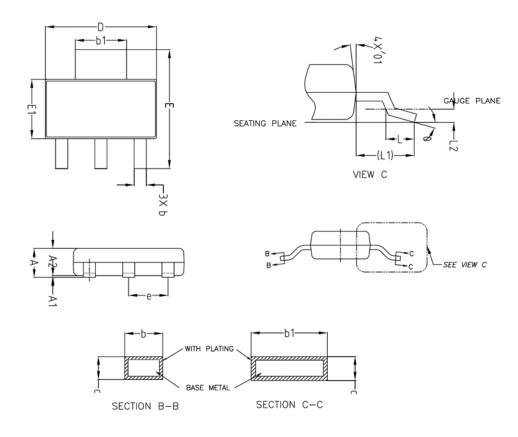






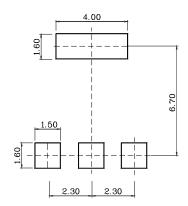
Outline Dimension

unit: mm



	MILLIMETERS				
SYMBOL	MINIMUM	NOMINAL	MAXIMUM	NOTE	
Α	_	_	1.80		
A1	0.00	_	0.10		
A2	1.60	1.65	1.70		
Ь	0.68	_	0.76		
ь1	2.95	_	3.07		
С	0.23	_	0.28		
D	6.40	6.50	6.60		
Ε	6.80	7.00	7.20		
E1	3.40	3.50	3.60		
е		2.30 BSC			
L	0.45	_	0.65		
L1		1.75 REF			
L2		0.10 BSC			
0	0,	_	10*		
0 1	5*	_	10°	Г	

**** Recommended Land Pattern** [unit: mm]



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