

Features

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

Product Summary

RoHS

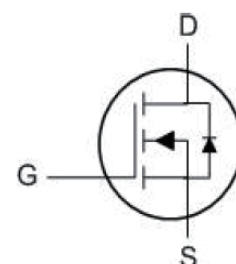
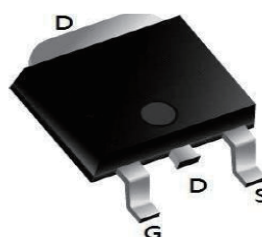
BVDSS	RDSON	ID
100V	65mΩ	20A

Description

The 20N10 is the highest performance trench Nc-h MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The 20N10 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS}@ 10V^1$	20	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS}@ 10V^1$	12	A
I_{DM}	Pulsed Drain Current ²	20	A
EAS	Single Pulse Avalanche Energy ³	4.1	mJ
I_{AS}	Avalanche Current	10	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ³	41.7	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 ¹	---	50	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	3.0	$^{\circ}C/W$

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

Symbol	Parameter		Test condition	Min.	Typ.	Max.	Units
Static Characteristics							
V _{(BR)DSS}	Drain-Source Breakdown Voltage		V _{GS} = 0V, I _D = 250μA	100	-	-	V
I _{GSS}	Gate-body Leakage current		V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	T _J =25°C	V _{DS} =100V, V _{GS} = 0V	-	-	1	μA
		T _J =100°C		-	-	100	
V _{GS(th)}	Gate-Threshold Voltage		V _{DS} = V _{GS} , I _D = 250μA	1.2	-	2.5	V
R _{DS(on)}	Drain-Source on-Resistance ⁴		V _{GS} = 10V, I _D = 5A	-	65	90	mΩ
			V _{GS} = 4.5V, I _D = 3A	-	75	105	
g _{fs}	Forward Transconductance ⁴		V _{DS} =5V , I _D =5A	-	12	-	S
Dynamic Characteristics ⁵							
C _{iss}	Input Capacitance		V _{DS} = 15V, V _{GS} =0V,f =1MHz	-	1220	-	pF
C _{oss}	Output Capacitance			-	53	-	
C _{rss}	Reverse Transfer Capacitance			-	42	-	
R _g	Gate Resistance		f =1MHz	-	1.3	-	Ω
Switching Characteristics ⁵							
Q _g	Total Gate Charge		V _{GS} = 10V, V _{DS} = 50V, I _D =5A	-	20.6	-	nC
Q _{gs}	Gate-Source Charge			-	4	-	
Q _{gd}	Gate-Drain Charge			-	3.7	-	
t _{d(on)}	Turn-On Delay Time		V _{GS} =10V, V _{DD} =50V, R _G = 3Ω, I _D = 5A	-	4.7	-	ns
t _r	Rise Time			-	21	-	
t _{d(off)}	Turn-Off Delay Time			-	20	-	
t _f	Fall Time			-	16	-	
Drain-Source Body Diode Characteristics							
V _{SD}	Diode Forward Voltage ⁴		I _S = 1A, V _{GS} = 0V	-	-	1.2	V
I _S	Continuous Source Current	TC=25°C	-	-	-	20	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_J(MAX)=150°C.
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
3. The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=8A.
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

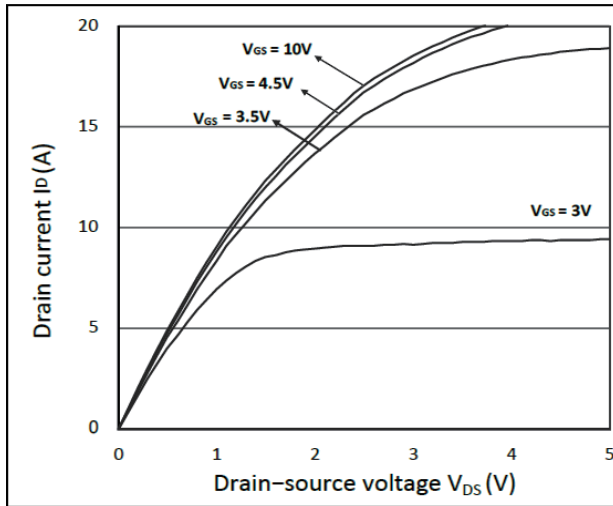


Figure 2: Typical Transfer Characteristics

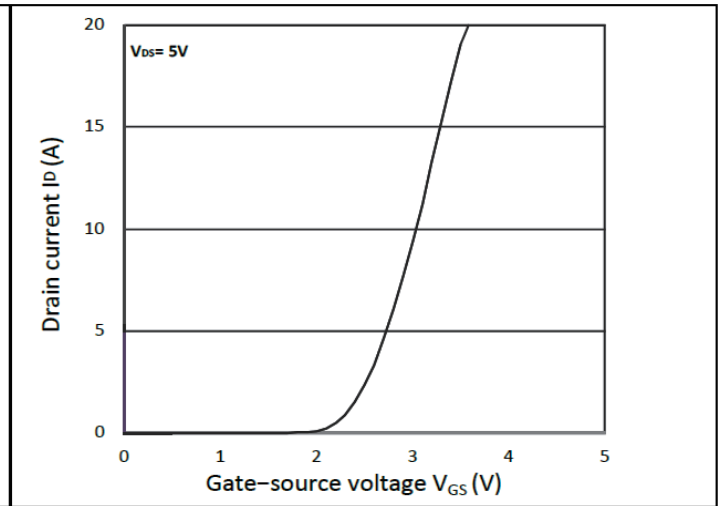


Figure 3: Forward Characteristics of Reverse

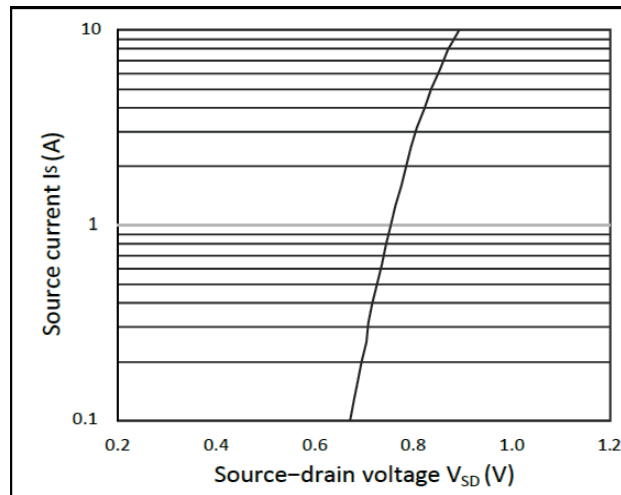


Figure 4: RDS(ON) vs. VGS

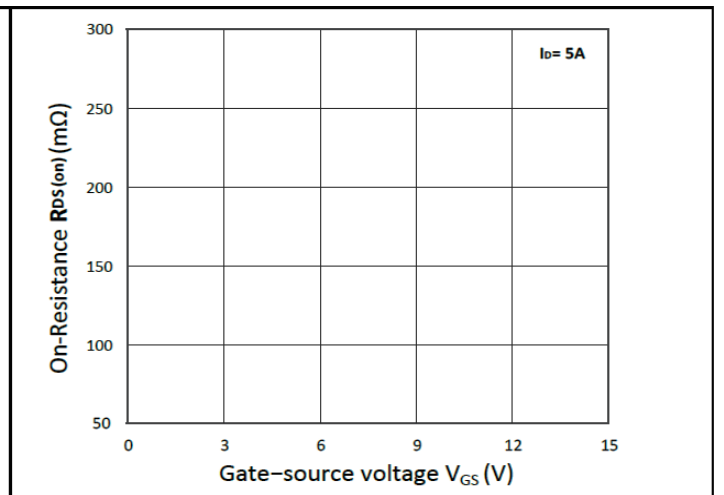


Figure 5: RDS(ON) vs. ID

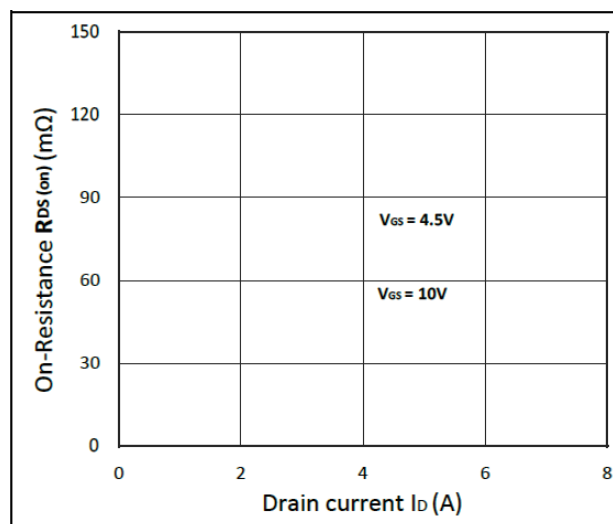
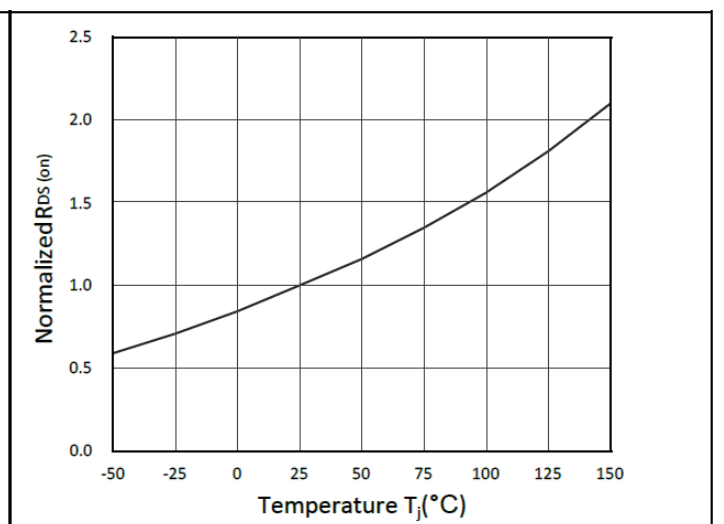


Figure 6: Normalized RDS(on) vs. Temperature



Typical Performance Characteristics

Figure 7: Capacitance Characteristics

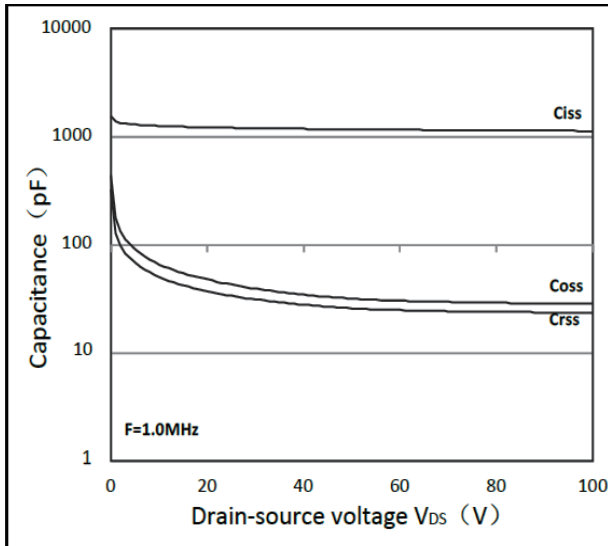


Figure 8: Gate Charge Characteristics

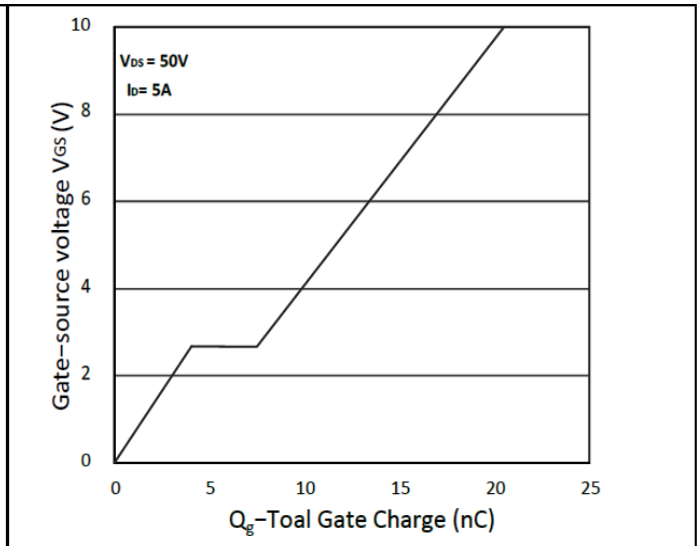


Figure 9: Power Dissipation

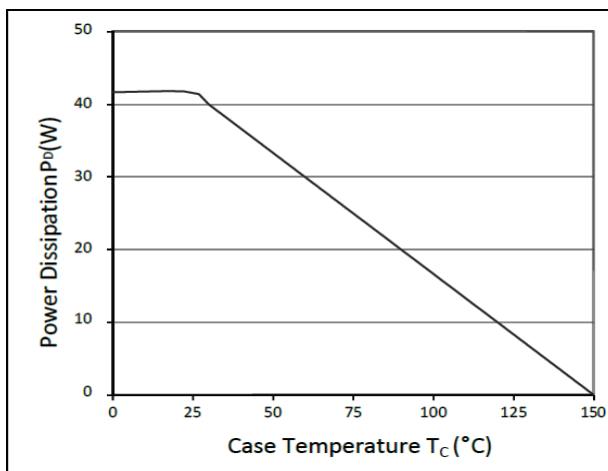


Figure 10: Safe Operating Area

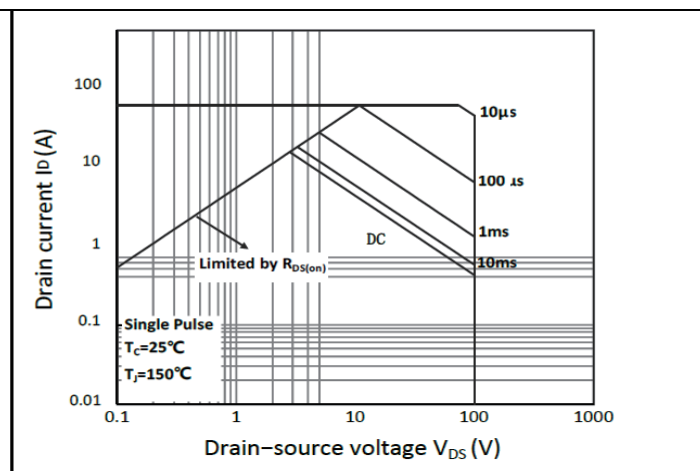
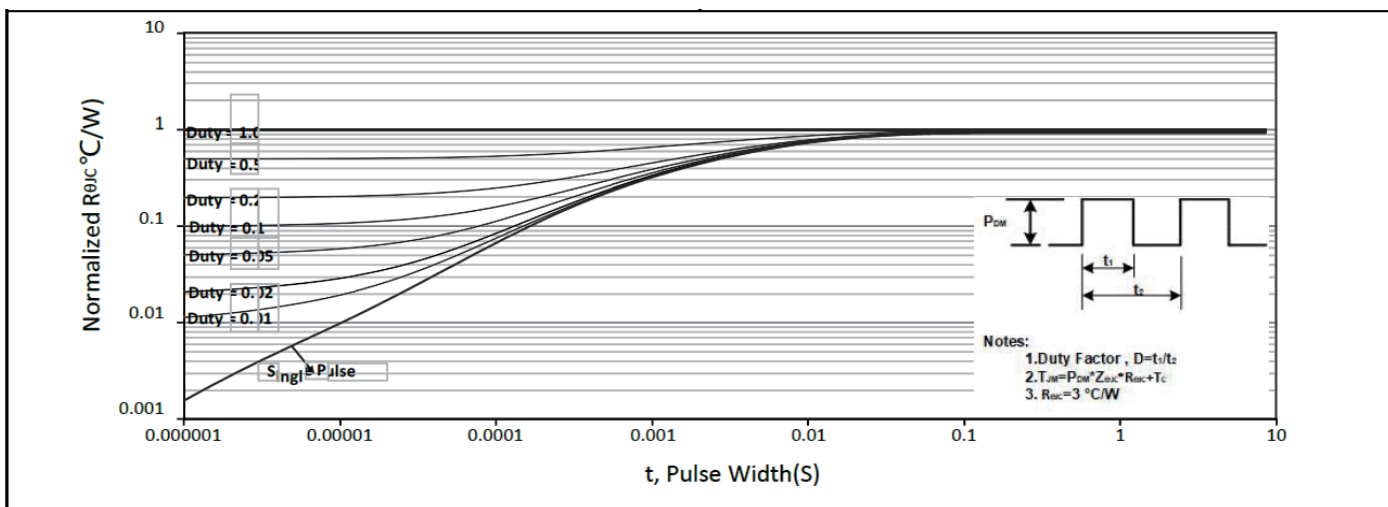
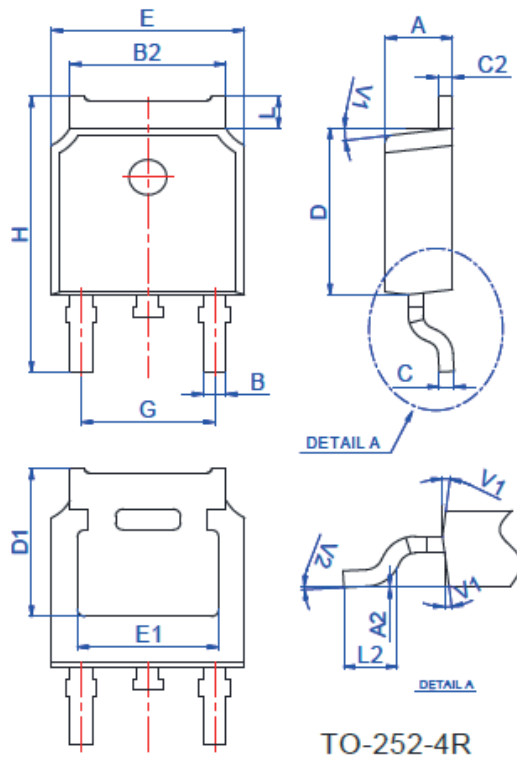


Figure 11: Normalized Maximum Transient Thermal Impedance

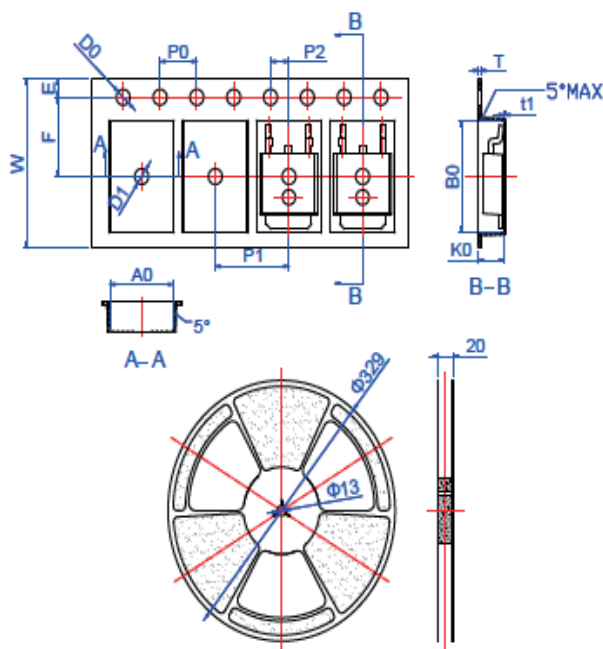


TO-252 Package outline



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°

TO-252 Package outline



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