P-Ch 40V Fast Switching MOSFETs

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

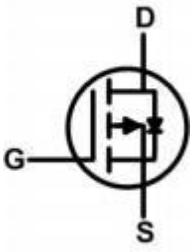
Product Summary

BVDSS	RDSON	ID
-40V	3.5mΩ	-150A

Description

The XXW150P04 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.
The XXW150P04 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration



Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	-40	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±20	V
I_D	Drain Current-Continuous(T_C=25℃)	-150	A
	Drain Current-Continuous(T_C=100℃)	-104	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	-592	A
P_D	Maximum Power Dissipation(T_C=25℃)	200	W
	Maximum Power Dissipation(T_C=100℃)	100	W
E_{AS}	Avalanche energy (Note 2)	1225	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	℃

Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		0.95	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=-250μA	-40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-40V, V_{GS}=0V T_J=25℃			-1	μA
		V_{DS}=-40V, V_{GS}=0V T_J=125℃			-100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-1		-2.5	V
g_{FS}	Forward Transconductance	V_{DS}=-10V, I_D=-20A		51		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-20A T_J=25℃		3.5	4.5	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-4.5V, I_D=-20A T_J=25℃		4.8	6	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-20V,V_{GS}=0V, f=1.0MHz		10733		pF
C_{oss}	Output Capacitance			770		pF
C_{rss}	Reverse Transfer Capacitance			697		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		1.7		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=-10V, V_{DS}=-20V, R_L=1Ω, R_{GEN}=3Ω		19.6		nS
t_r	Turn-on Rise Time			3.6		nS
$t_{d(off)}$	Turn-Off Delay Time			22.8		nS
t_f	Turn-Off Fall Time			38		nS
Q_g	Total Gate Charge	V_{GS}=-10V, V_{DS}=-20V, I_D=-20A		195		nC
Q_{gs}	Gate-Source Charge			24.1		nC
Q_{gd}	Gate-Drain Charge			39.9		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				-150	A
V_{SD}	Forward on Voltage (Note 3)	V_{GS}=0V, I_S=-20A			-1.2	V
t_{rr}	Reverse Recovery Time	I_F=-20A, dI/dt=-100A/μs		51.1		ns
Q_{rr}	Reverse Recovery Charge	I_F=-20A, dI/dt=-100A/μs		125.2		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.E_{AS} condition: T_J=25℃,V_{DD}=-40V,V_G=-10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

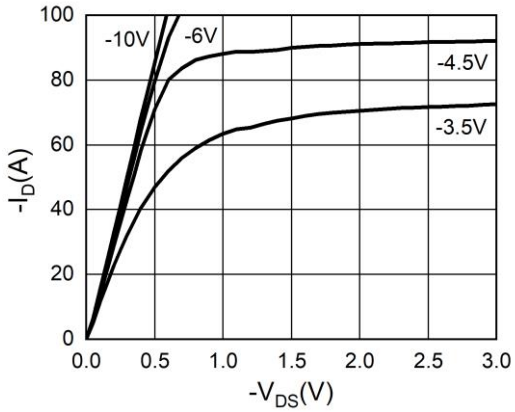


Figure 2. Transfer Characteristics

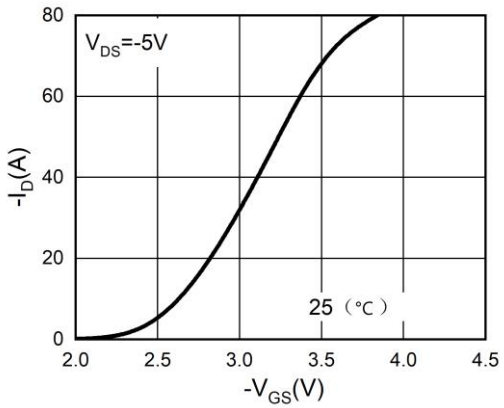


Figure 3. Power Dissipation

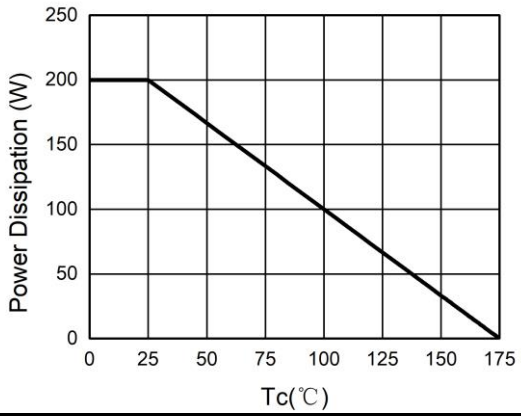


Figure 4. Drain Current

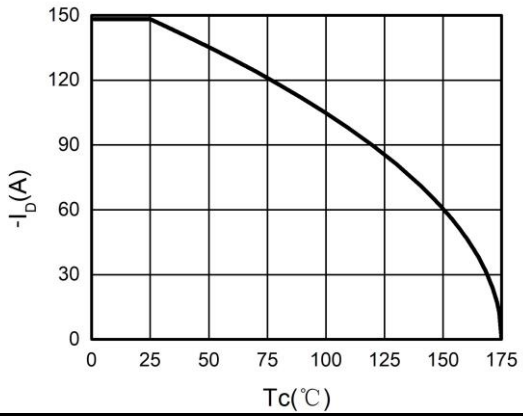


Figure 5. BV_{DSS} vs Junction Temperature

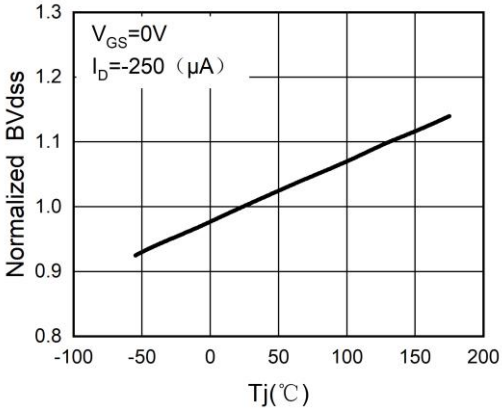
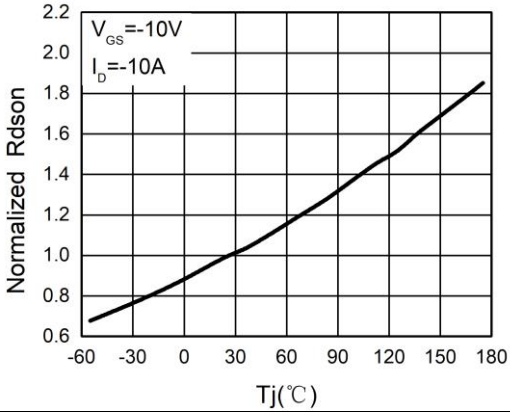


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



Typical Electrical And Thermal Characteristics (Curves)

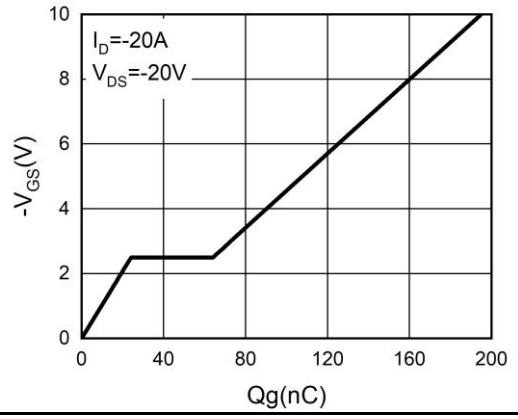
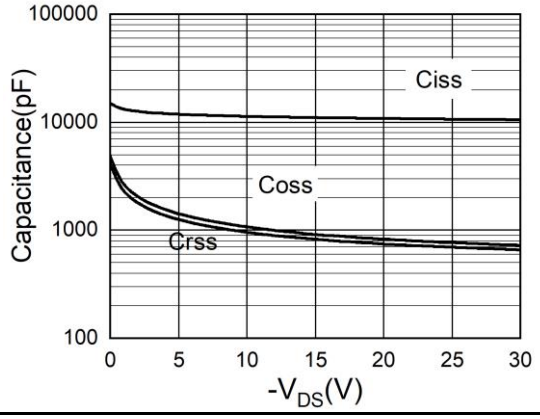
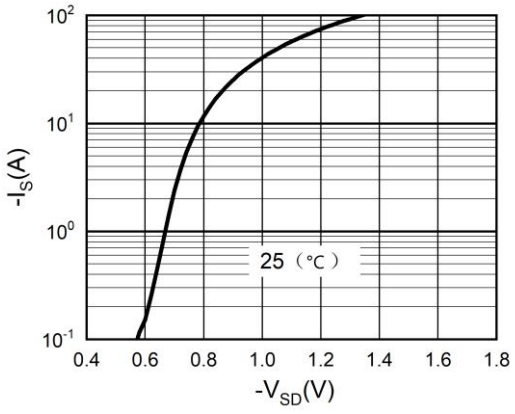
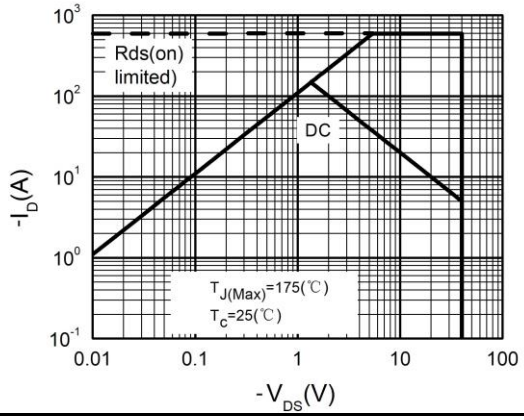
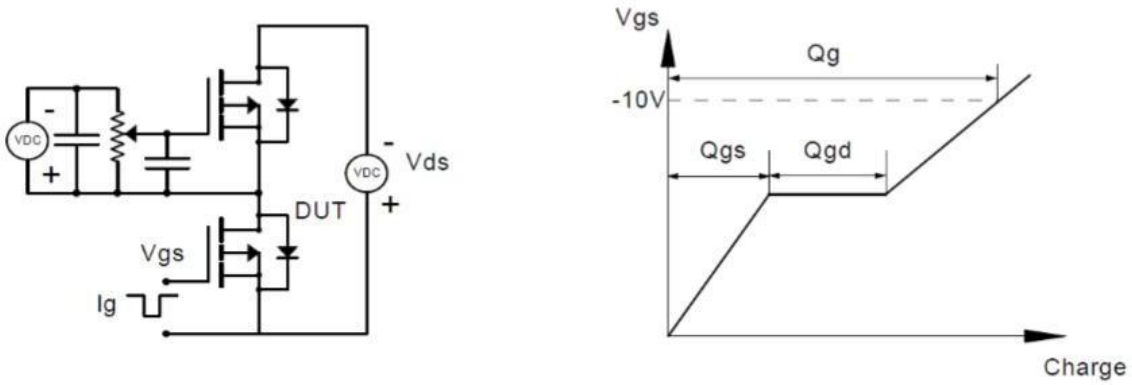
Figure 7. Gate Charge Waveforms	Figure 8. Capacitance
	

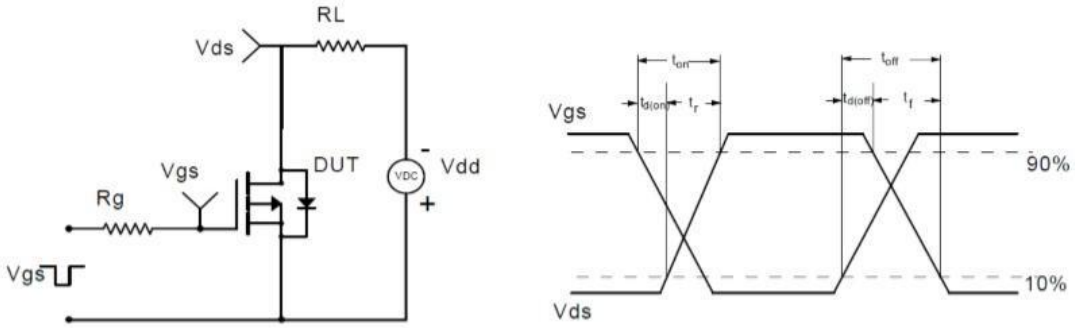
Figure 9. Body-Diode Characteristics	Figure 10. Maximum Safe Operating Area
	

Test Circuit

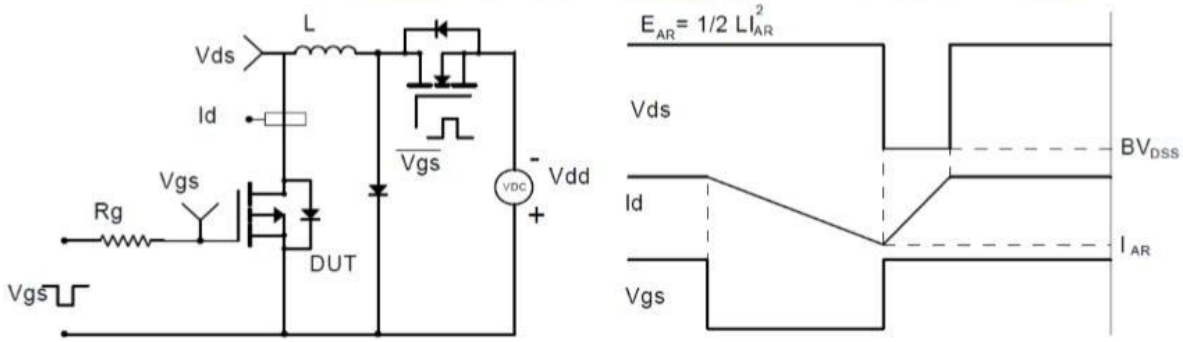
Gate Charge Test Circuit & Waveform



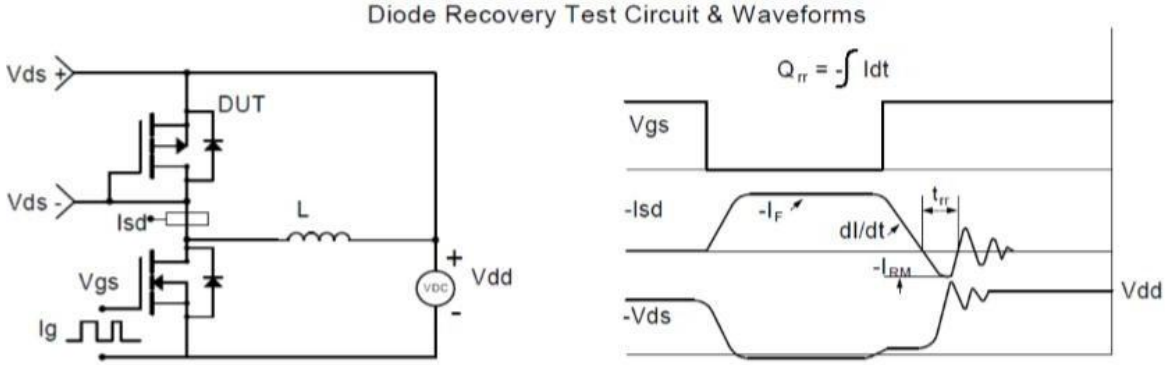
Resistive Switching Test Circuit & Waveforms



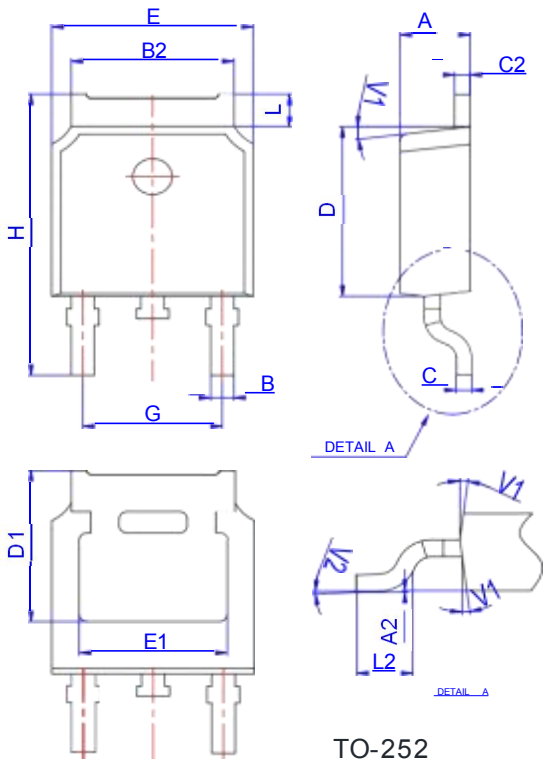
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



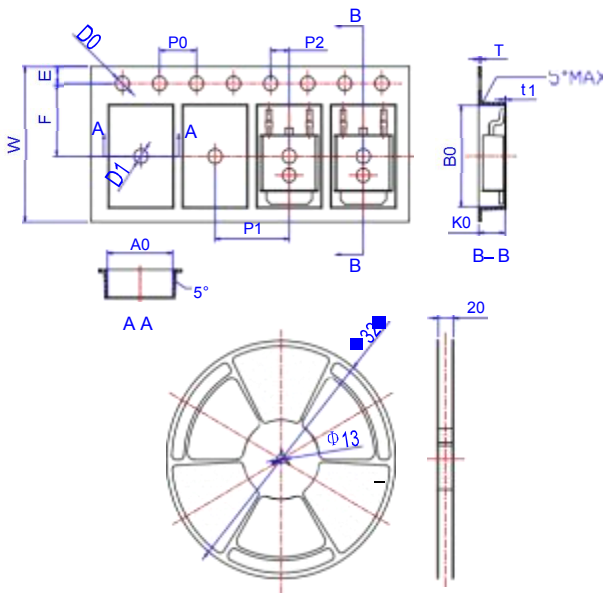
Package Mechanical Data-TO-252



TO-252

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°

eel Spectification-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	0.1 13
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