UN1012N3R4-PD56

ROHS

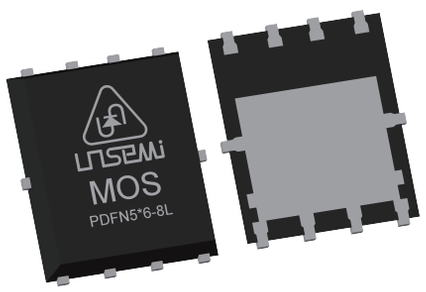
N-Channel Enhancement Mode MOSFET

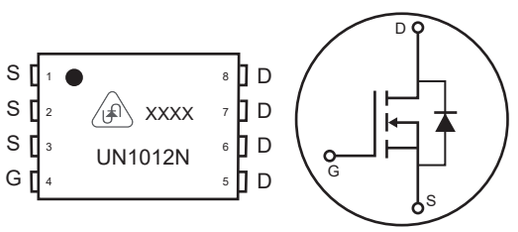
www.unsemi.com.tw

Product Summary

V_{DS}	100V
I_D	100A
$R_{DS(ON)}$(@V_{GS}=10V I_D=20A)	≤4.0mΩ
$R_{DS(ON)}$(@V_{GS}=4.5V I_D=20A)	≤6.0mΩ

DFN5*6-8L





Features

- SGT MOSFET Technology
- 100% Avalanche Tested
- Reliable and Rugged
- RoHS compliant

Applications

- DC/DC Converter
- Battery Management System
- High power inverter system
- Industrial and Motor Drive applications

Package Marking And Ordering information

Part Number	Package Type	Packaging	Reel(pcs)
UN1012N3R4-PD56	DFN5*6-8L	Tape & Reel	5,000

Absolute Maximum Ratings TC = 25℃ unless otherwise specified

Parameter		Symbol	Maximum	Units
Drain to Source Voltage		V_{DS}	100	V
Continuous Drain Current [1]	@Tc=25℃	I_D	100	A
	@Tc=100℃		81	
Drain Current Pulsed [2]		I_{DM}	384	A
Drain current of silicon wafer [3]		I_{DSW}	128	A
Gate-Source Voltage		V_{GS}	±20	V
Single Pulsed Avalanche Energy [4]		E_{AS}	480	mJ
Power Dissipation	@Tc=25℃	P_D	125	W
	@Tc=100℃		50	
Junction and Storage Temperature Range		Tstg,T_J	-55~150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	--	58	℃/W
Thermal Resistance from Junction to case	$R_{\theta JC}$	--	1.0	℃/W

Notes:

1) The maximum current rating is package limited.

2) Single pulse width limited by junction temperature .

3) The maximum current rating is silicon wafer limited.

4) Limited by $T_{J(MAX)}$, starting T_J=25℃, Rg=25Ω, L=0.5mH.

5) Design parameters, guaranteed by design, not subject to production.

Electrical Characteristics at T_J = 25℃ unless otherwise specified

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250uA	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100V , V_{GS} = 0V			1.0	μA
Gate-Source leakage current	I_{GSS}	V_{GS} = ±20V , V_{DS} = 0V			±100	nA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS} , I_D = 250μA	1.5	2.0	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10V , I_D = 20A		3.4	4.0	mΩ
		V_{GS} = 4.5V , I_D = 20A		5.0	6.0	mΩ
Forward Transconductance	gfs	V_{DS} = 5.0V, I_D = 25A		100		S
Body-Diode PARAMETERS						
Drain-Source Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V		0.7	1.0	V
Body Diode Reverse Recovery Time	trr	I_F = 20A di/dt = 500A/μs		40		ns
Body Diode Reverse Recovery Charge	Qrr			240		nC
DYNAMIC PARAMETERS [5]						
Gate Resistance	R_G	F = 1MHZ		1.8		Ω
Input Capacitance	Ciss	V_{GS} = 0V V_{DS} = 50V F = 1MHz		4445		pF
Output Capacitance	Coss			817		pF
Reverse Transfer Capacitance	Crss			37.8		pF
Gate charge Total	Qg	V_{GS} = 10V V_{DS} = 50V I_D = 20A		75		nC
Gate to Source Charge	Qgs			12.6		nC
Gate to Drain Charge	Qgd			20		nC
Turn-On Delay Time	$td_{(ON)}$	V_{DS} = 50V, V_{GS} = 10V R_G = 2.7Ω		14.8		ns
Turn-On Rise Time	tr			32.2		ns
Turn-Off Delay Time	$td_{(OFF)}$			50.8		ns
Turn-Off Fall Time	tf			66.0		ns

Electrical Characteristics Curves

Fig. 1 Power Derating

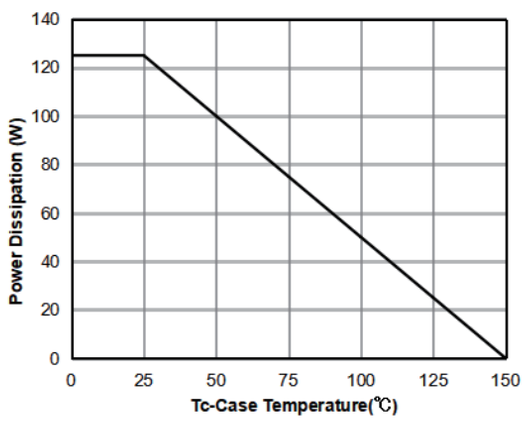


Fig. 2 Maximum Drain Current vs. Case Temperature

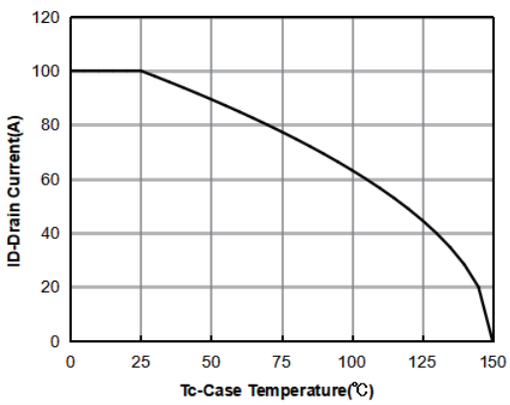


Fig. 3 Output Characteristics

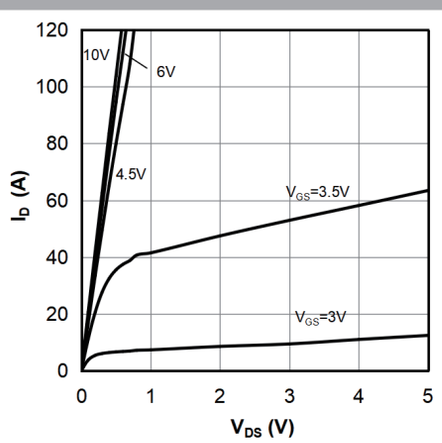


Fig. 4 Transfer Characteristics

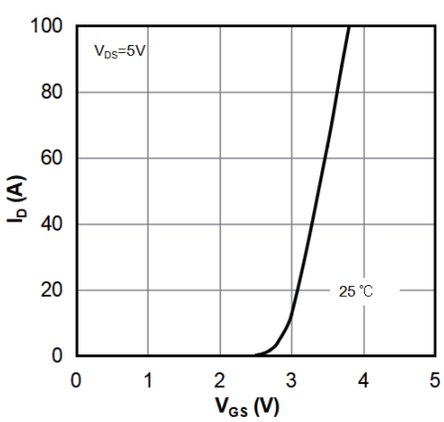


Fig. 5 On-Resistance vs. Drain Current and Gate Voltage

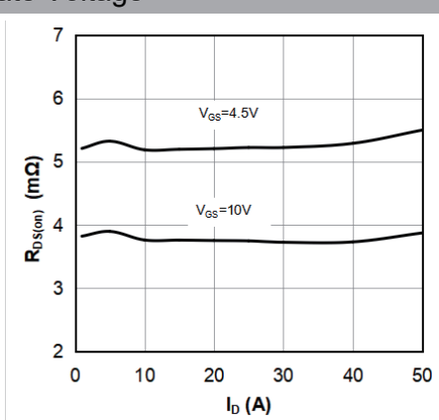
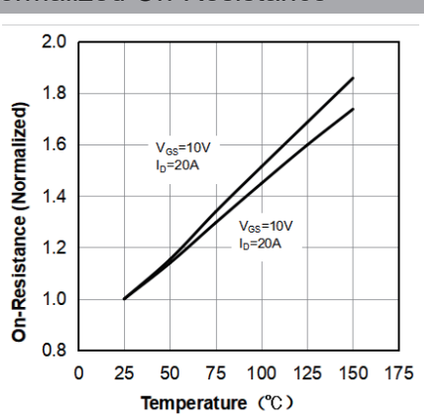


Fig. 6 On-Resistance vs. Junction Temperature/ Normalized On-Resistance



Electrical Characteristics Curves

Fig. 7 On-Resistance vs. Gate-Source Voltage

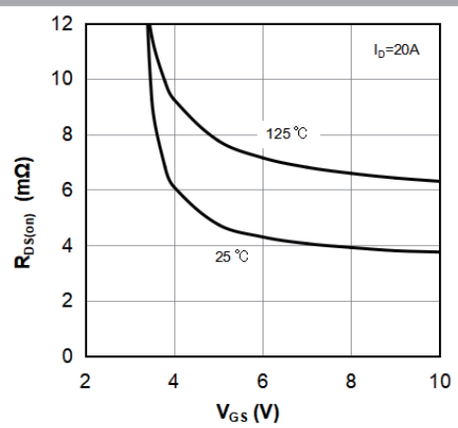


Fig. 8 Body-Diode Characteristics

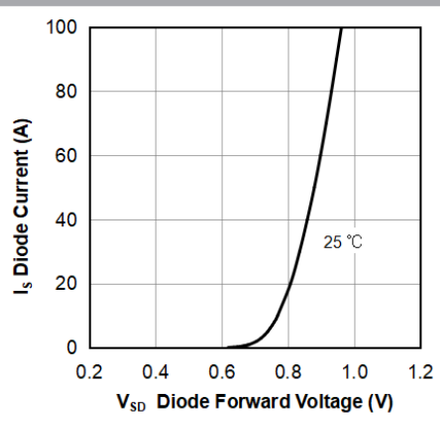


Fig. 9 Capacitance Characteristics

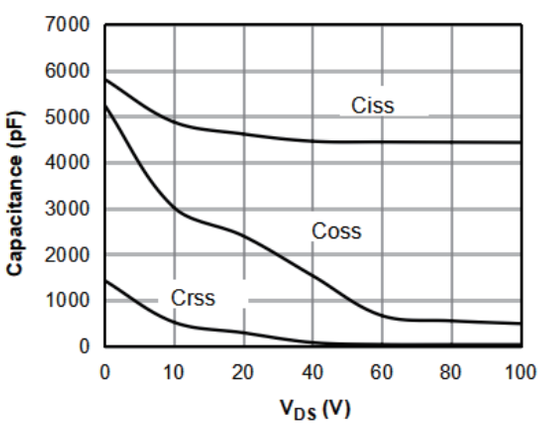


Fig. 10 Gate Charge Characteristics

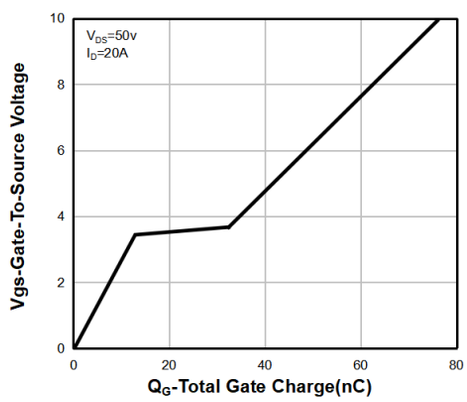
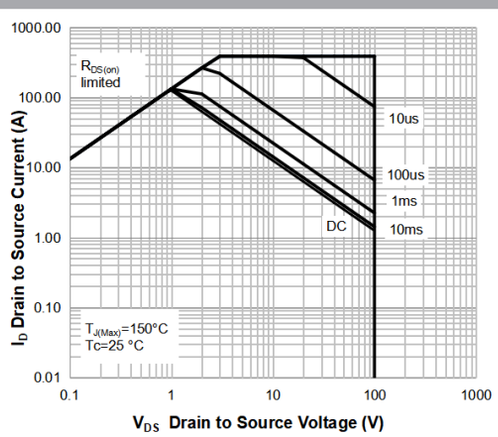
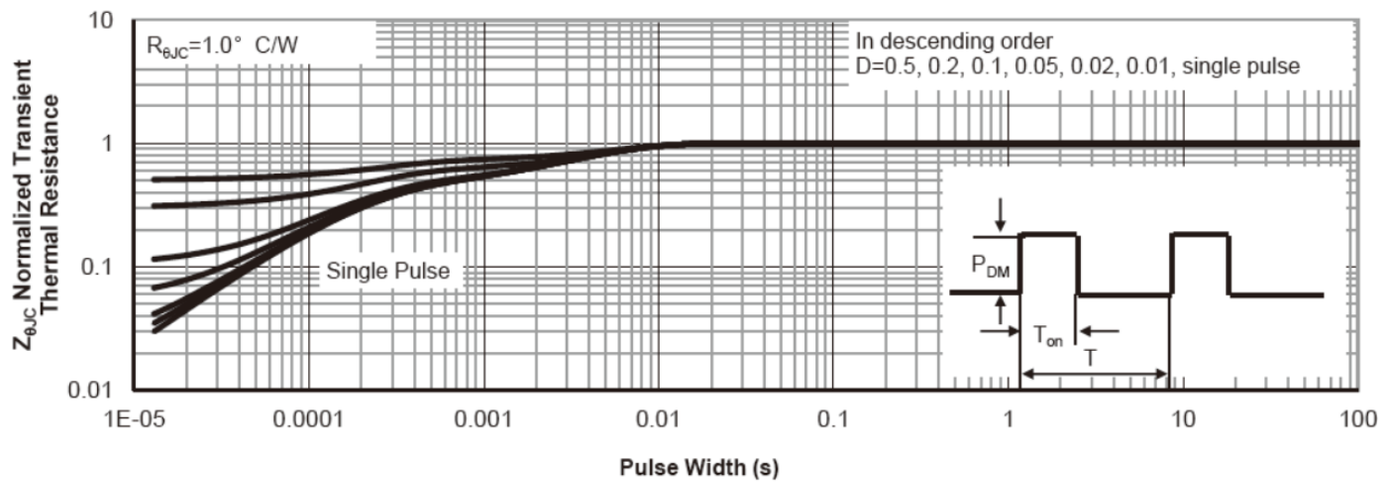


Fig. 11 Safe Operation Area



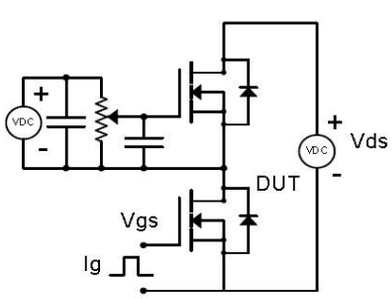
Electrical Characteristics Curves

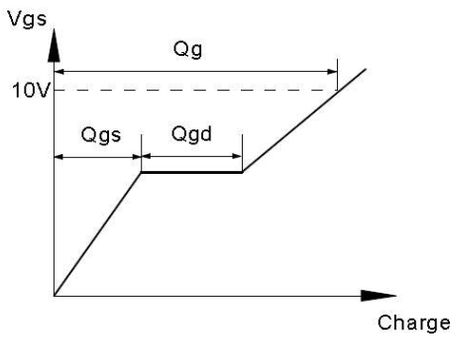
Fig. 12 Normalized Maximum Transient thermal impedance



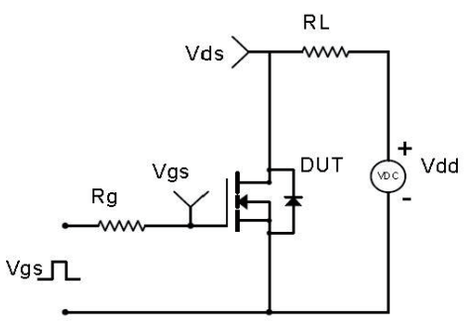
Test Circuit

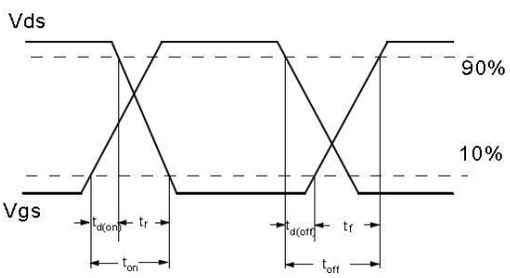
Gate Charge Test Circuit & Waveform



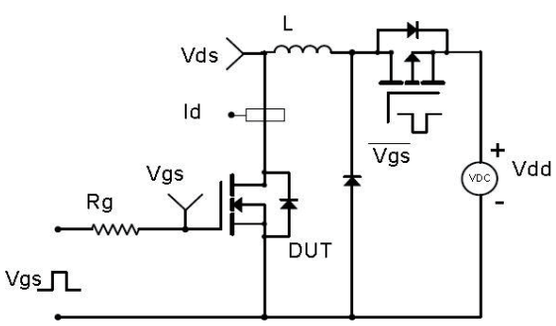


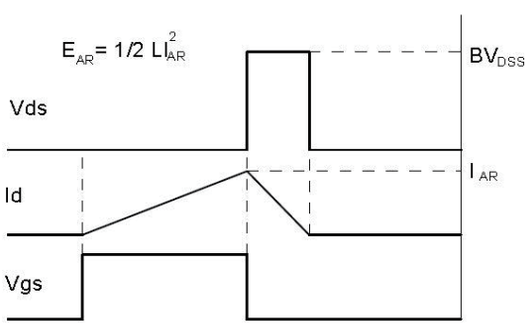
Resistive Switching Test Circuit & Waveforms



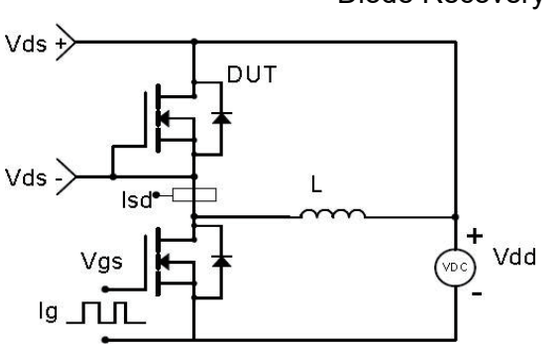


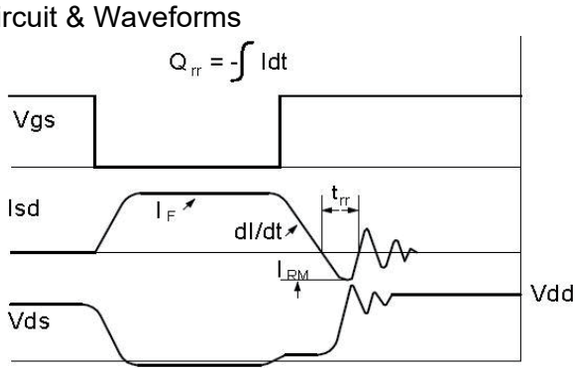
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





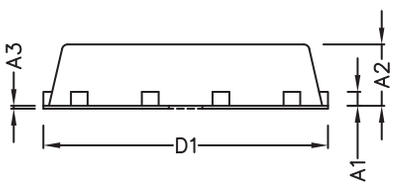
Diode Recovery Test Circuit & Waveforms



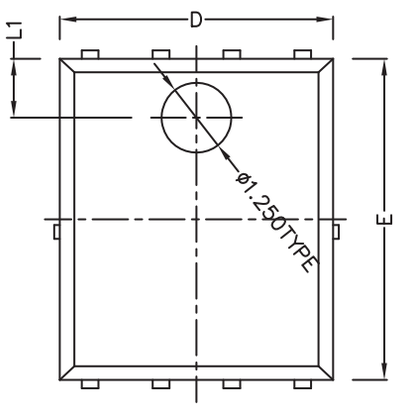


DFN5*6-8L Package Outine & Dimensions (Units: mm / in)

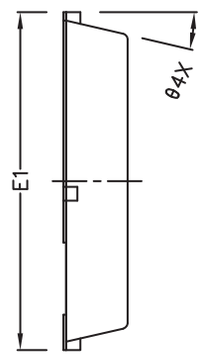
PDFN5*6-8L



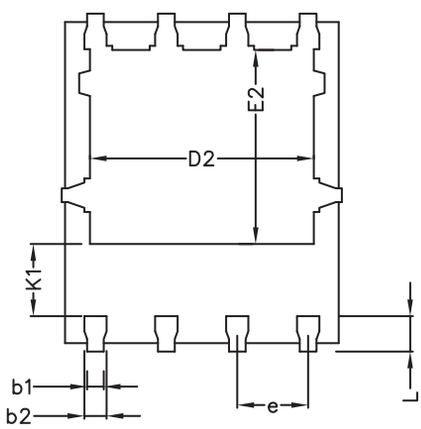
SIDE VIEW



TOP VIEW



SIDE VIEW



BOTTOM VIEW
OPTION 1

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A1	(0.254 BSC)		(0.0100 BSC)	
A2	1.000	1.100	0.0394	0.0433
A3	0.005	-	0.0001	-
b1	0.250	0.300	0.0098	0.0118
b2	0.350	0.400	0.0138	0.0157
D	4.800	4.900	0.1890	0.1929
D1	5.000	5.100	0.1969	0.2008
D2	3.910	4.010	0.1539	0.1579
E	5.650	5.750	0.2224	0.2263
E1	5.950	6.050	0.2342	0.2381
E2	3.375	3.475	0.1329	0.1368
e	(1.270 TYPE)		(0.0500 TYPE)	
L	0.530	0.630	0.0209	0.0248
L1	1.00 REF		0.0394 REF	
θ	13° TYPE		13° TYPE	
K1	1.235 REF		0.0486 REF	

優恩半導體 UNSEMI

ROHS

Disclaimer

UNSEMI RESERVES THE RIGHT TO MAKE CHANGE ON OUR PRODUTS , PRODUCTS SPECIFICATION AND DATA WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

UN SEMICONDUCTOR LIMITED its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “UNSEMI”)does not give any representations or warranties for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

In no event shall UNSEMI be liable for any indirect, incidental, punitive, special or consequential damages (including any and all implied warranties, warranties of fitness for particular purpose, non-infringement and merchantability.) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Statements regarding the suitability of products for certain types of applications are based on UNSEMI knowledge of typical requirements that are often placed on UNSEMI products in generic applications. Such statements are not binding, statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify UNSEMI's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Unless otherwise agreed in writing, UNSEMI product is not designed, authorized or warranted to be suitable for use in medical life-saving, or life-sustaining application , nor in applications where failure or malfunction of a UNSEMI product can reasonably be expected to result in personal injury, death or severe property or environmental damage. UNSEMI and its suppliers accept no liability for inclusion or use of UNSEMI products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

All referenced brands, product names, service names and trademarks are the property of their respective owners.