40N10

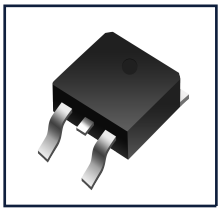
TO-252 N-Ch 30V Fast Switching MOSFETs

Description

The 40N10 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

General Features

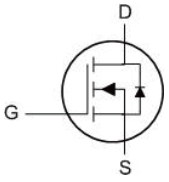
- SuperLowGateCharge
- ExcellentCdV/dteffectdecline
- AdvancedhighcelldensityTrench technology



TO-252

Applications

- DC-DC Converter
- Motor Drive
- Powertrain Management



Equivalent Circuit

Ordering information

Product ID	Pack	Naming rule	Marking	Qty(PCS)
40N10	TO-252	40N10 产品名称 product name	40N10	2500

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

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current	40	A
I_D@T_C=100℃		21	A
I_{DM}	Pulsed Drain Current[1]	120	A
EAS	Single Pulse Avalanche Energy[2]	30	mJ
P_D@T_C=25℃	Power Dissipation	42	W
$R_{\theta JC}$	Thermal Resistance Junction-Case	3.6	℃/W
T_J,T_{STG}	Storage Temperature Range	-55 to 175	℃

DAYA SEMICONDUCTOR

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Electrical Characteristics (T_A=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V, V_{GS}=0V	---	---	1.0	uA
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0V, V_{GS}=±20V	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.8	1.2	1.6	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V_{GS}=10V , I_D=10A	---	25	32.5	mΩ
		V_{GS}=4.5V , I_D=6A	---	26	36	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V,f=1.0MHz	---	1964	---	pF
C_{oss}	Output Capacitance		---	90	---	
C_{rss}	Reverse Transfer Capacitance		---	74	---	
Q_g	Total Gate Charge	V_{DS}=80V, I_D=20A,V_{GS}=4.5V	---	20	---	nC
Q_{gs}	Gate-Source Charge		---	3.1	---	
Q_{gd}	Gate-Drain(“Miller”)Charge		---	14	---	
Switching Characteristics						
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=80V,I_D=20A, R_G=3.1Ω,V_{GS}=4.5V	---	11	---	ns
T_r	Rise Time		---	91	---	
$T_{d(off)}$	Turn-Off Delay Time		---	40	---	
T_f	Fall Time		---	71	---	
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		---	---	40	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		---	---	120	A
V_{SD}	Drainto Source Diode Forward Voltage	V_{GS}=0V, I_S=20A	---	---	1.2	V
t_{rr}	BodyDiodeReverseRecoveryTime	I_F=20A,dI/dt=100A/μs	---	64	---	ns
Q_{rr}	Body Diode Reverse Recovery Charge		---	152	---	nC

Notes:

1.Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature

2.EAS condition:T_J=25℃,V_{DD}=50V,V_G=10V,L=0.5mH,Rg=25Ω,I_{AS}=11A

3.Pulse Test:Pulse Width≤300μs,Duty Cycle≤0.5%

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Typical Characteristics

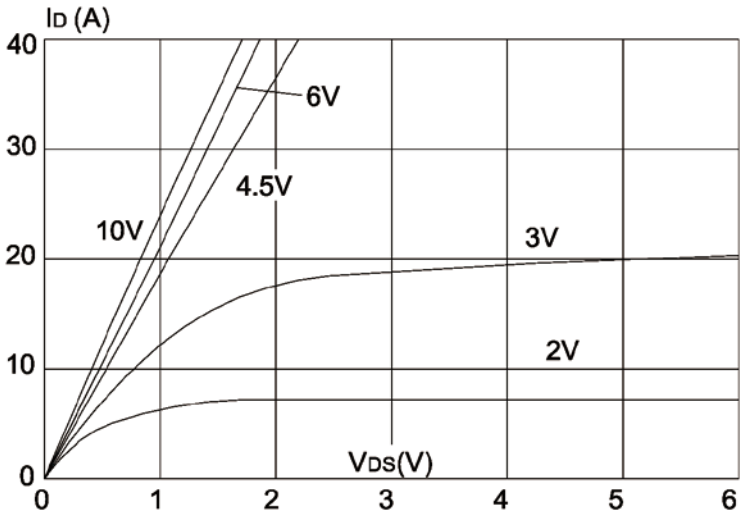

Figure1: Output Characteristics

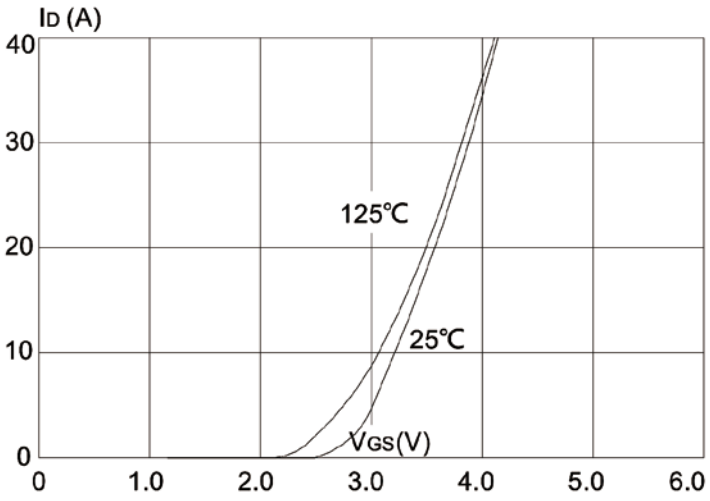

Figure 2: Typical Transfer Characteristics

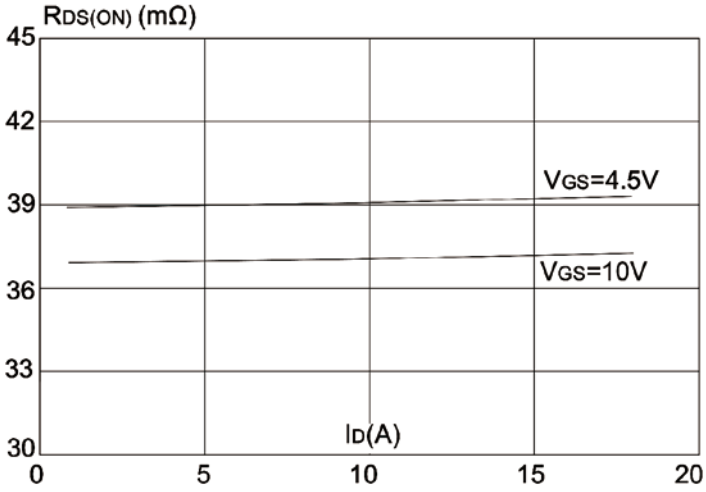

Figure 3:On-resistance vs. Drain Current

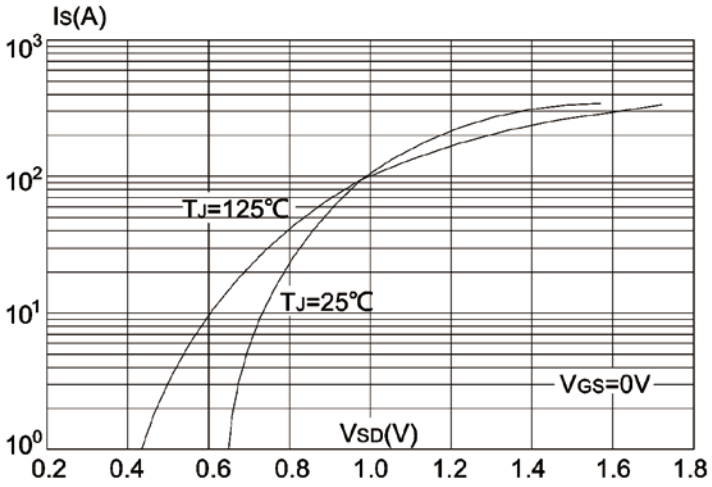

Figure 4: Body Diode Characteristics

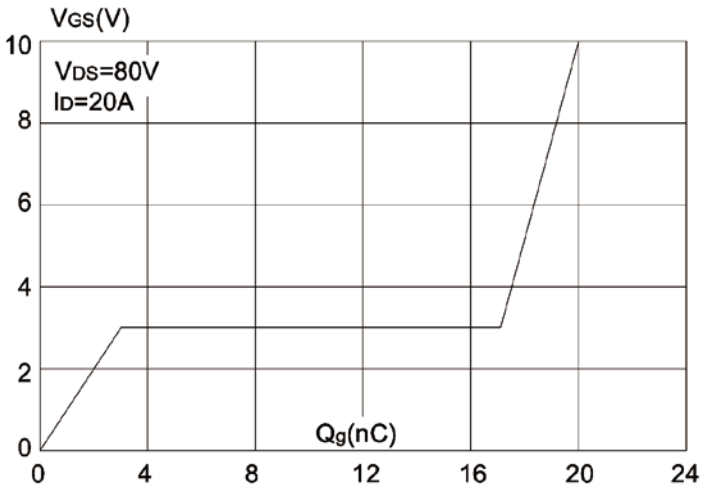

Figure 5: Gate Charge Characteristics

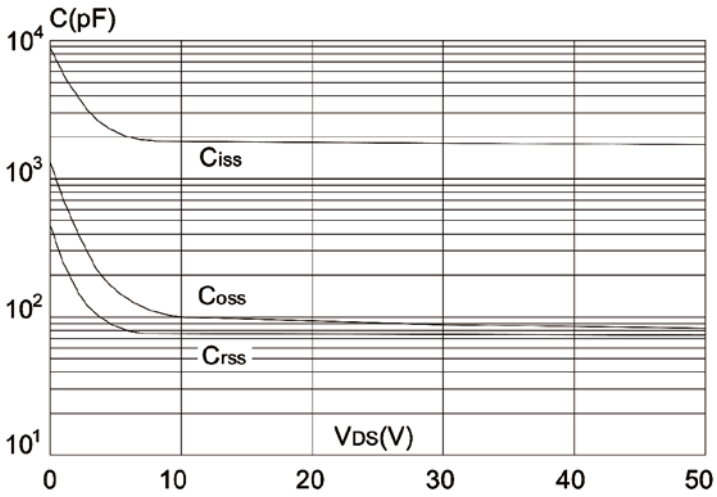

Figure 6: Capacitance Characteristics

Typical Characteristics

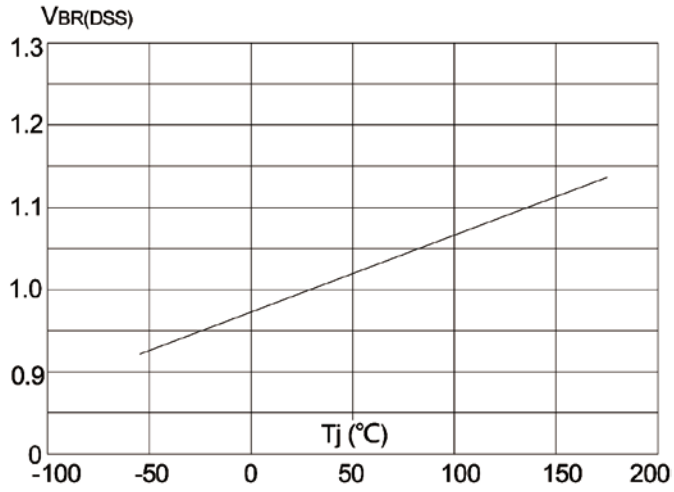

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

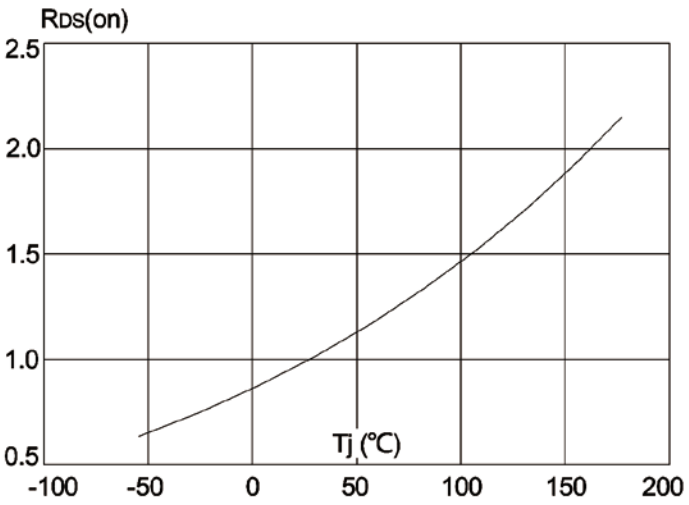

Figure 8: Normalized on Resistance vs. Junction Temperature

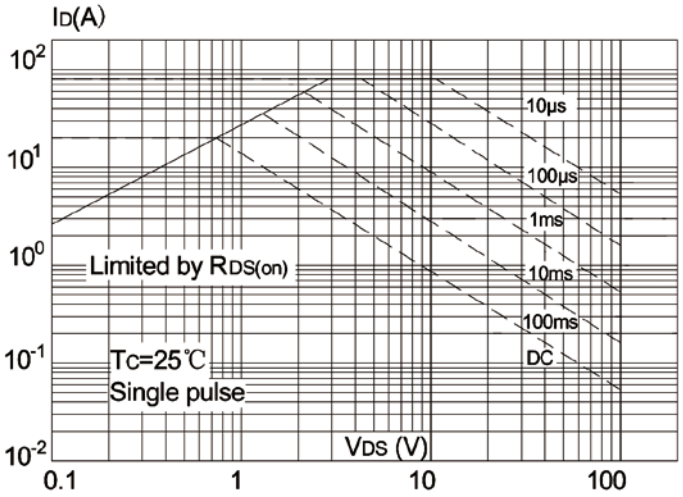

Figure 9: Maximum Safe Operating Area

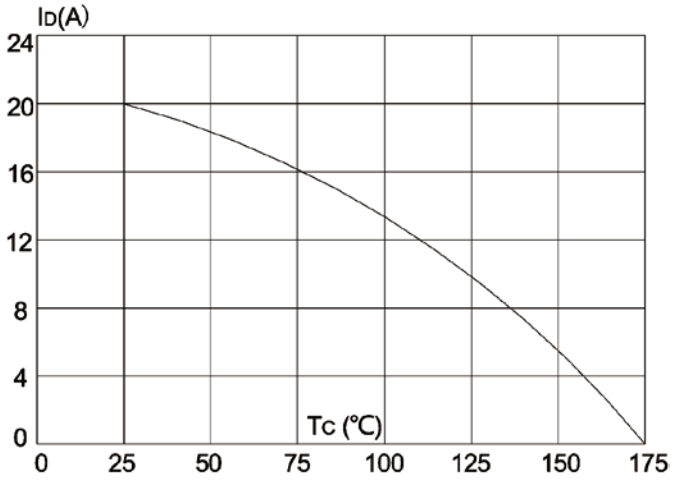

Figure 10: Maximum Continuous Drain Current vs. Case Temperature

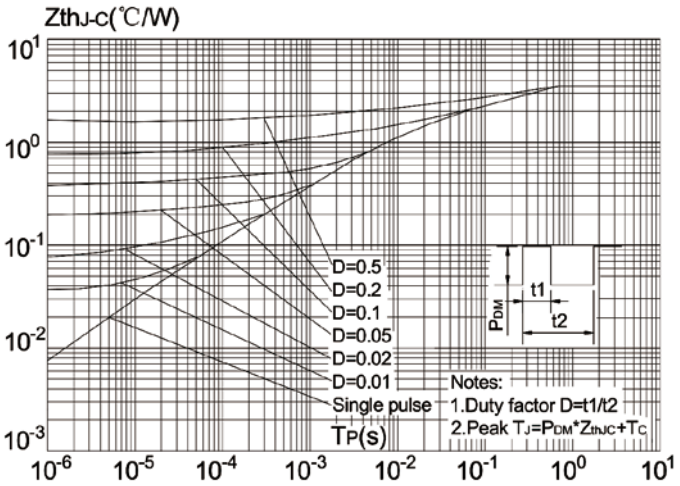

Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

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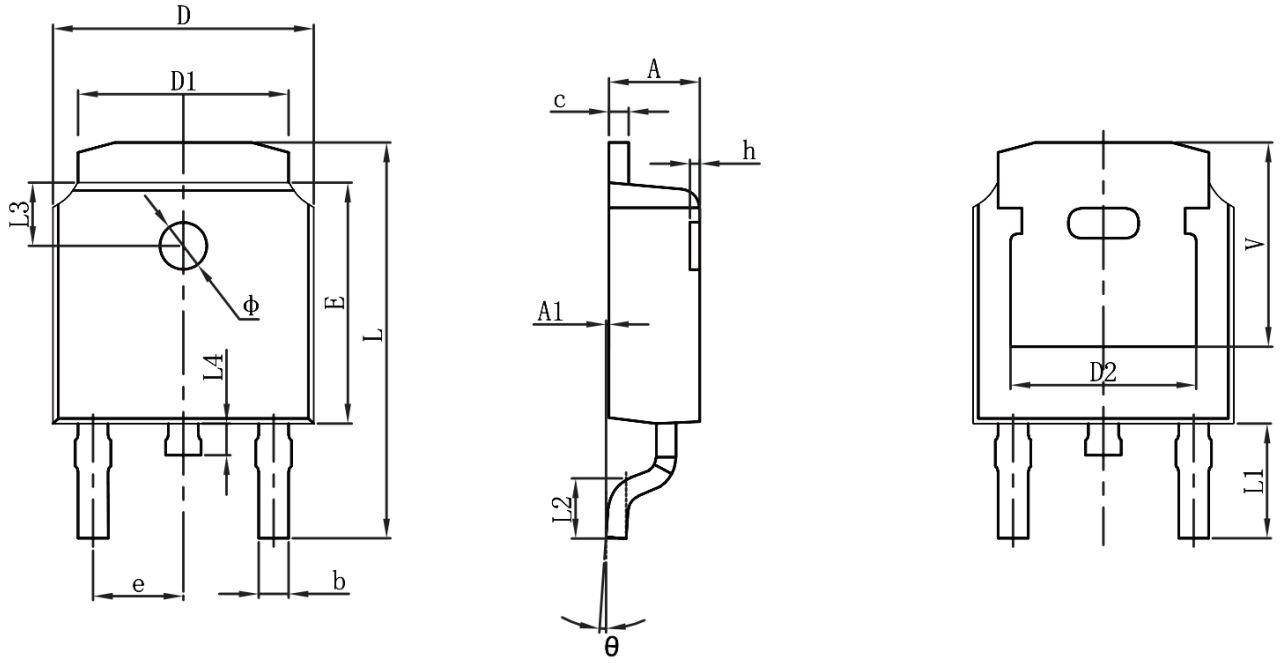
TO-252 Package Outline Dimensions



Symbol	Dimensions in Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	