

N-Ch 40V Fast Switching MOSFETs

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

Product Summary



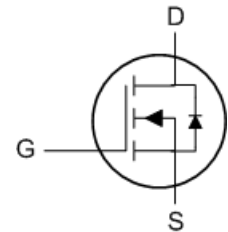
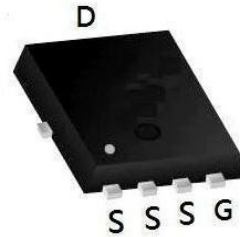
BVDSS	RDS(on)	ID
40V	13.4mΩ	40A

Description

The UD20N04D is the high cell density trench N-ch MOSFETs, which provides excellent RDS(on) and efficiency for most of the small power switching and load switch applications.

The UD20N04D meet the RoHS and Green Product requirement with full function reliability approved.

PDFN3333-8L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	40	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	24	A
I_{DM}	Pulsed Drain Current ²	120	A
EAS	Single Pulse Avalanche Energy ³	28	mJ
I_{AS}	Avalanche Current	40	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	12.5	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
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	10	$^\circ C/W$

N-CH Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.2	2.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A	-	13.4	18	mΩ
		V _{GS} =4.5V, I _D =8A	-	14.9	20	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =8A	-	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, F=1.0MHz	-	850	-	PF
Output Capacitance	C _{oss}		-	78	-	PF
Reverse Transfer Capacitance	C _{rss}		-	69	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =20V, I _D =10A V _{GS} =10V, R _{GEN} =3Ω	-	10	-	nS
Turn-on Rise Time	t _r		-	12	-	nS
Turn-Off Delay Time	t _{d(off)}		-	33	-	nS
Turn-Off Fall Time	t _f		-	9	-	nS
Total Gate Charge	Q _g	V _{DS} =20V, I _D 10A V _{GS} =0to10V	-	12	-	nC
Gate-Source Charge	Q _{gs}		-	2	-	nC
Gate-Drain Charge	Q _{gd}		-	2.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _S =15A	-	-	1.2	V

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J=25^{\circ}\text{C}$, $V_{DD}=20V$, $V_G=10V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=10.5A$
 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.

Typical Performance Characteristics-N

Figure 1: Output Characteristics

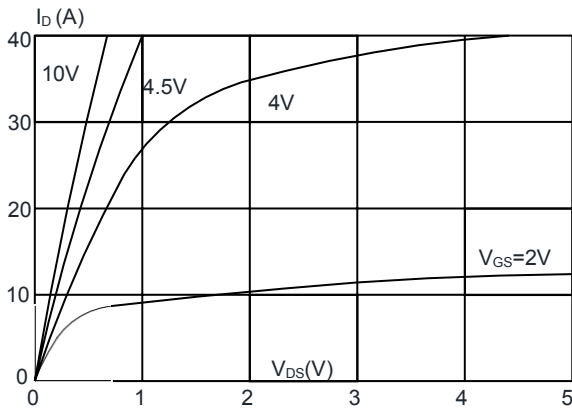


Figure 2: Typical Transfer Characteristics

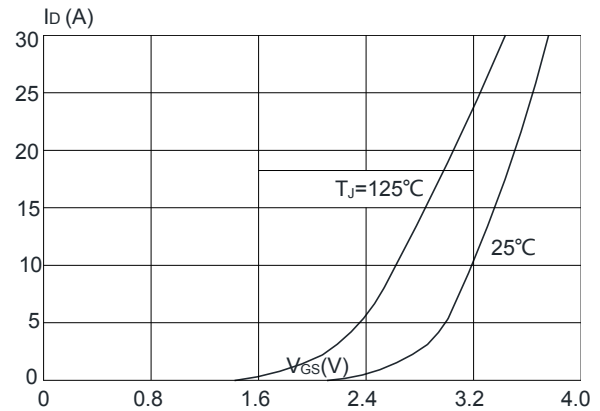


Figure 3: On-resistance vs. Drain Current

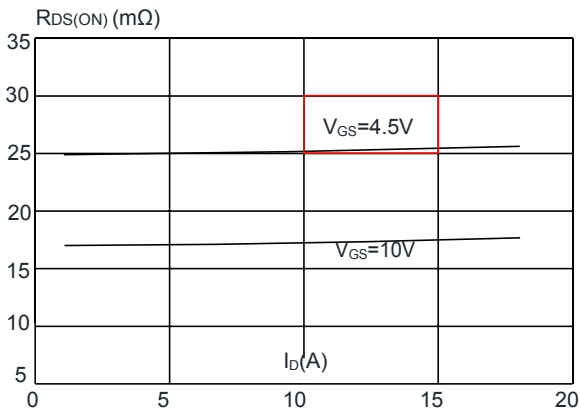


Figure 4: Body Diode Characteristics

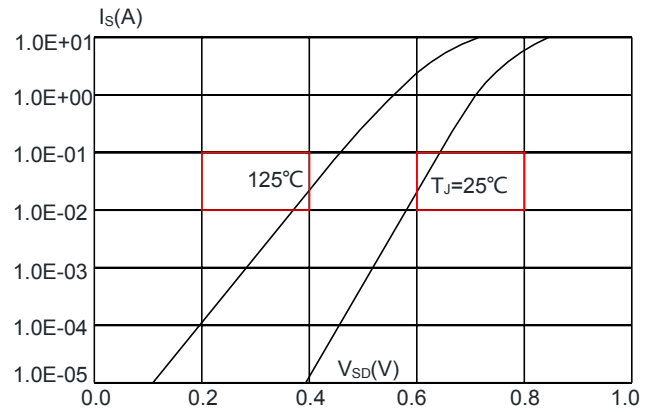


Figure 5: Gate Charge Characteristics

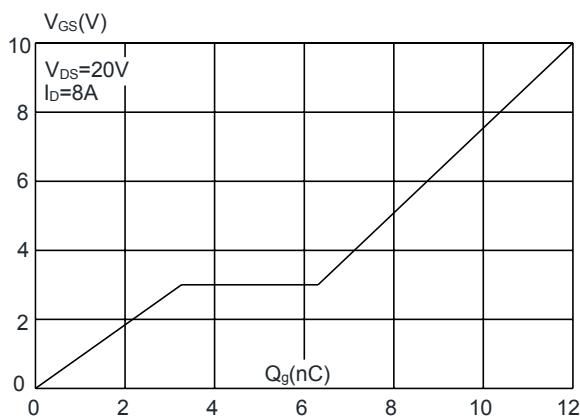
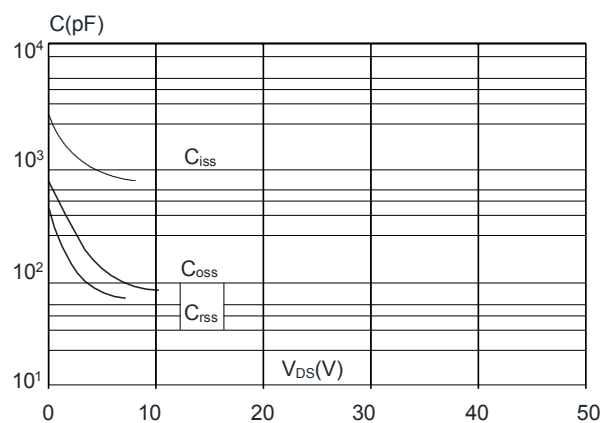


Figure 6: Capacitance Characteristics



N-Ch 40V Fast Switching MOSFETs

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

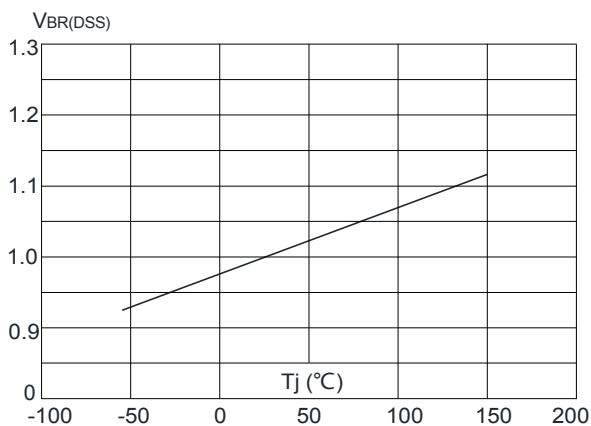


Figure 8: Normalized on Resistance vs. Junction Temperature

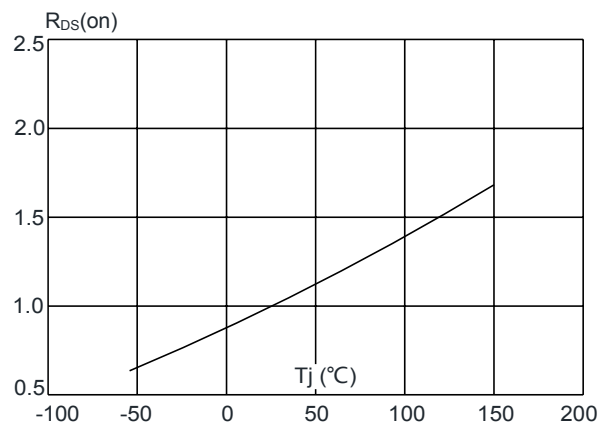


Figure 9: Maximum Safe Operating Area

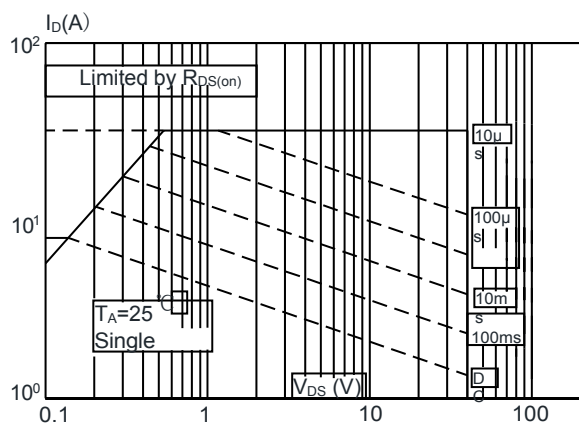


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

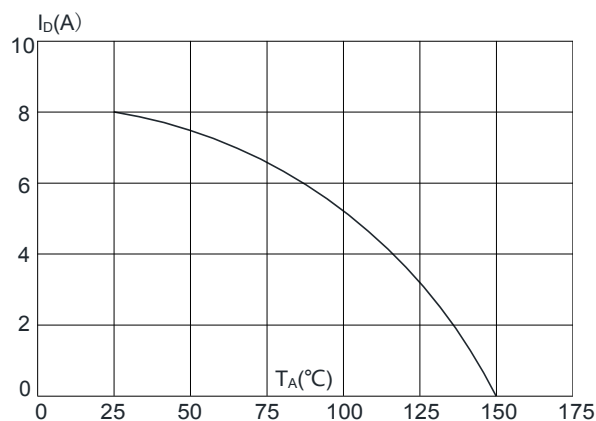
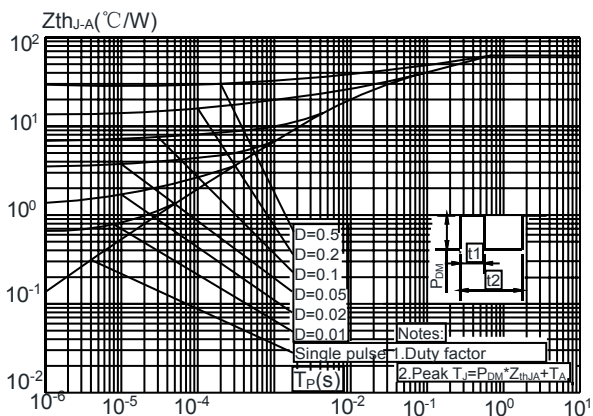
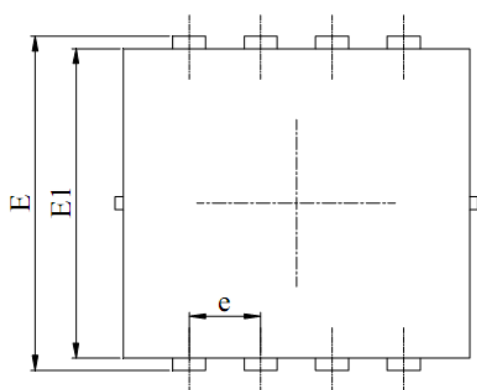


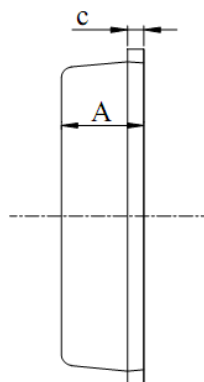
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



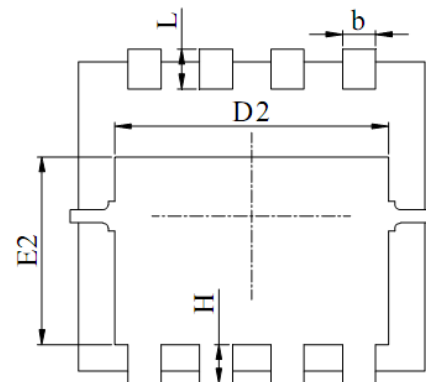
Package Mechanical Data-PDFN3333-8L-Single



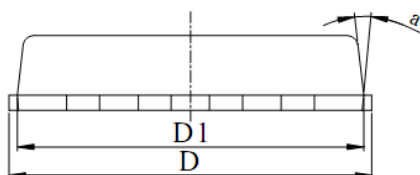
Top View



Side View



Bottom View

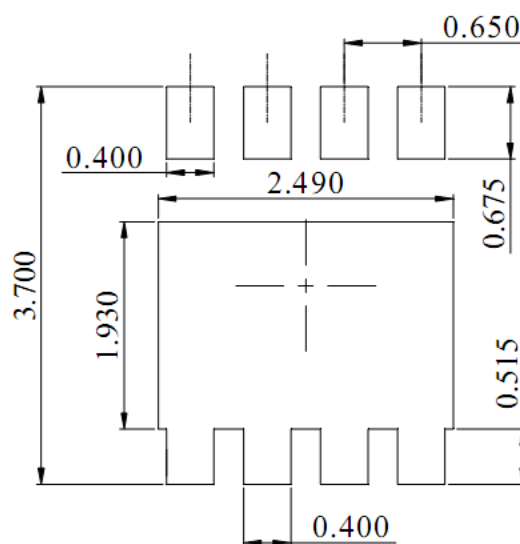


Front View

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMENSIONS IN MILLIMETER (ANGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.20	0.25
D	3.00	3.15	3.25
D1	2.95	3.05	3.15
D2	2.39	2.49	2.59
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.70	1.80	1.90
e	0.65 BSC		
H	0.30	0.40	0.50
L	0.25	0.40	0.50
a	---	---	15°



DIMENSIONS:MILLIMETERS