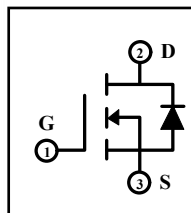


50A 150V N-channel Enhancement Mode Power MOSFET

1 Description

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



$V_{DSS} = 150V$
$R_{DS(on)} (Type) = 18m\Omega$
$I_D = 50A$

2 Features

- Low on resistance
- Low gate charge
- High avalanche current
- Fast switching
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test

3 Applications

- Power switching applications
- Motor control and drive
- Battery management
- UPS(Uninterruptible Power Supplies)



4 Electrical Characteristics

4.1 Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

Parameter	Symbol	Rating		Units	
		DH50N15/ DHI50N15/DHE50N15	DHF50N15		
Drain-Source Voltage	V_{DSS}	150		V	
Gate-Source Voltage	V_{GSS}	± 20		V	
Drain Current(continuous) ⁽¹⁾	I_D	50		A	
Drain Current(continuous)(T=100°C) ⁽¹⁾	I_D	36		A	
Drain Current(Pulsed) ⁽¹⁾	I_{DM}	180		A	
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	670		mJ	
Avalanche Current ⁽⁴⁾	I_{AS}	52		A	
Maximum Power Dissipation	T _a =25°C	P _D	2	2	W
	T _c =25°C	P _D	180	54	W
Operating Junction Temperature Range	T _J	-55~175		°C	
Storage Temperature Range	T _{stg}	-55~175		°C	
High Temperature(tin solder)	T _L	300		°C	

4.2 Thermal Characteristics

Parameter	Symbol	Rating		Unit
		DH50N15/ DHI50N15/DHE50N15	DHF50N15	
Thermal Resistance Junction-to-Case	R _{θJC}	0.83	2.78	°C/W
Thermal Resistance Junction-to-Ambient	R _{θJA}	75	75	°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	V _{DSS}	I _D =250μA, V _{GS} =0V	150	162	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =150V, V _{GS} =0V, T _C =25°C	--	--	1	μA
		V _{DS} =120V, V _{GS} =0V, T _C =125°C	--	--	100	μA
Gate-to-Body 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	2.0	3.1	4.0	V
Drain-Source on-state Resistance	R _{DS(on)}	V _{GS} =10V, I _D =50A	--	18	25	mΩ
Gate Resisitance	R _G	V _{DD} =0V, V _{GS} =0V, f=1MHz	--	1.2	--	Ω
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz	--	2772	--	pF
Output Capacitance	C _{oss}		--	349	--	
Reverse Transfer Capacitance	C _{rss}		--	153	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	I _D =30A, V _{DS} =100V, V _{GS} =10V, R _{GEN} =2.5Ω	--	16.1	--	nS
Turn-on Rise Time	t _r		--	55.7	--	
Turn-off Delay Time	t _{d(off)}		--	38.4	--	
Turn-off Fall Time	t _f		--	67.1	--	
Total Gate Charge	Q _g	I _D =30A, V _{DS} =100V, V _{GS} =10V	--	63	--	nC
Gate-to-Source Charge	Q _{gs}		--	15	--	
Gate-to-Drain("Miller") Charge	Q _{gd}		--	24	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V _{SD}	V _{GS} =0V, I _S =30A	--	0.86	1.3	V
Diode Forward Current	I _S		--	--	50	A
Reverse Recovery Time ⁽³⁾	t _{rr}	T _J =25°C, I _F =30A, dI _F /dt=100A/μS, V _{GS} =0V	--	53	--	nS
Reverse Recovery Charge ⁽³⁾	Q _{rr}		--	103	--	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=52A, V_{DD}=50V, V_{GS}=10V, Start T_J=25°C.

5 Typical characteristics diagrams

Figure 1: Power Dissipation

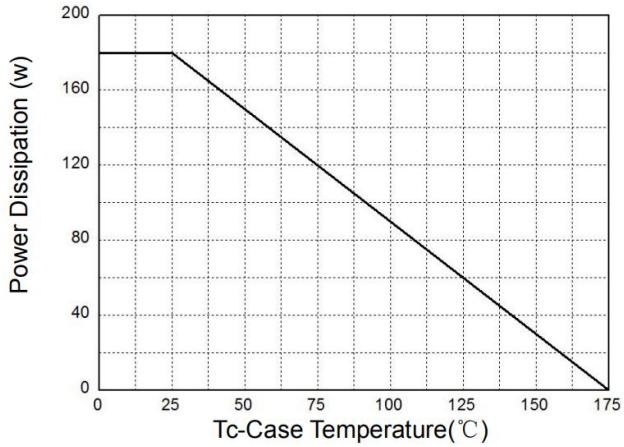


Figure 2: Drain Current

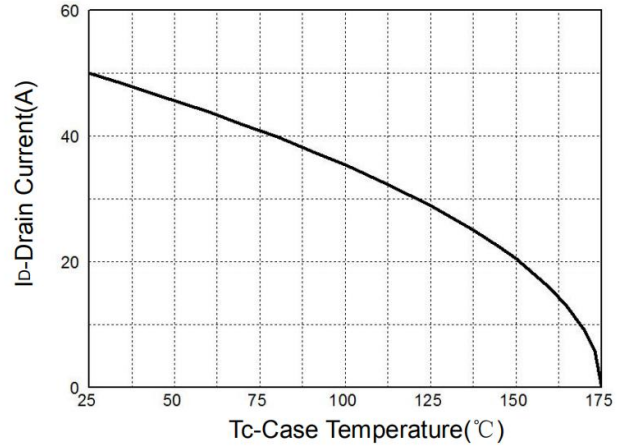


Figure 3: Safe Operation Area

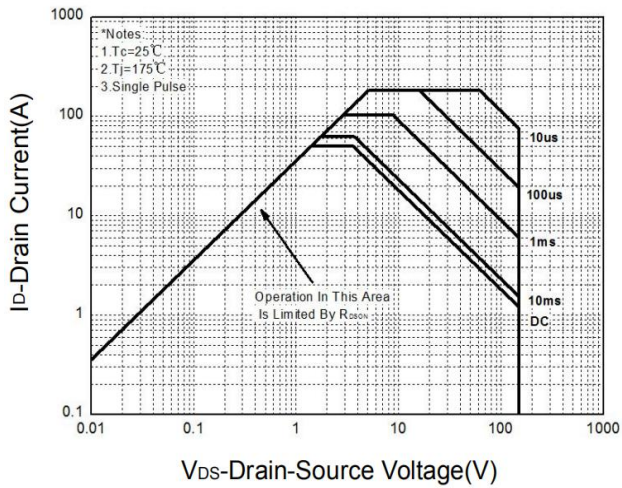
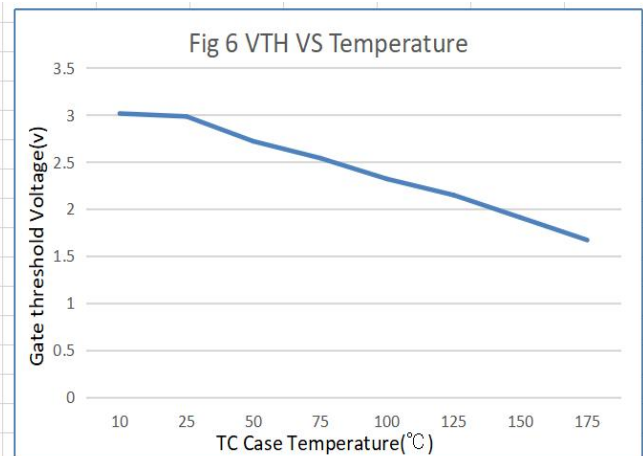
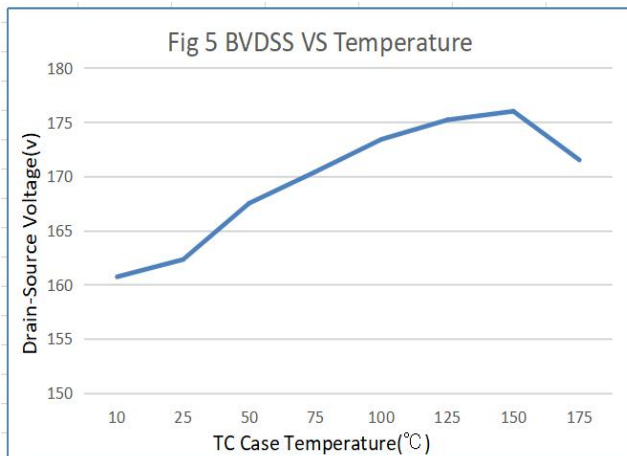
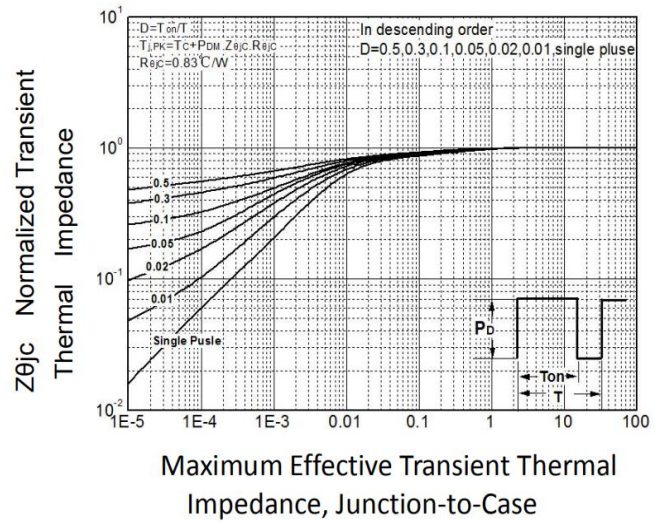
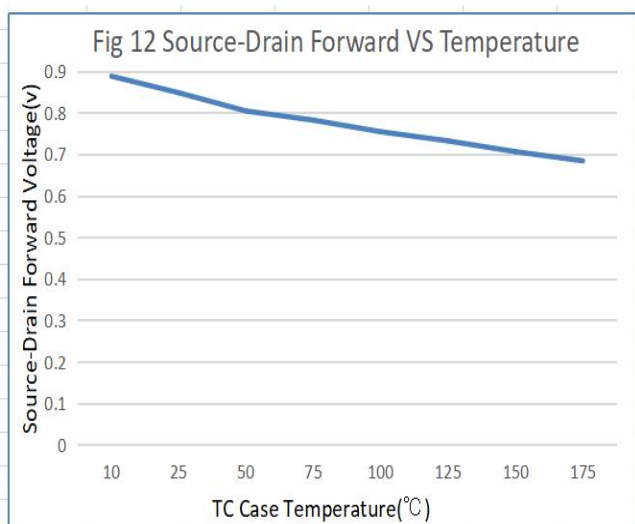
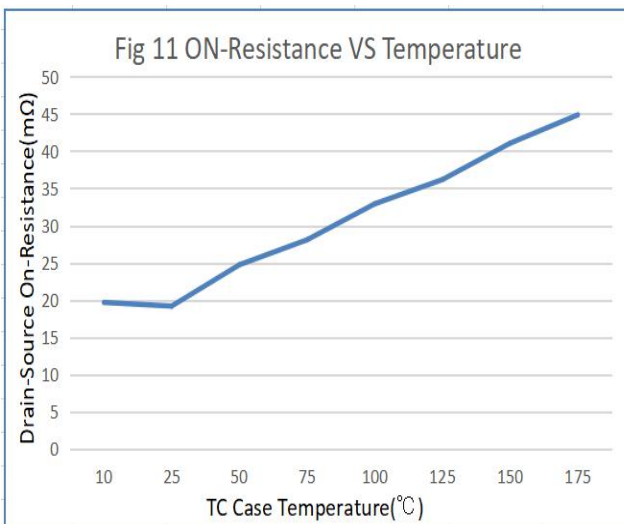
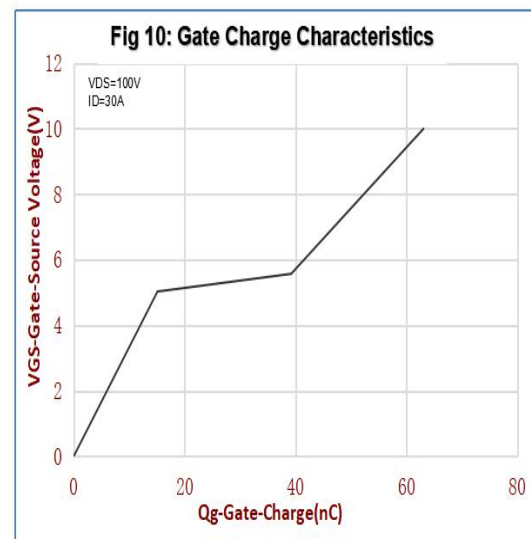
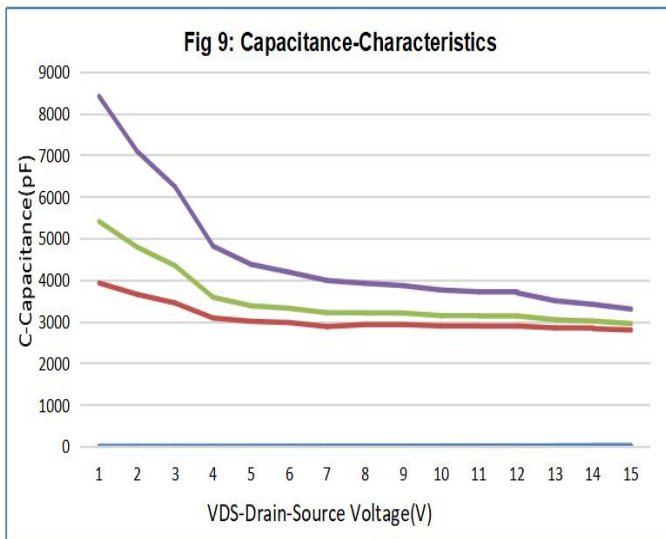
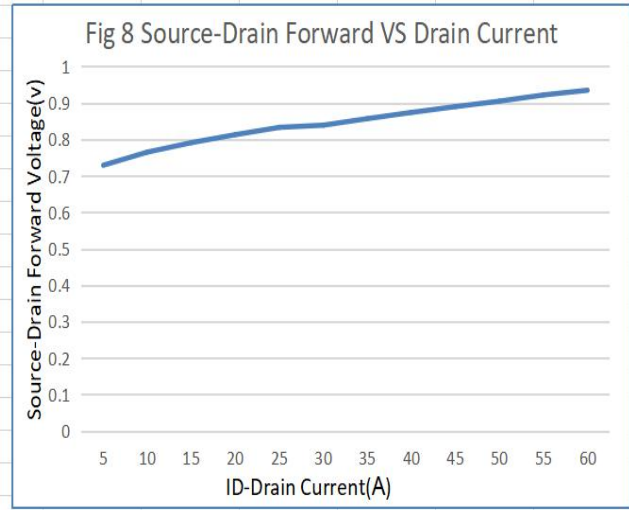
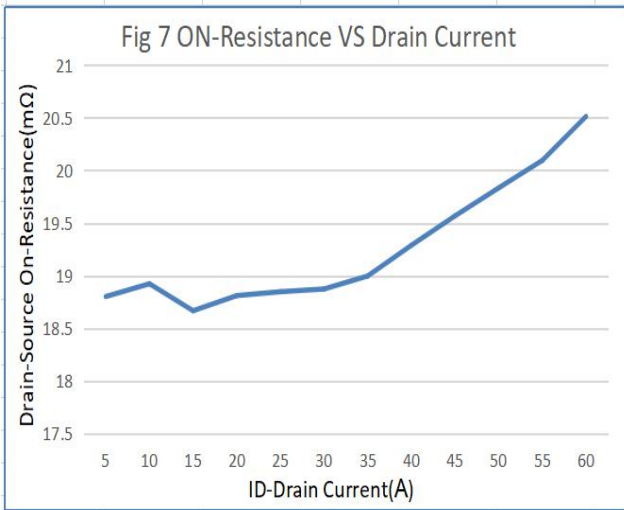


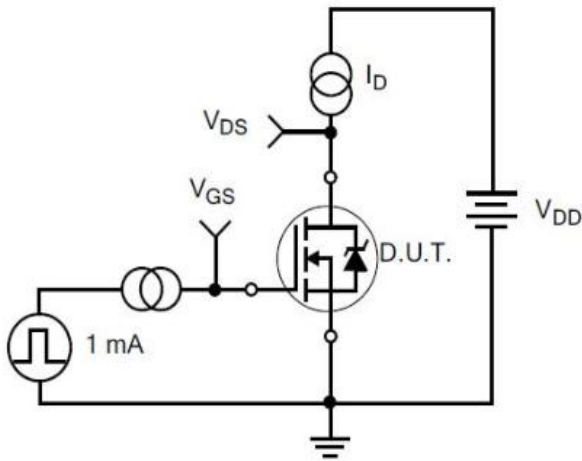
Figure 4: Thermal Transient Impedance



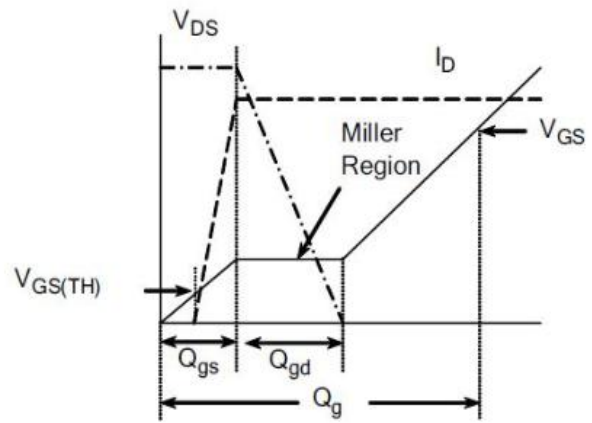
5 Typical characteristics diagrams(continues)



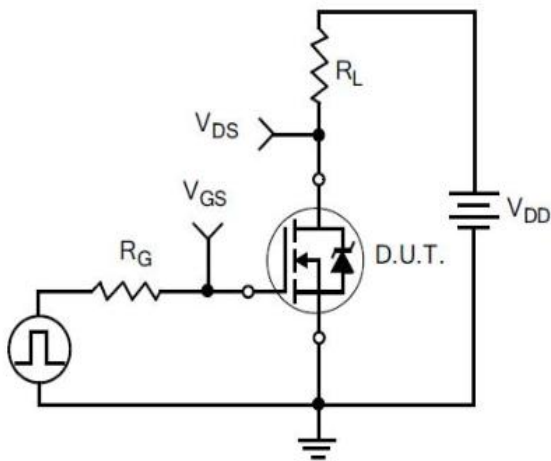
6 Typical Test Circuit and Waveform



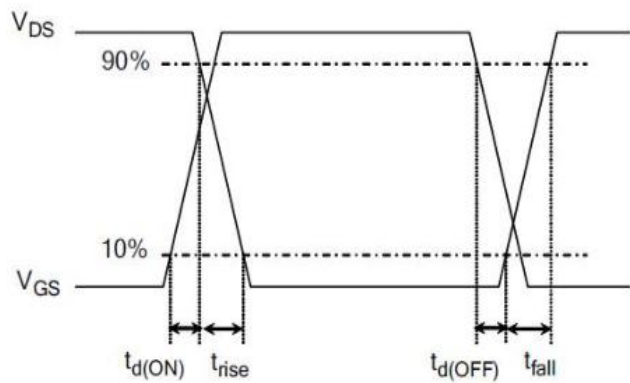
1) Gate Charge Test Circuit



2) Gate Charge Waveform

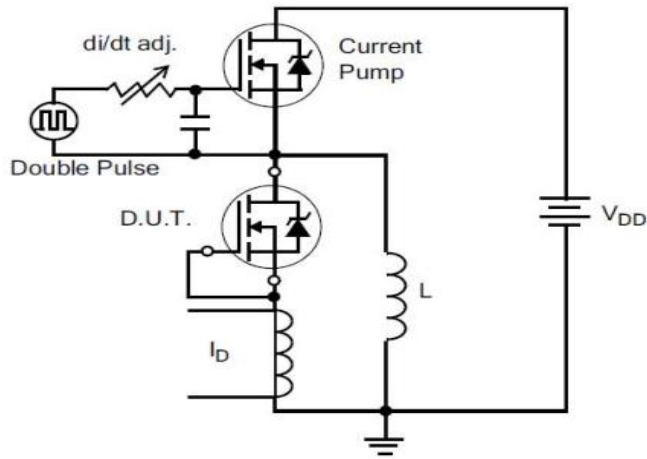


3) Resistive Switching Test Circuit

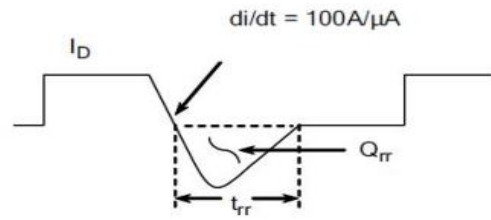


4) Resistive Switching Waveforms

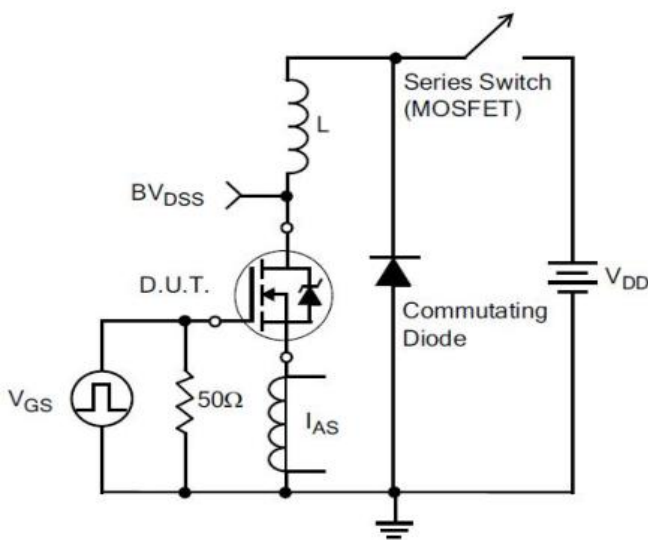
6 Typical Test Circuit and Waveform(continues)



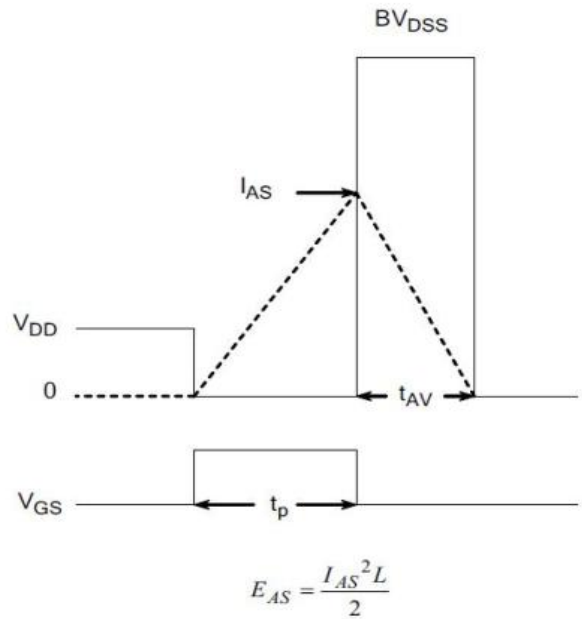
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

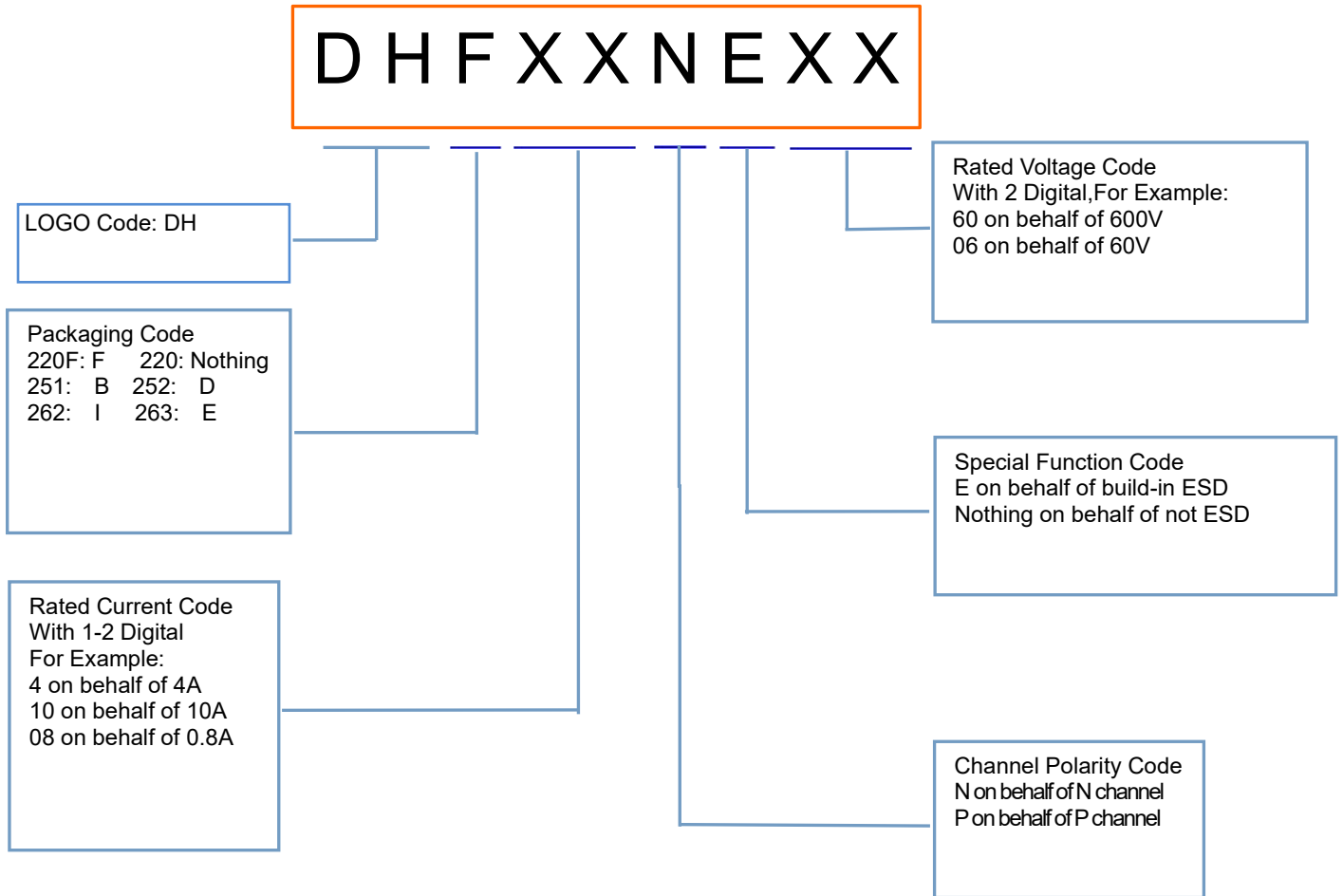


7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

7 Product Names Rules

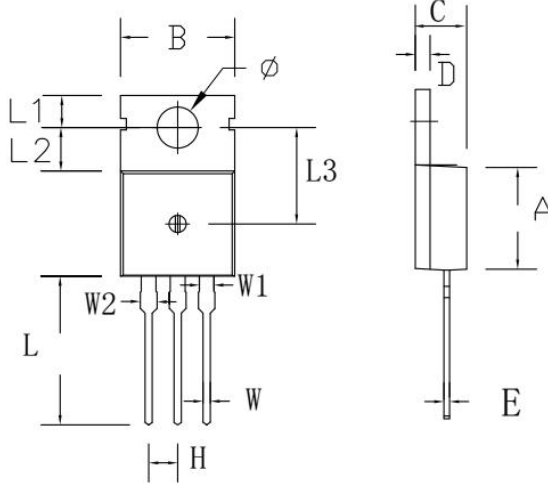


8 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
DH50N15	TO-220C	DH50N15	Pb-free	Tube	1000/box
DHF50N15	TO-220F	DHF50N15	Pb-free	Tube	1000/box
DHI50N15	TO-262	DHI50N15	Pb-free	Tube	1000/box
DHE50N15	TO-263	DHE50N15	Pb-free	Tape & Reel	800/box

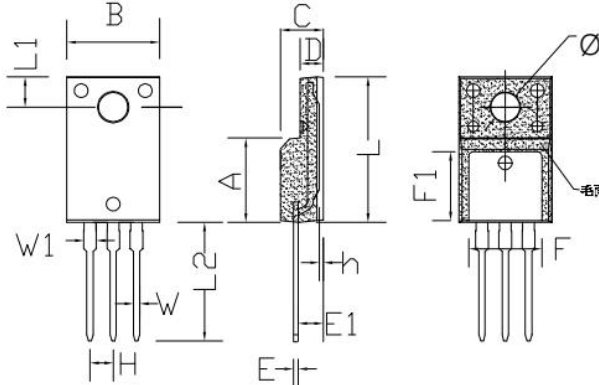
9 Dimensions

TO-220C PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
H	2.54 TYP		0.100 TYP	
W	0.60	0.95	0.024	0.037
W1	1.05	1.45	0.041	0.057
W2	1.20	1.60	0.047	0.063
L	12.60	13.40	0.496	0.528
L1	2.45	2.95	0.096	0.116
L2	3.45	3.95	0.136	0.156
L3	8.15	8.65	0.321	0.341
Φ	3.50	3.90	0.138	0.154

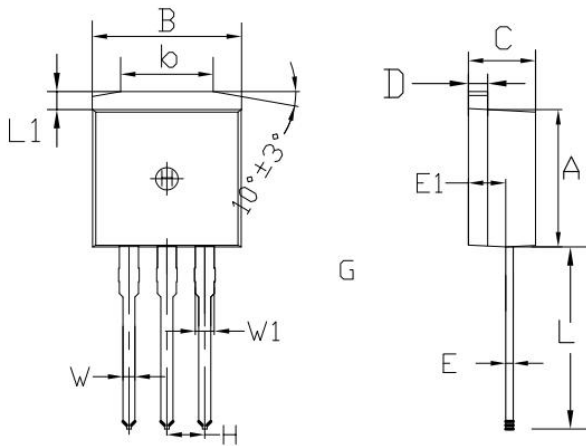
TO-220F PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	10.00	10.50	0.394	0.413
C	4.30	4.90	0.169	0.193
D	2.30	2.70	0.091	0.106
L	15.55	16.15	0.612	0.636
h	0.40	0.60	0.016	0.024
L1	3.15	3.55	0.124	0.140
L2	12.65	13.35	0.498	0.526
W	0.70	0.90	0.028	0.035
W1	1.15	1.55	0.045	0.061
H	2.54 TYP		0.100 TYP	
E	0.48	0.53	0.019	0.021
Φ	2.90	3.40	0.114	0.134
E1	2.40	2.90	0.094	0.114
F	7.75	8.25	0.305	0.325
F1	7.35	7.85	0.289	0.309

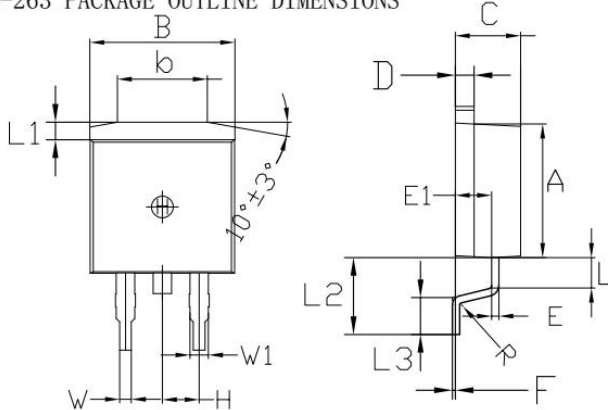
9 Dimensions(continues)

TO-262 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
L	12.25	13.75	0.482	0.541
L1	1.15	1.45	0.045	0.057
E1	2.4	2.6	0.0945	0.1024
W	0.80	0.82	0.0315	0.034
W1	1.20	1.30	0.047	0.051
H	2.54 TYP		0.200 TYP	
b	5.50	6.50	0.216	0.256

TO-263 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
L	1.90	2.30	0.075	0.091
L1	1.15	1.45	0.045	0.057
R	0.24	0.26	0.0095	0.0102
W	0.80	0.82	0.0315	0.0323
W1	1.20	1.30	0.047	0.051
H	2.54 TYP		0.200 TYP	
b	5.50	6.50	0.216	0.256
E1	2.4	2.6	0.0946	0.1024
L2	5.20	5.80	0.205	0.228
L3	2.20	3.20	0.087	0.126
F	0.03	0.23	0.0012	0.0091

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
2019.12.09	1.0	Original	