

54A 30V N-channel Enhancement Mode Power MOSFET

1 Description

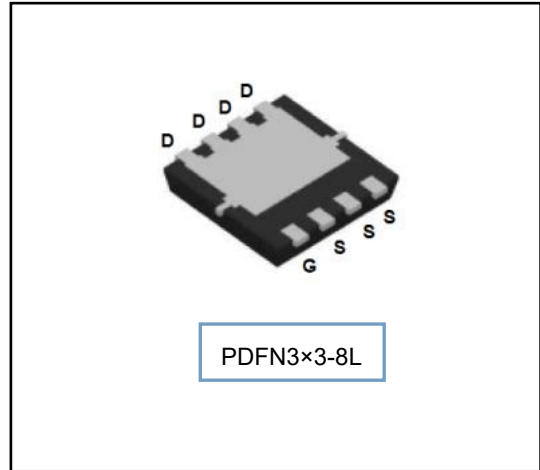
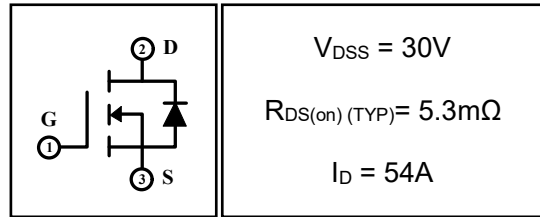
These N-channel enhanced vdmofets used advanced trench technology design, provided excellent $R_{DS(on)}$ and low gate charge. Which accords with the RoHS standard.

2 Features

- Low switching loss
- Low on resistance
- Low gate charge
- Low reverse transfer capacitance
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test

3 Applications

- Power switching applications
- DC-DC converters
- Power tools
- Synchronous Rectifier
- Inverter management system



4 Electrical Characteristics

4.1 Absolute Maximum Rating ($T_C=25^\circ C$, unless otherwise noted)

Parameter	Symbol	Value	Units
Maximum Drain-Source DC Voltage	V_{DSS}	30	V
Maximum Gate-Drain Voltage	V_{GSS}	± 20	V
Drain Current(continuous)	I_D	$T_C=25^\circ C$	54
		$T_C=100^\circ C$	35
Drain Current(Pulsed) ⁽¹⁾	I_{DM}	140	A
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	84	mJ
Avalanche Current ⁽⁴⁾	I_{AS}	18.5	A
Total Dissipation	P_{tot}	$T_a=25^\circ C$	--
		$T_C=25^\circ C$	30
Junction Temperature	T_j	-55~150	$^\circ C$
storage Temperature	T_{stg}	-55~150	$^\circ C$
Maximum Temperature for soldering	T_L	260	$^\circ C$

4.2 Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-to-Case ⁽¹⁾	R_{thJC}	4.17	$^\circ C/W$
Thermal Resistance Junction-to-Ambient	R_{thJA}	--	$^\circ C/W$

4.3 Electrical Characteristics (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Drain-source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	30	33	---	V
Drain-to-Source Leakage Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V, T _C =25°C	---	---	1	μA
		V _{DS} =24V, V _{GS} =0V, T _C =125°C	---	---	100	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
On Characteristics						
Gate threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.5	2	V
Drain-source on-state Resistance	R _{DS(on)}	V _{GS} =10V, I _D =25A	4.5	5.5	7.5	mΩ
		V _{GS} =4.5V, I _D =20A	6	8.8	12	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =15V, f=1.0MHz	---	1200	---	pF
Output Capacitance	C _{oss}		---	200	---	
Reverse Transfer Capacitance	C _{rss}		---	137	---	
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =0V, f=1.0MHz	---	1.25	---	Ω
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	I _D =50A, V _{DD} =15V, V _{GS} =4.5V, R _{GEN} =2Ω	---	16	---	nS
Turn-on Rise Time	t _r		---	110	---	
Turn-off Delay Time	t _{d(off)}		---	25	---	
Turn-off Fall Time	t _f		---	110	---	
Total Gate Charge	Q _g	I _D =25A, V _{DD} =15V, V _{GS} =10V	---	25.7	---	nC
Gate-to-Source Charge	Q _{gs}		---	5.2	---	
Gate-to-Drain("Miller") Charge	Q _{gd}		---	5.8	---	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V _{FSD}	V _{GS} =0V, I _S =30A	---	0.9	1.2	V
Diode Forward Current	I _S		---	---	50	A
Reverse Recovery Time ⁽³⁾	t _{rr}	T _J =25°C, I _F =25A, dI _F /dt=100A/μS, V _{GS} =0V	---	11	---	nS
Reverse Recovery Charge ⁽³⁾	Q _{rr}		---	3.4	---	nC

Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t_s≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: L=0.5mH, I_D=18.5A, V_{DD}=24V, V_{GATE}=30V, Start T_J=25°C.

5 Typical characteristics diagrams

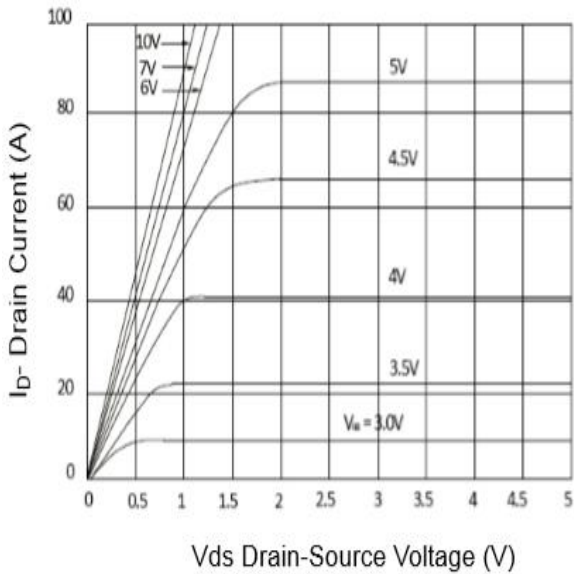


Figure 1 Output Characteristics

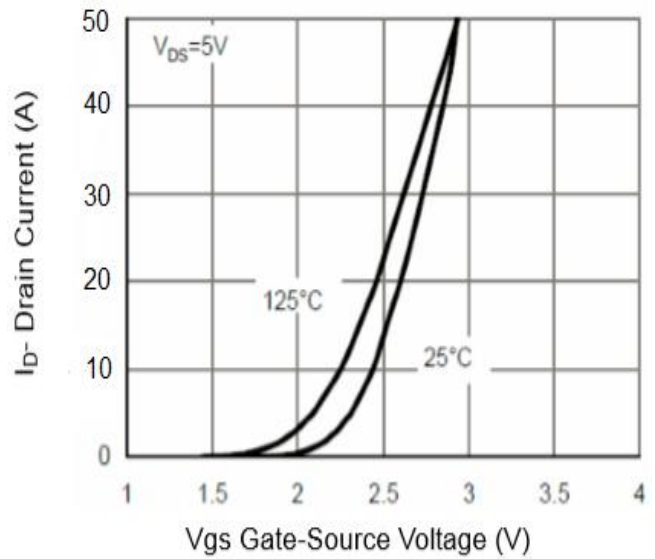


Figure 2 Transfer Characteristics

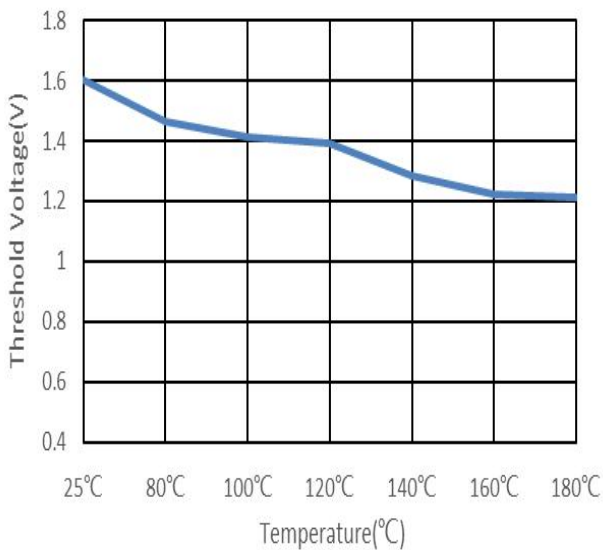


Figure 3. Threshold vs Temperature

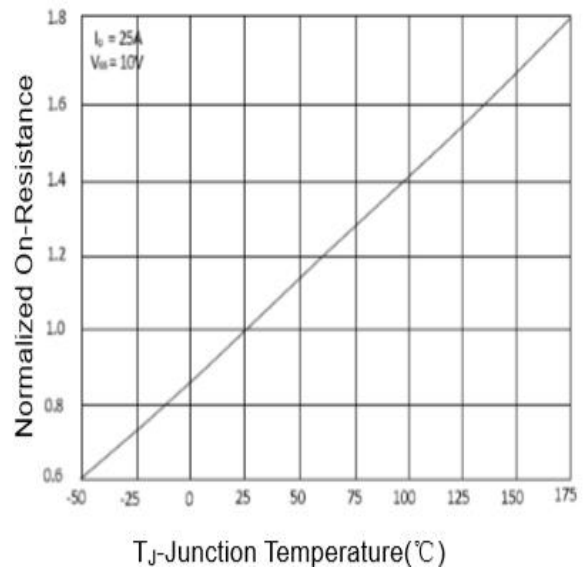


Figure 4. Rdson vs Temperature

5 Typical characteristics diagrams(continues)

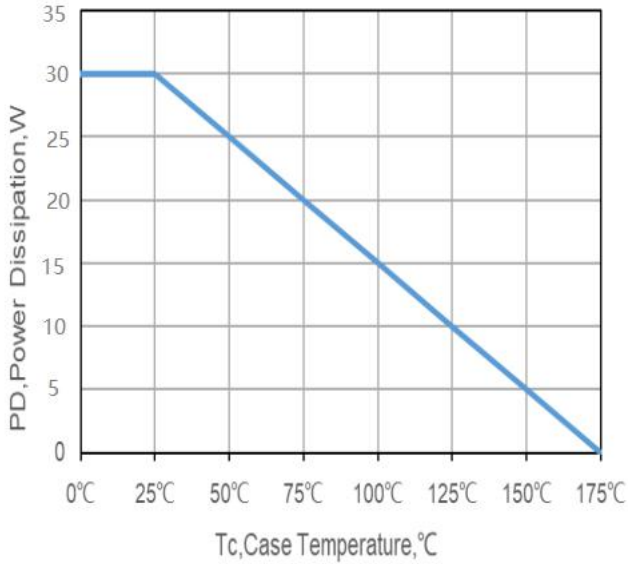


Figure 5. Power De-rating

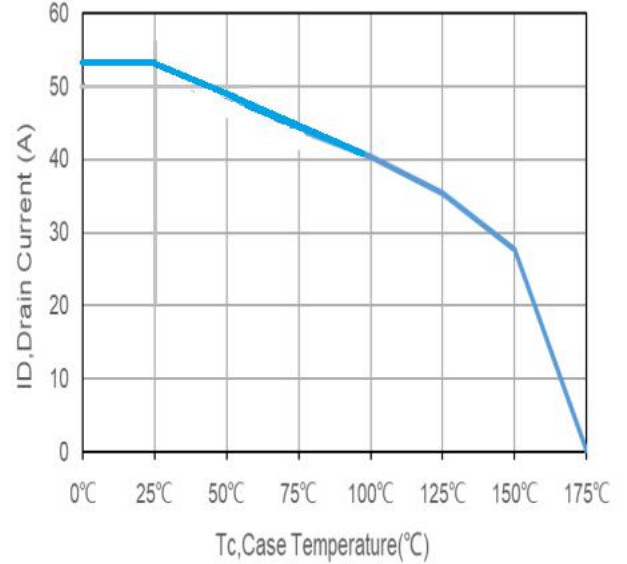


Figure 6. ID Current Derating

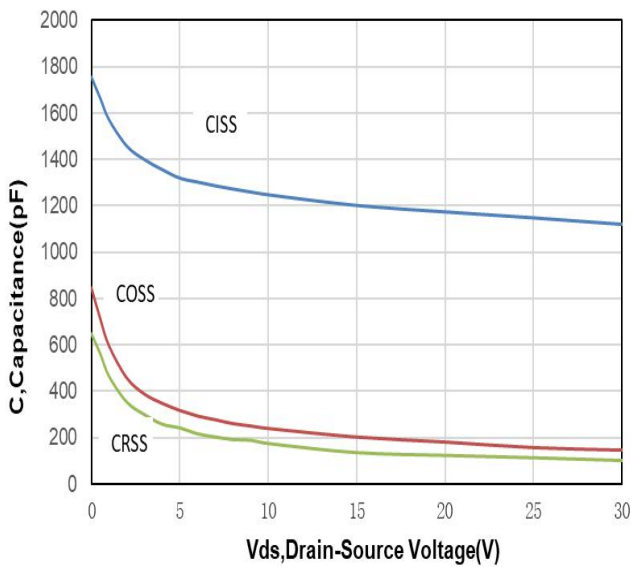


Figure 7. Capacitance Characteristics

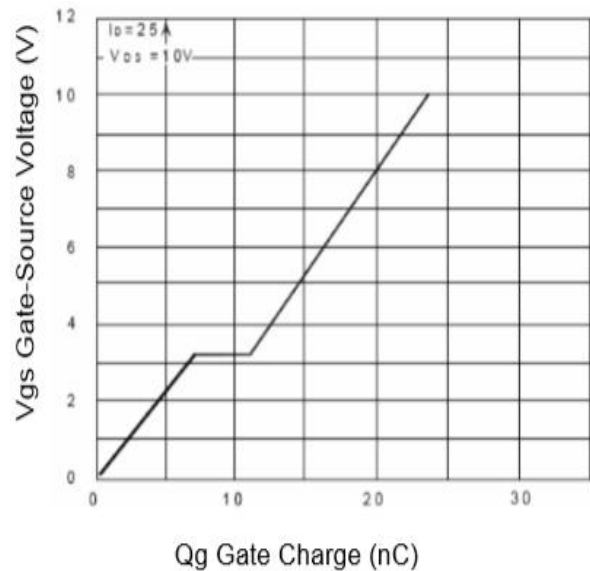
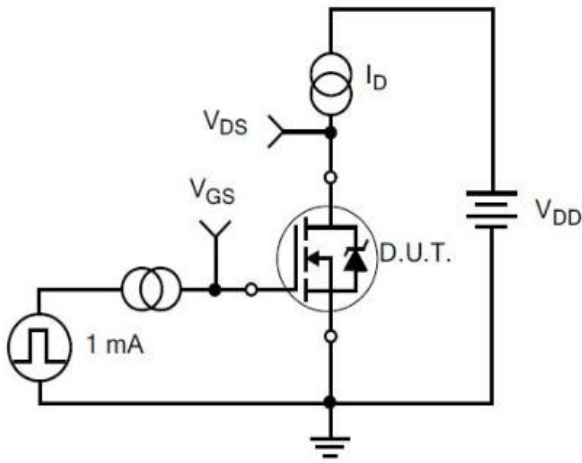
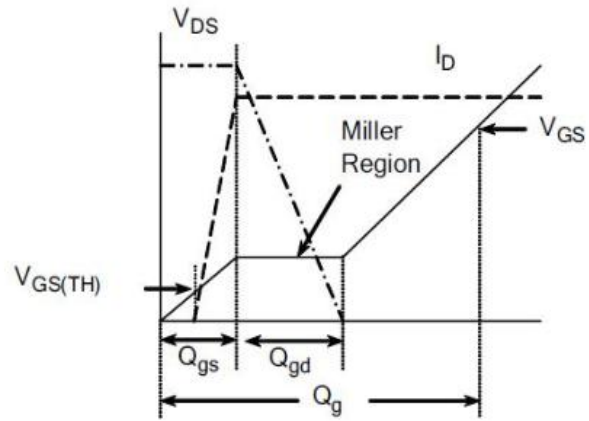


Figure 8. Gate Charge Characteristics

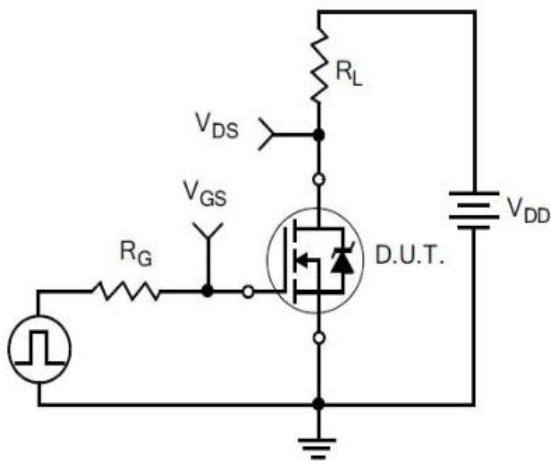
6 Typical Test Circuit and Waveform



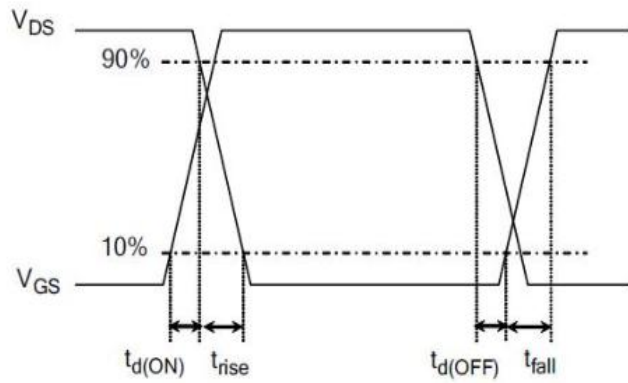
1) Gate Charge Test Circuit



2) Gate Charge Waveform

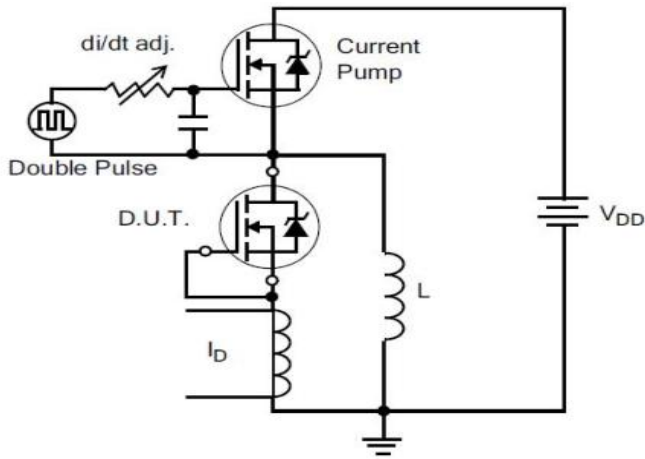


3) Resistive Switching Test Circuit

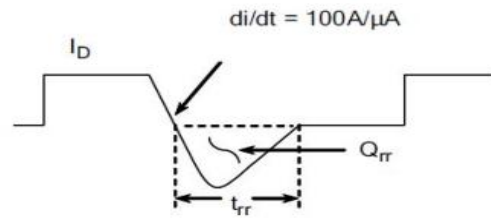


4) Resistive Switching Waveforms

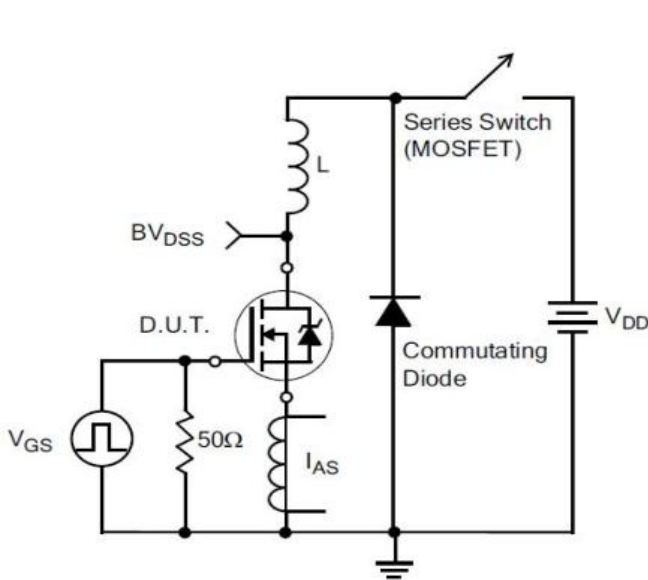
6 Typical Test Circuit and Waveform(continues)



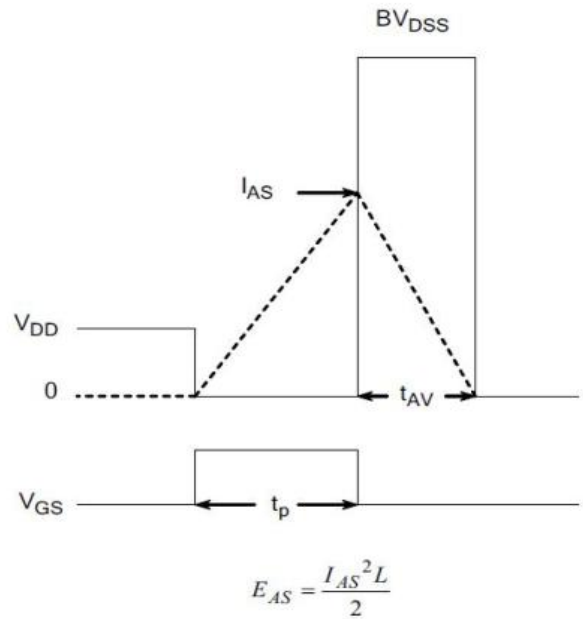
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

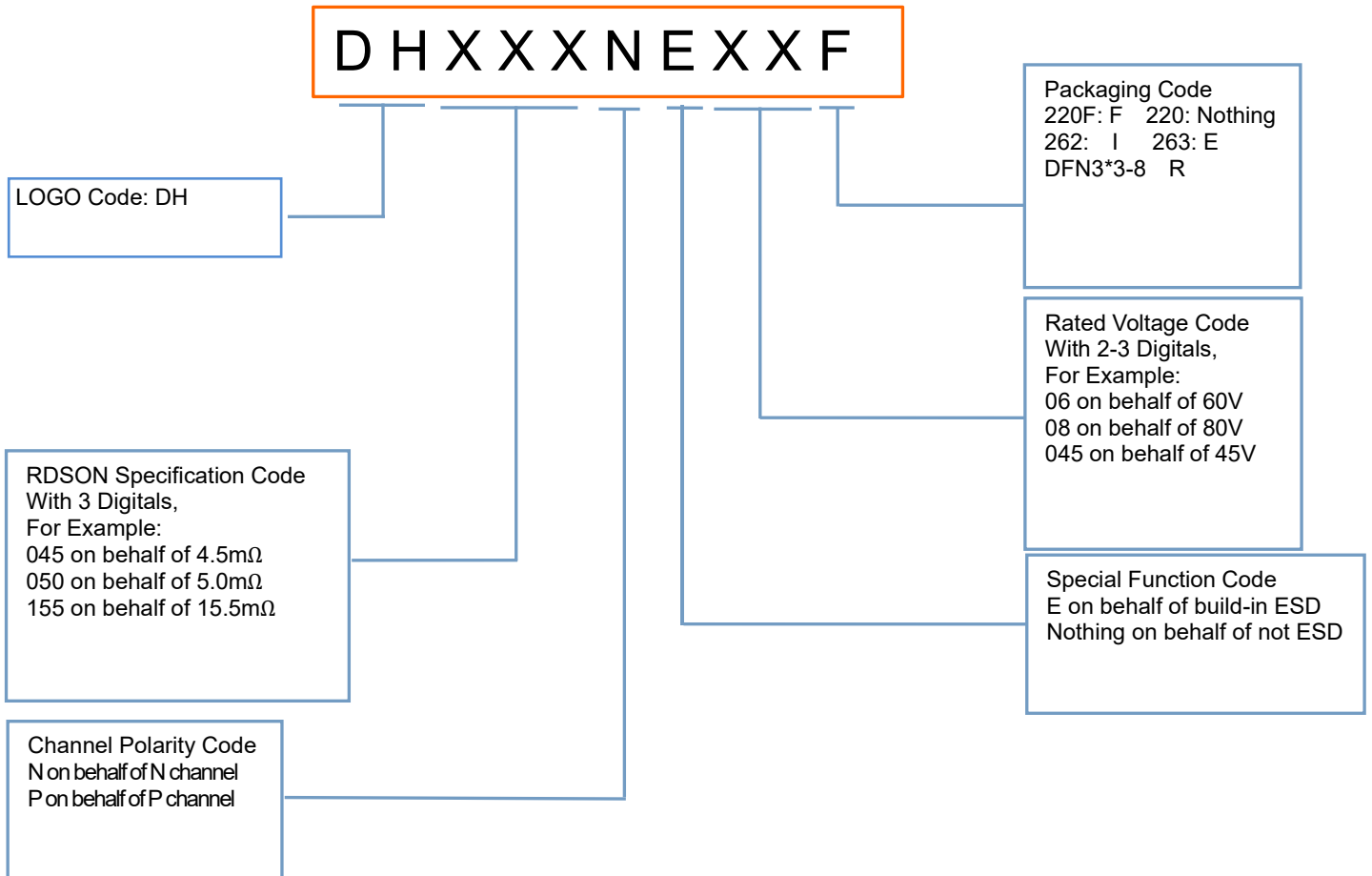


7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

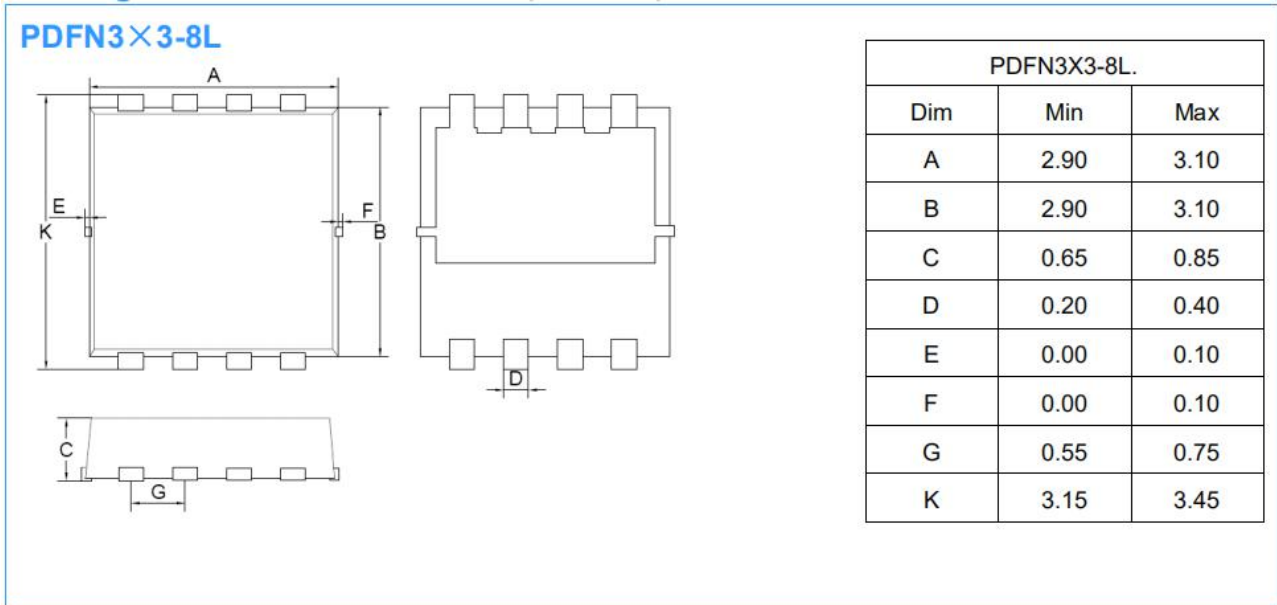
7 Product Names Rules



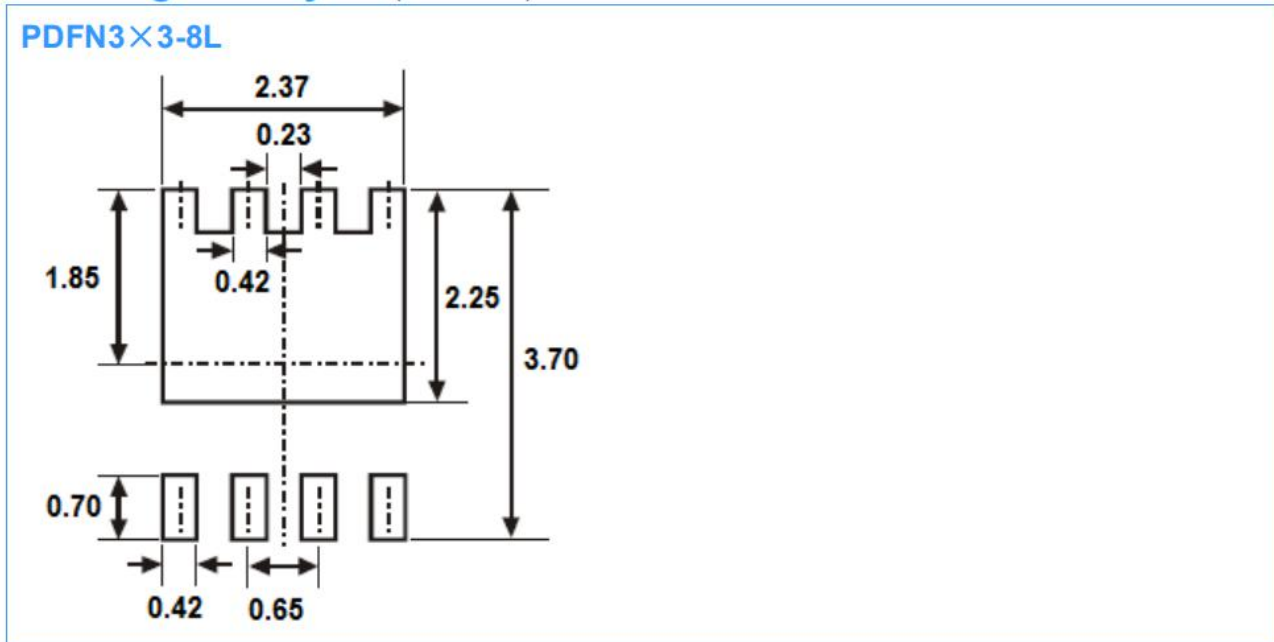
8 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
DH060N03R	PDFN3*3-8L	DH060N03R	Pb-free	Tape & Reel	2500/box

9 Dimensions



Mounting Pad Layout (unit: mm)



10 Attentions

- Jiangsu Donghai Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Donghai products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

11 Appendix

Revision history:

Date	REV.	Description	Page
2020.04.15	1.0	Original	