Product Summary

RoHS

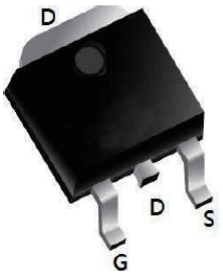
★ Green Device Available
★ Excellent CdV/dt effect decline
★ 100% EAS Guaranteed
★ Advanced VD MOSFETS

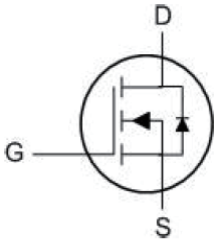
BVDSS	RDSON	ID
500V	2.4mΩ	4A

Applications

The 4N50 is the Advanced VD N-ch MOSFETS, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.
The 4N50 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		500	V
V_{GSS}	Gate-Source Voltage		±30	V
I_D	Continuous Drain Current	T_C = 25℃	4	A
		T_C = 100℃	2	A
I_{DM}	Pulsed Drain Current note1		15	A
EAS	Single Pulsed Avalanche Energy (Note 2)		67	mJ
I_{AR}	Avalanche Current (Note 1)		5	A
EAR	Repetitive Avalanche Energy (Note 1)		6.4	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)		5	V/ns
P_D	Power Dissipation	T_C = 25℃	32.9	W
		Derate above 25°C	0.2	W/°C
T_L	Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		300	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 To 150	℃

Thermal Data

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	6.25	°C/W
$R_{\theta JS}$	Thermal Resistance, Case-to-Sink Typ.	--	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

Electrical Characteristics (T_J =25 °C unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown	V_{GS} = 0V, I_D = 250μA	500	550	--	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}= 650V, V_{GS}= 0V,	--	--	1	μA
IGSS	Gate-Source Leakage	V_{GS} = ±30V	--	--	±100	nA
VGS(th)	Gate-Source Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2	3	4	V
RDS(on)	Drain-Source On-Resistance	V_{GS} = 10V, I_D = 3.5A	--	2.4	3	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	310	--	pF
C_{oss}	Output Capacitance		--	39	--	
C_{rss}	Reverse Transfer Capacitance		--	6	--	
Q_g	Total Gate Charge	V_{DD}=400V, I_D = 3A, V_{GS} = 10V	--	8	--	nC
Q_{gs}	Gate-Source Charge		--	1.2	--	
Q_{gd}	Gate-Drain Charge		--	5	--	
td(on)	Turn-on Delay Time	V_{DD}=250V, I_D = 3A, R_G = 25Ω	--	7.8	--	ns
t_r	Turn-on Rise Time		--	33	--	
td(off)	Turn-off Delay Time		--	23	--	
t_f	Turn-off Fall Time		--	59	--	
IS	Continuous Body Diode Current	T_C = 25 ºC	--	--	4	A
ISM	Pulsed Diode Forward Current		--	--	12	A
V_{SD}	Body Diode Voltage	T_J = 25ºC, I_{SD} = 3A, V_{GS} = 0V	--	--	1.4	V
trr	Reverse Recovery Time	V_{GS} = 0V,Is = 3A, di_F/dt =100A /μs	--	80	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.8	--	μC

Notes:

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2、The EAS data shows Max. rating . IAS = 2.4A, V_{DD} = 50V, RG = 25 Ω, Starting TJ = 25 °C

3、The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

4、The power dissipation is limited by 150°C junction temperature

5、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Electrical and Thermal Characteristics (Curves)

Figure1: Output Characteristics

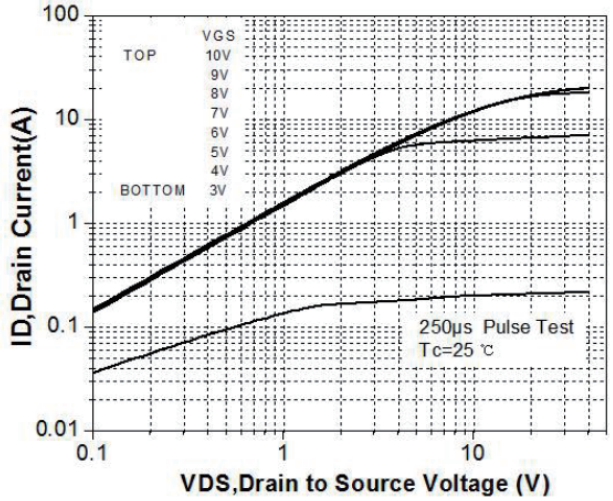


Figure 2: Typical Transfer Characteristics

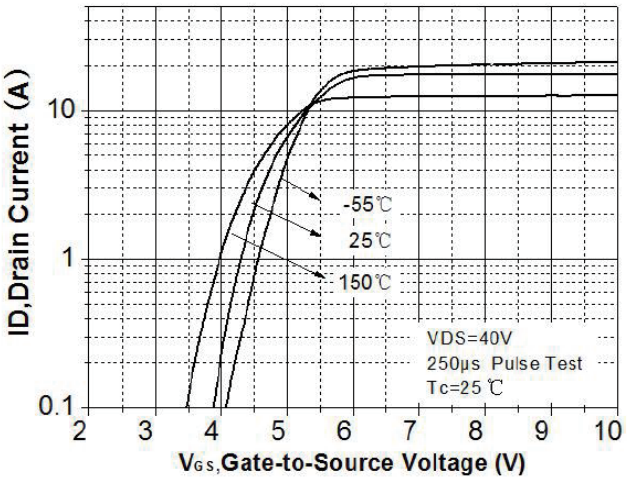


Figure 3:On-resistance vs. Drain Current

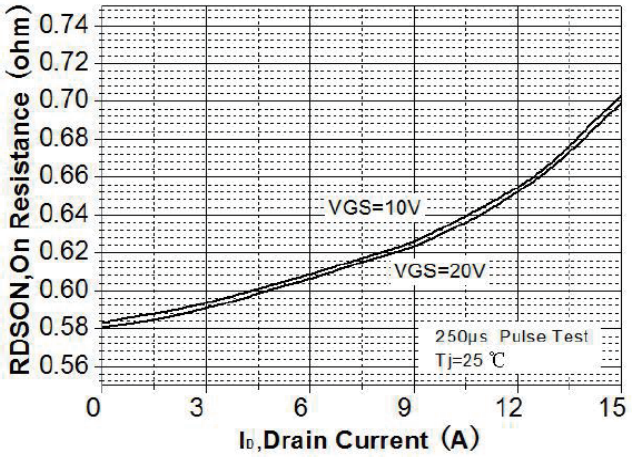


Figure 4: Body Diode Characteristics

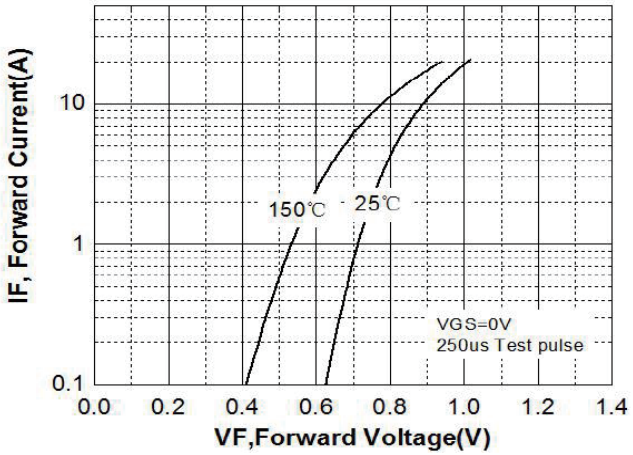


Figure 5: Capacitance Characteristics

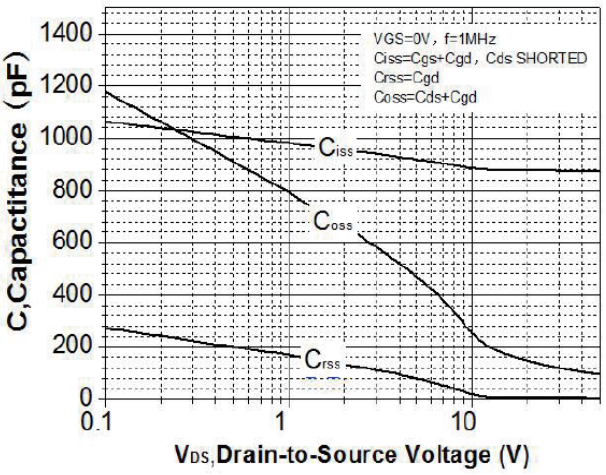
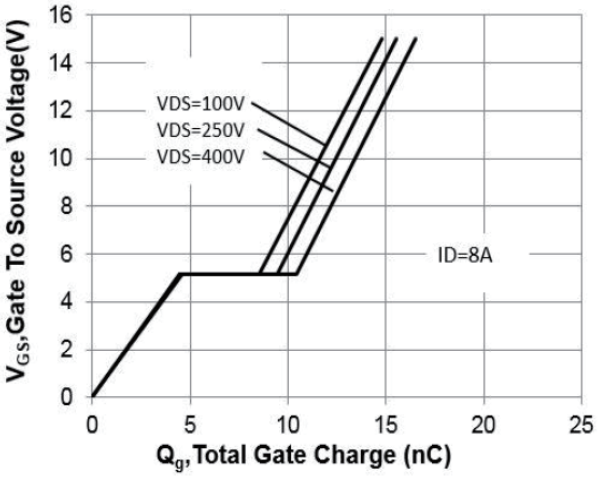


Figure 6:Gate Charge Characteristics



Typical Performance Characteristics

Figure 7:Breakdown Voltage Variation

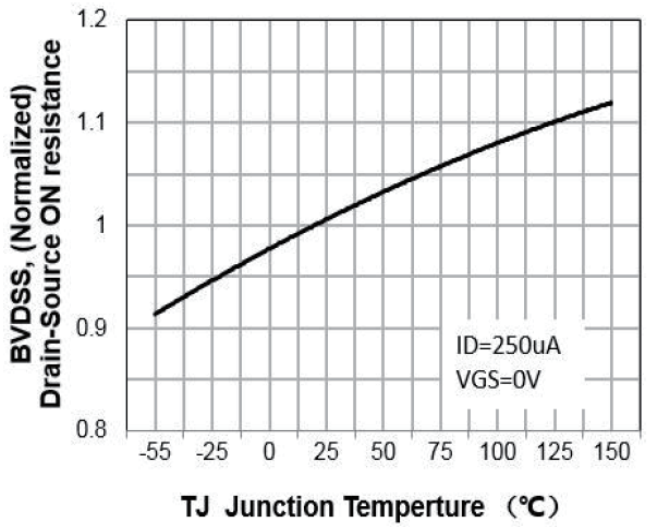


Figure 8: On-Resistance Variation

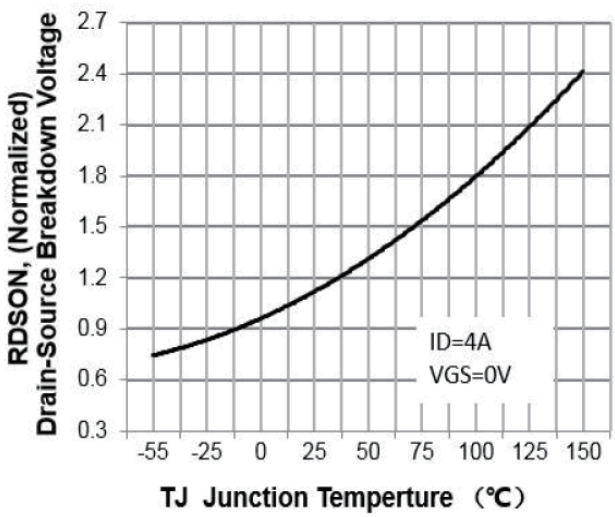


Figure 9:Maximum Safe Operating Area

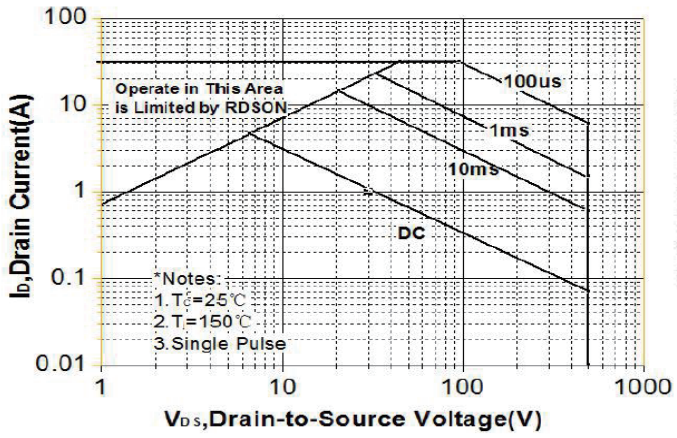


Figure 10: Maximum Drain Current

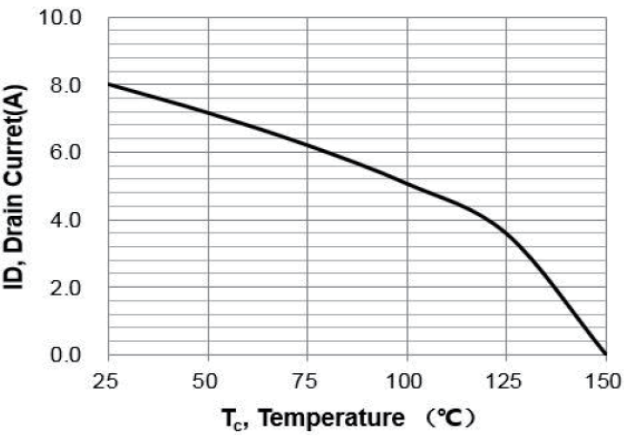
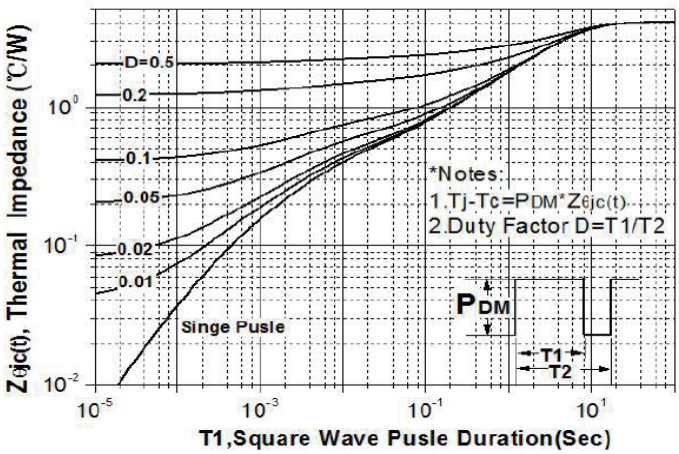
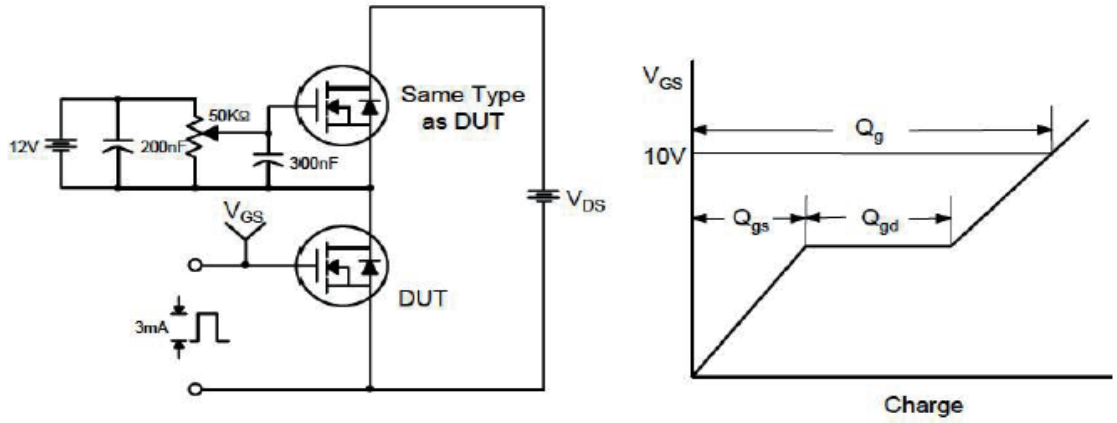


Figure 11:Transient Thermal Response

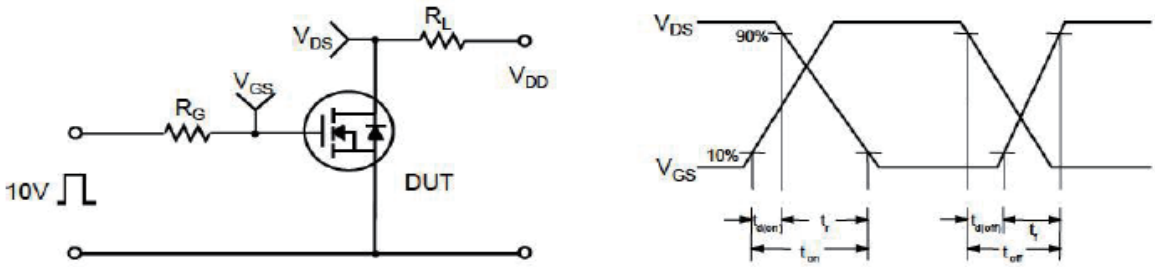


Test circuit

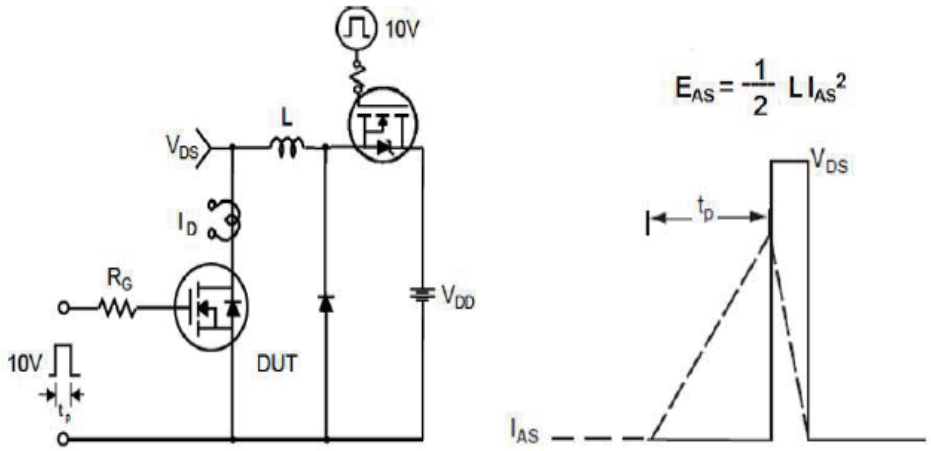
Gate Charge Test Circuit & Waveform



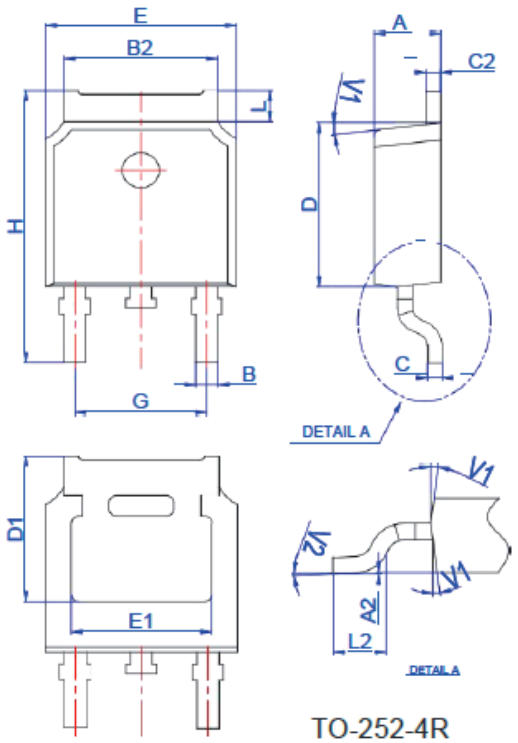
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



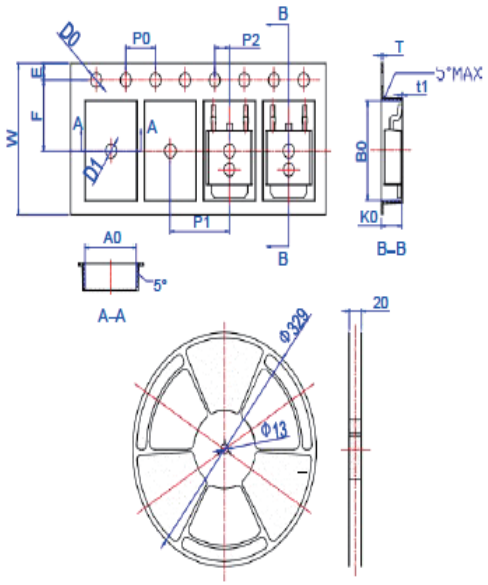
Package Mechanical Data-TO-252



TO-252-4R

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

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