

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

Product Summary

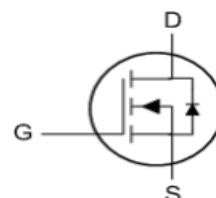
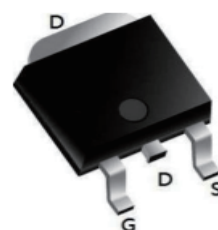
RoHS

BVDSS	RDS(on)	ID
20V	12mΩ	30A

Description

The 30N02 is the high cell density trench N-ch MOSFETs, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The 30N02 meet the RoHS and Green Product, requirement 100% EAS guaranteed with full function reliability approved.



TO252 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	30	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	18	A
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	8.2	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	6.5	A
I_{DM}	Pulsed Drain Current ²	60	A
EAS	Single Pulse Avalanche Energy ³	12.1	mJ
I_{AS}	Avalanche Current	11	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	5	W
$P_D@T_A=25^\circ C$	Total Power Dissipation ⁴	2	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) ¹	---	100	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	---	$^\circ C/W$

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250μA	20	-	-	V
I _{GSS}	Gate Leakage Current	V _{GS} = ±12V, V _{DS} = 0 V	-	-	±100	nA
I _{DSS}	Drain Cut-off Current	V _{DS} = 20V, V _{GS} = 0 V	-	-	1	μA
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 250μA	0.45	0.7	1	V
R _{DS(on)}	Drain-Source On-State Resistance ³	V _{GS} = 4.5V, I _D = 5A	-	12	20	mΩ
		V _{GS} = 2.5V, I _D = 4.7A	-	17	30	
		V _{GS} = 1.8V, I _D = 4.3A	-	28	50	
Dynamic Characteristics ⁴						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 10V, f = 1MHz	-	700	-	pF
C _{oss}	Output Capacitance		-	120	-	
C _{rss}	Reverse Transfer Capacitance		-	105	-	
Switching Characteristics ⁴						
Q _g	Total Gate Charge	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 5A	-	10.5	-	nC
Q _{gs}	Gate-Source Charge		-	2	-	
Q _{gd}	Gate-Drain Charge		-	2.5	-	
T _{d(on)}	Turn-On Time	V _{GEN} = 5V, V _{DD} = 10V, I _D = 5A, R _G = 3Ω,	-	10	-	ns
T _r	Rise Time		-	20	-	
T _{d(off)}	Turn-Off Time		-	32	-	
T _f	Fall Time		-	12	-	
Source-Drain Diode Characteristics						
V _{SD}	Body Diode Voltage ³	I _S = 4A, V _{GS} = 0V	-	-	1.2	V
I _S	Continuous Source Current		-	-	30	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.
2. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. This value is guaranteed by design hence it is not included in the production test.

Typical Performance Characteristics

Figure1: Output Characteristics

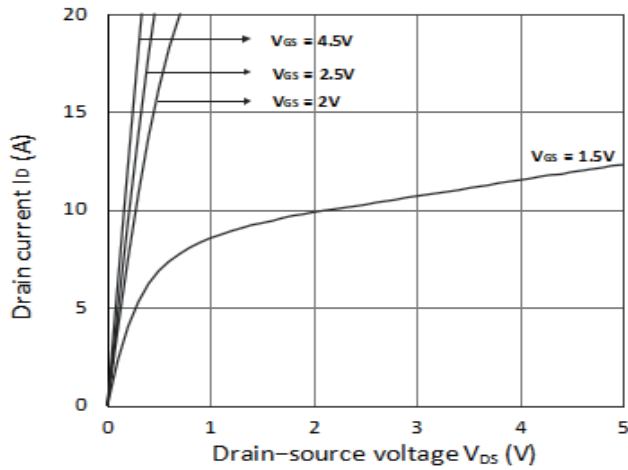


Figure 2: Typical Transfer Characteristics

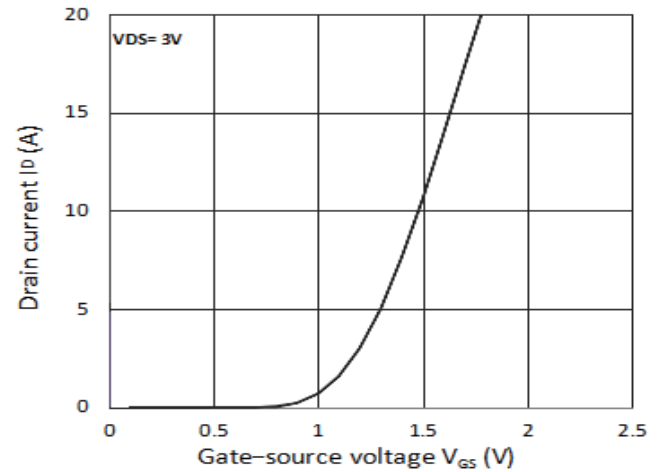


Figure 3: Forward Characteristics of Reverse

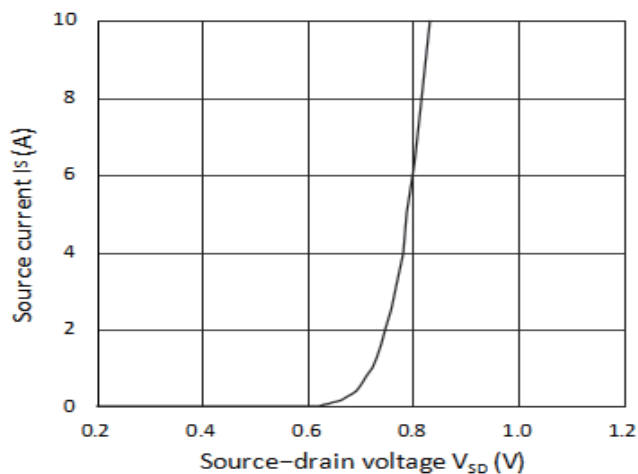


Figure 4: $R_{DS(ON)}$ vs. V_{GS}

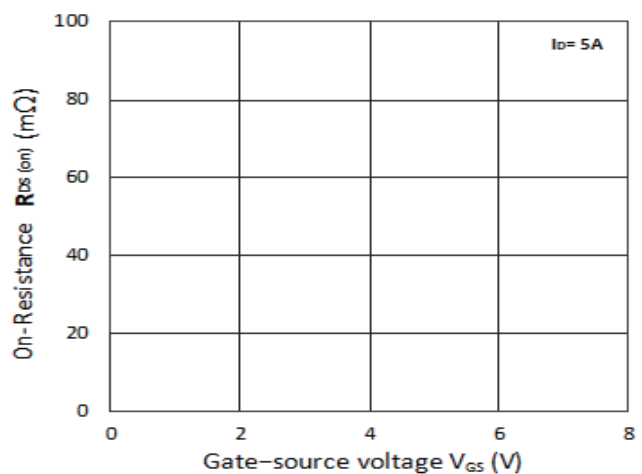


Figure 5: $R_{DS(ON)}$ vs. I_D

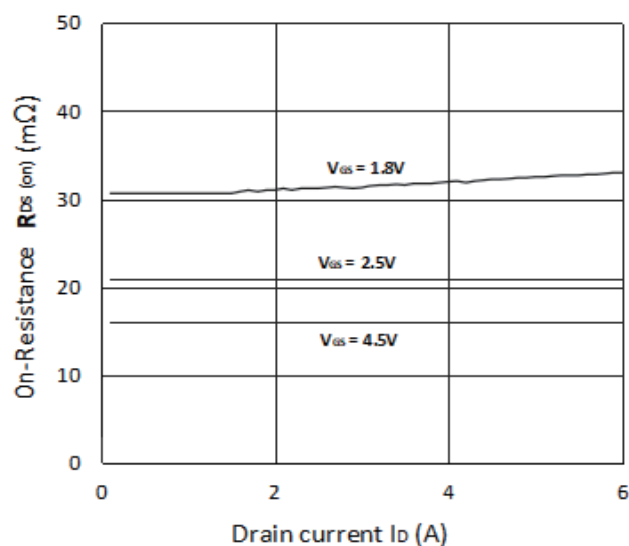
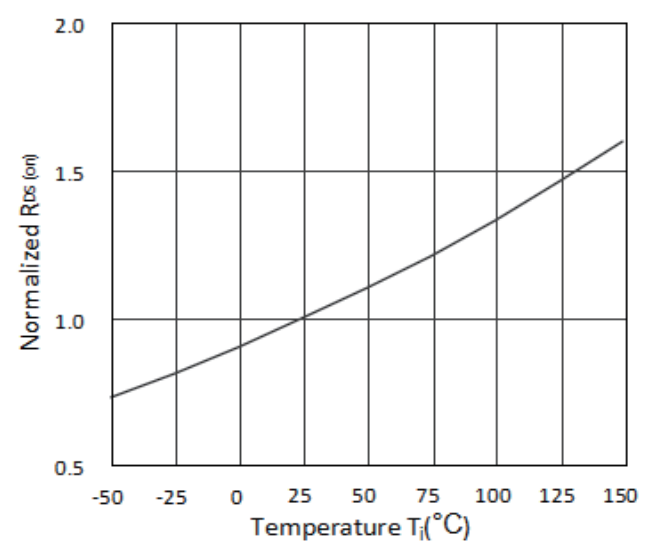


Figure 6: Normalized $R_{DS(on)}$ vs. Temperature



Typical Performance Characteristics

Figure 7: Capacitance Characteristics

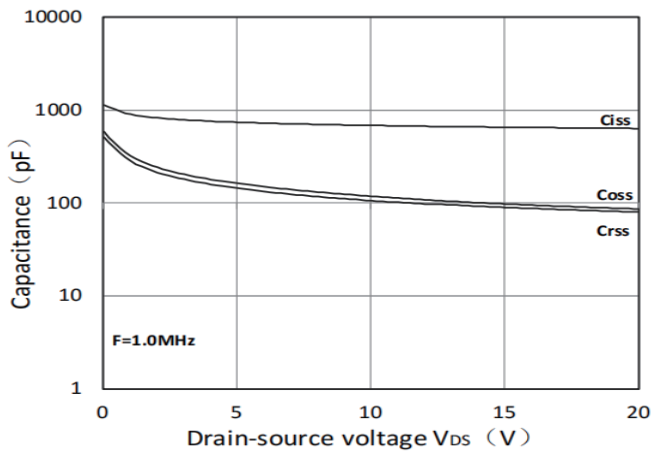
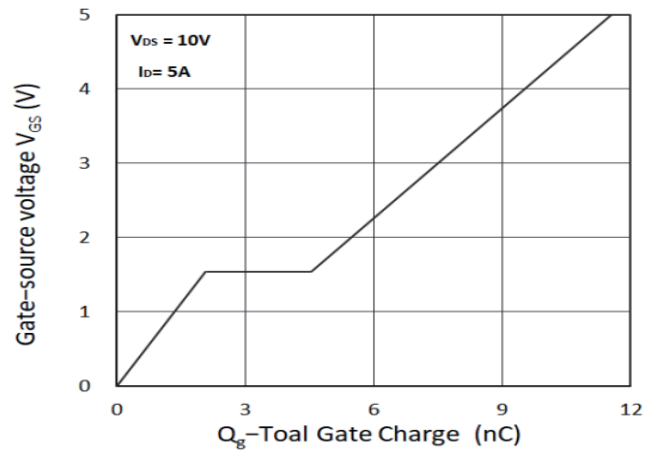
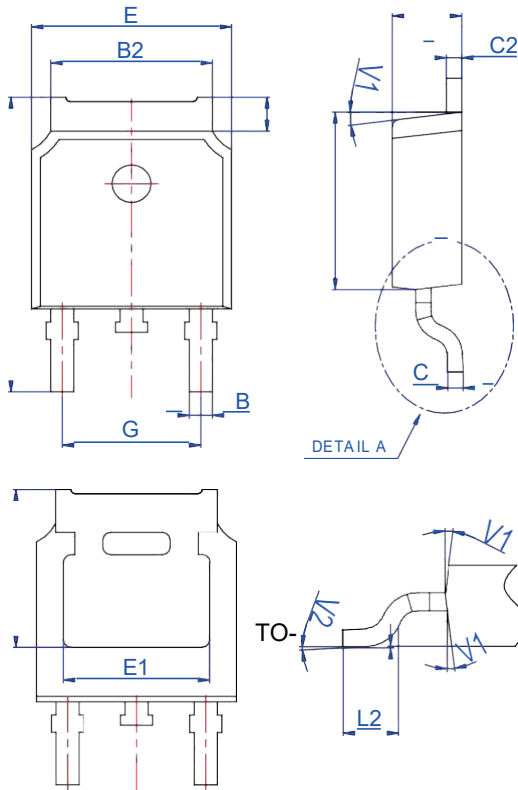


Figure 8: Gate Charge Characteristics

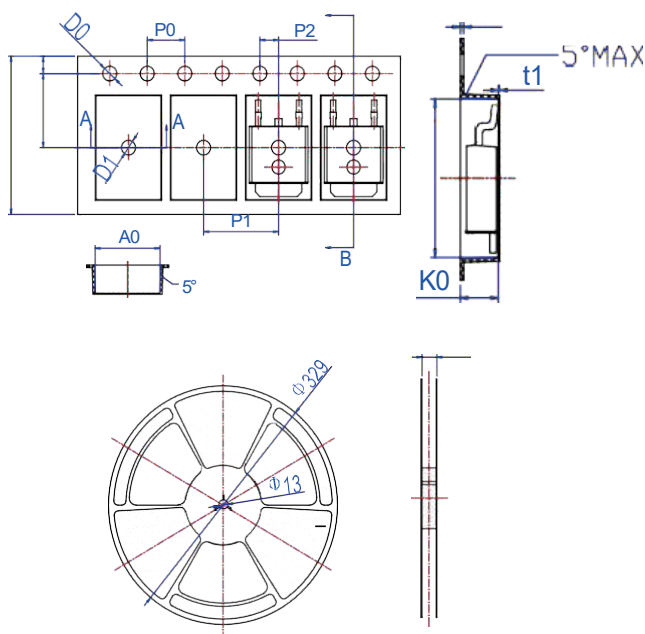


Package Mechanical Data-TO-252-4R



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.1		2.5	0.083		0.098
A2	0		0.1	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.4		0.6	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.9		6.3	0.232		0.248
D1	5.30REF			0.209REF		
E	6.4		6.8	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.5		10.7	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	15.9	16	16.1	0.626	0.63	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.4	7.5	7.6	0.291	0.295	0.299
D0	1.4	1.5	1.6	0.055	0.059	0.063
D1	1.4	1.5	1.6	0.055	0.059	0.063
P0	3.9	4	4.1	0.154	0.157	0.161
P1	7.9	8	8.1	0.311	0.315	0.319
P2	1.9	2	2.1	0.075	0.079	0.083
A0	6.85	6.9	7	0.27	0.271	0.276
B0	10.45	10.5	10.6	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	0.1			0.004		
10P0	39.8	40	40.2	1.567	1.575	1.583