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

Product Summary

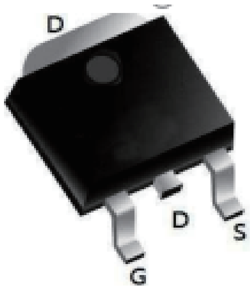
RoHS

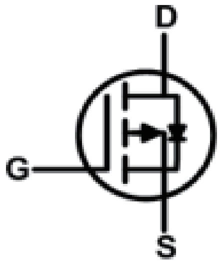
BVDSS	RDSON	ID
-20V	9mΩ	-50A

Description

The 50P02 is the high cell density trenched P-ch MOSFETs, which provides excellent RDSON and gate charge for most of the synchronous buck converter applications The 50P02 meets the RoHS and Green Product requirement,100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_C=25˚C	Continuous Drain Current, V_{GS} @ -4.5V[1]	-50	A
I_D@T_C=70˚C	Continuous Drain Current, V_{GS} @ -4.5V[1]	-25	A
I_{DM}	Pulsed Drain Current[2]	-68	A
P_D@T_C=25˚C	Total Power Dissipation[3]	38	W
P_D@T_C=70˚C	Total Power Dissipation[3]	18	W
T_{STG}	Storage Temperature Range	-55 to 150	˚C
T_J	Operating Junction Temperature Range	-55 to 150	˚C

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	75	˚C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	40	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	4.2	˚C/W

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.012	---	V/℃
		V_{GS}=-4.5V , I_D=-10A	---	9	13	mΩ
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-2.5V , I_D=-8A	---	12	18	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.4	-0.7	-1	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2.94	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-15V , V_{GS}=0V , T_J=25℃	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12 V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-10A	---	43	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-10V , V_{GS}=-4.5V , I_D=-10A	---	35	---	nC
Q_{gs}	Gate-Source Charge		---	5	---	
Q_{gd}	Gate-Drain Charge		---	10	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-10V , V_{GS}=-4.5V , R_G=3.3Ω, I_D=-10A	---	12	---	ns
T_r	Rise Time		---	40	---	
$T_{d(off)}$	Turn-Off Delay Time		---	30	---	
T_f	Fall Time		---	10	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	2800	---	pF
C_{oss}	Output Capacitance		---	690	---	
C_{rss}	Reverse Transfer Capacitance		---	590	---	

Diode Characteristics

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	-50	A
I_{SM}	Pulsed Source Current[2,4]		---	---	----	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	IF=-10A , dI/dt=100A/µs ,T_J =25℃	---	27	---	nS
Q_{rr}	Reverse Recovery Charge		---	17.8	---	nC

Notes:

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

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The power dissipation is limited by 150°C junction temperature

4.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Electrical and Thermal Characteristics (Curves)

Figure1: Output Characteristics

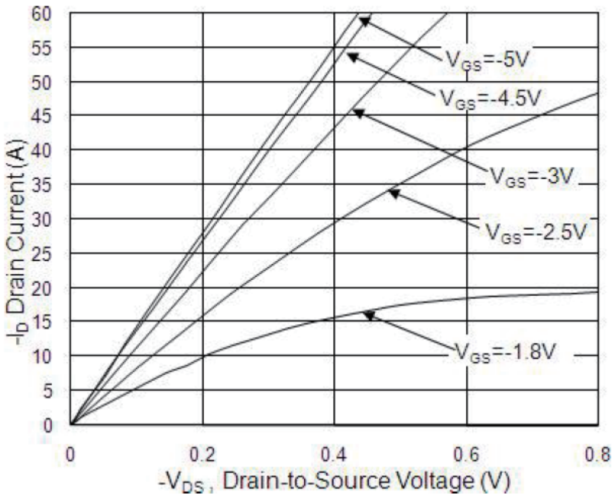


Figure 2: On-Resistance vs. G-S Voltage

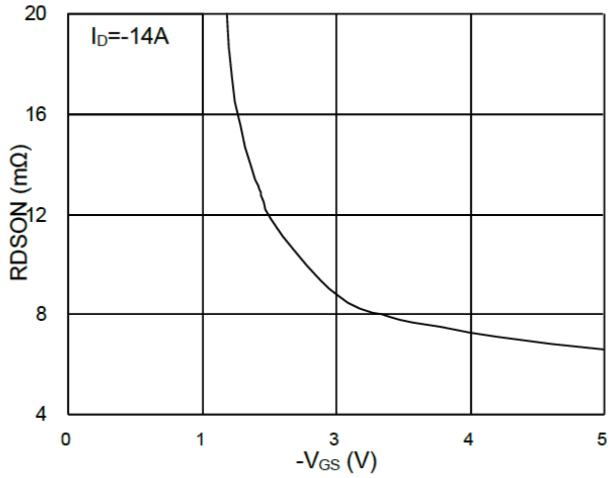


Figure 3:Forward Characteristics of Rever

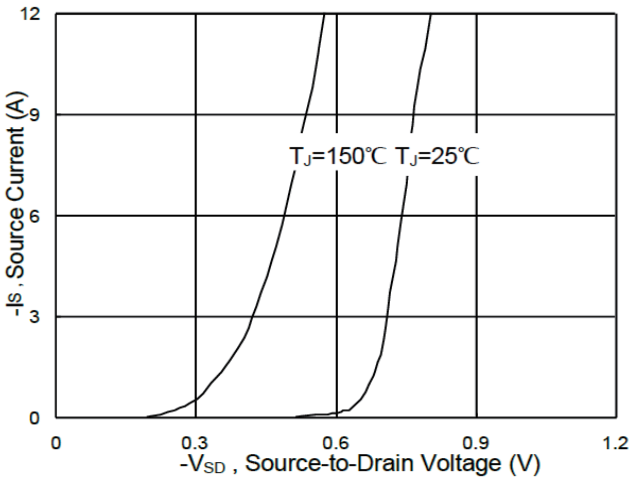


Figure 4: Gate-charge Characteristics

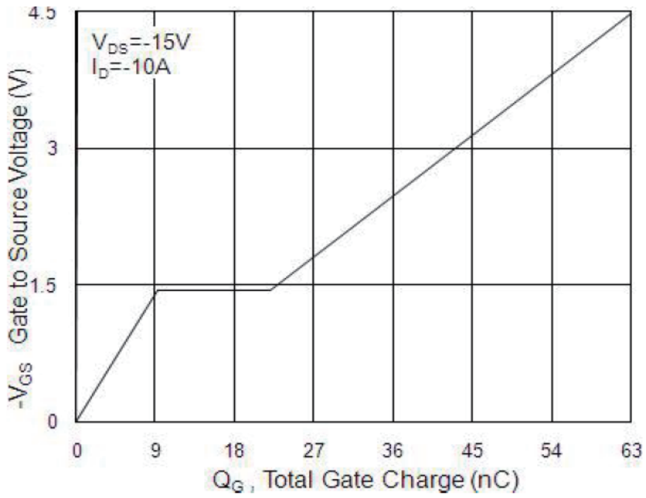


Figure 5:Normalized VGS(th) vs. TJ

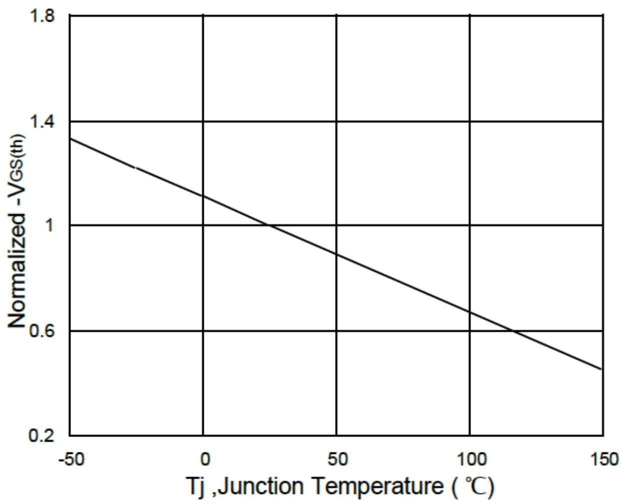
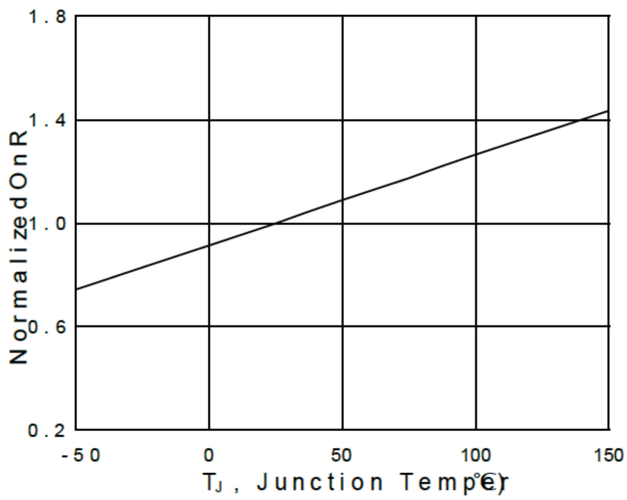


Figure 6:Normalized RDSON vs. TJure



Typical Performance Characteristics

Figure 7:Capacitance

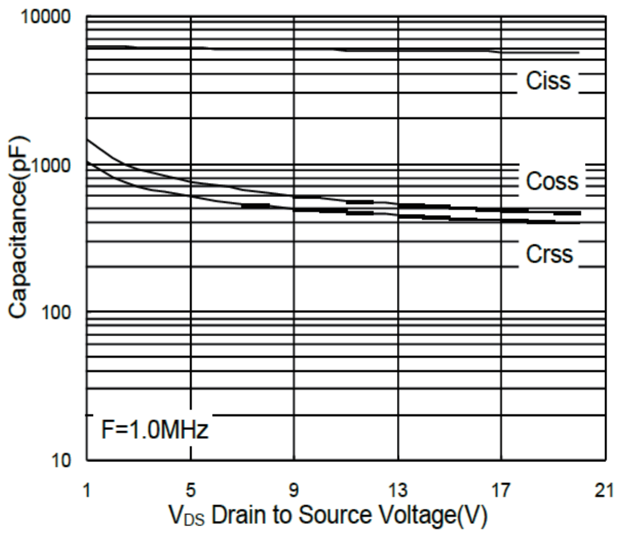


Figure 8: Safe Operating Area

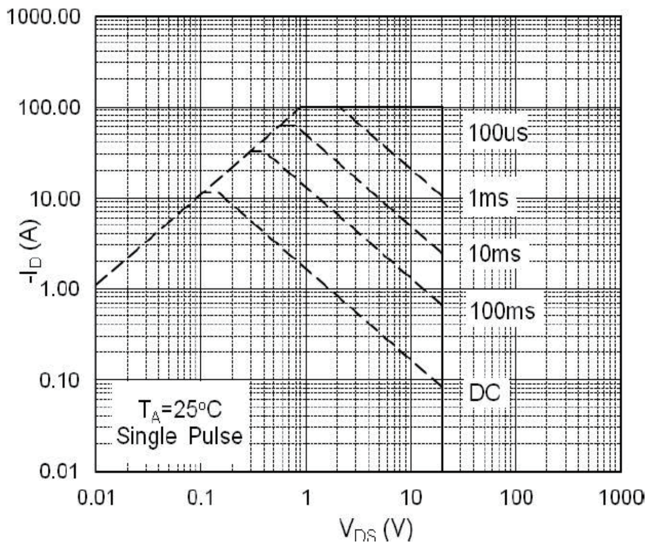


Figure 9: Normalized Maximum Transient

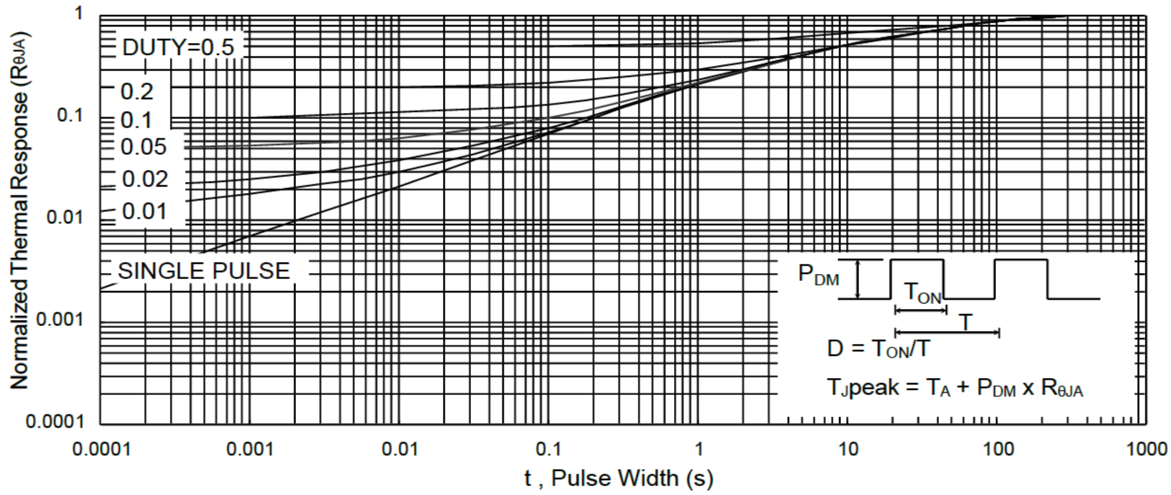


Figure 10:Switching Time Waveformnsie

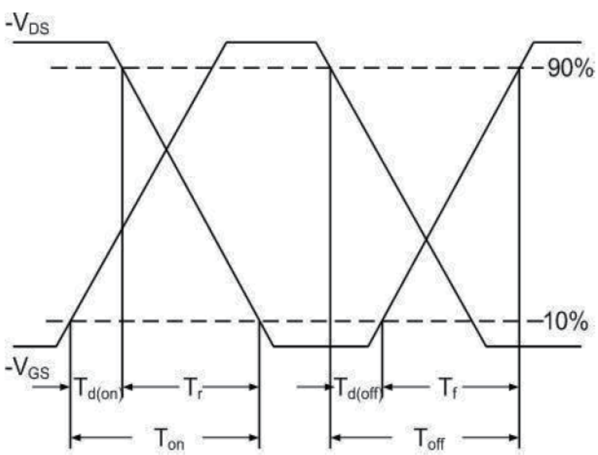
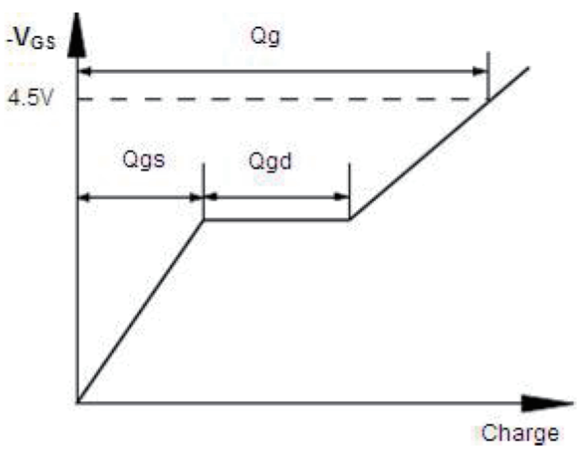


Figure 11: Gate Charge Waveform



Package Mechanical Data TO 252

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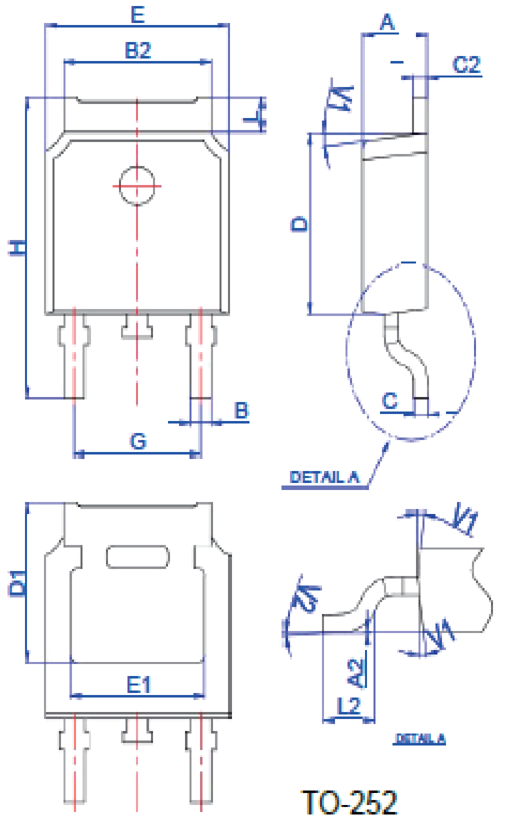
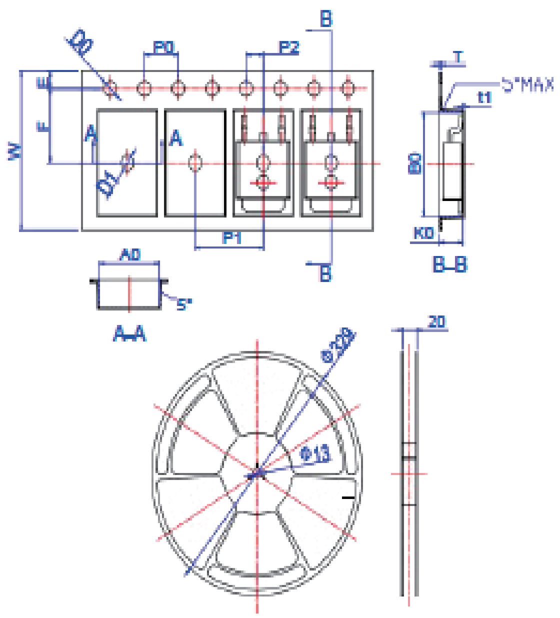


TO-252

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°

Reel Specification-TO-252-4R



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