

180A 80V N-channel Enhancement Mode Power MOSFET

1 Description

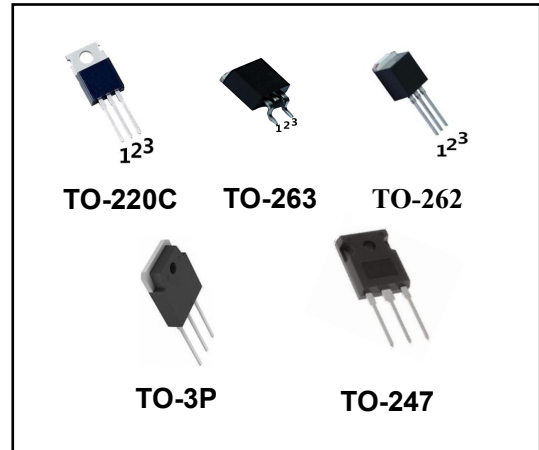
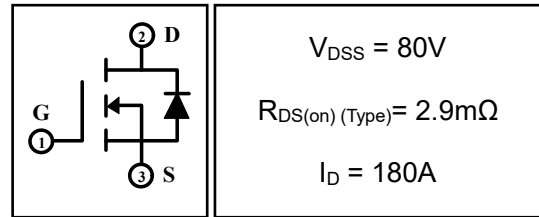
These N-channel enhancement mode power mosfets used advanced trench technology design, provided excellent $R_{DS(on)}$ and low gate charge. Which accords with the RoHS standard.

2 Features

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

3 Applications

- Switching power supply
- DC-DC converters
- Power tool control
- Automotive electronics applications



4 Electrical Characteristics

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

Parameter	Symbol	Rating		Units	
		DH029N08 DHI029N08/DHE029N08	DH029N08D DH029N08B		
Drain-to-Source Voltage	V_{DSS}	80		V	
Gate-to-Source Voltage	V_{GSS}	± 25		V	
Continuous Drain Current	I_D	$T_c=25^\circ C$	180	A	
		$T_c=100^\circ C$	134	A	
Pulsed Drain Current ⁽¹⁾	I_{DM}	780		A	
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	1720		mJ	
Avalanche Current ⁽⁴⁾	I_{AS}	50		A	
Power Dissipation	P_{tot}	$T_a=25^\circ C$	2	3	W
		$T_c=25^\circ C$	245	245	W
Junction Temperature Range	T_j	-55~175		$^\circ C$	
Storage Temperature Range	T_{stg}	-55~175		$^\circ C$	
Maximum Temperature for soldering	T_L	300		$^\circ C$	

4.2 Thermal Characteristics

Parameter	Symbol	Rating		Unit
		DH029N08 DHI029N08/DHE02	DH029N08D DH029N08B	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.61	0.61	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	75	50	$^\circ C/W$

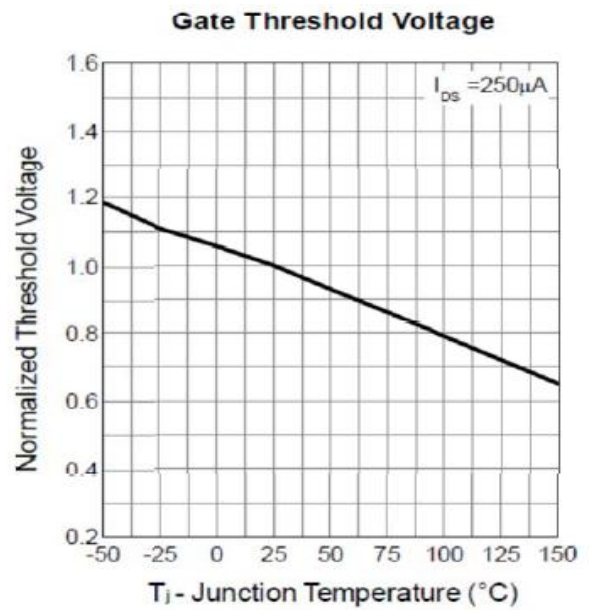
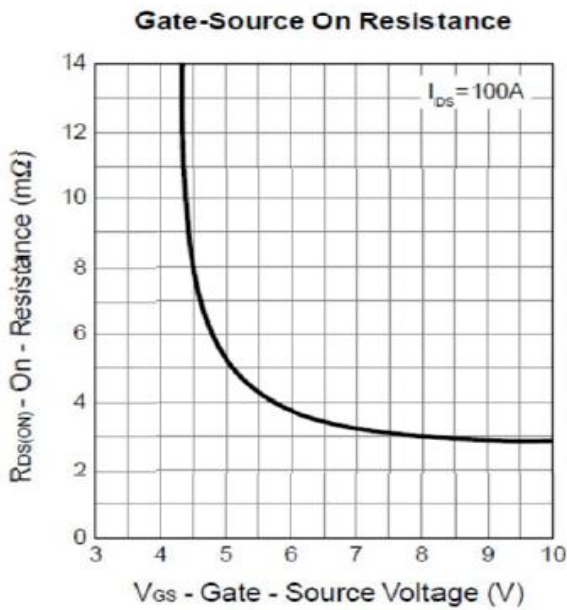
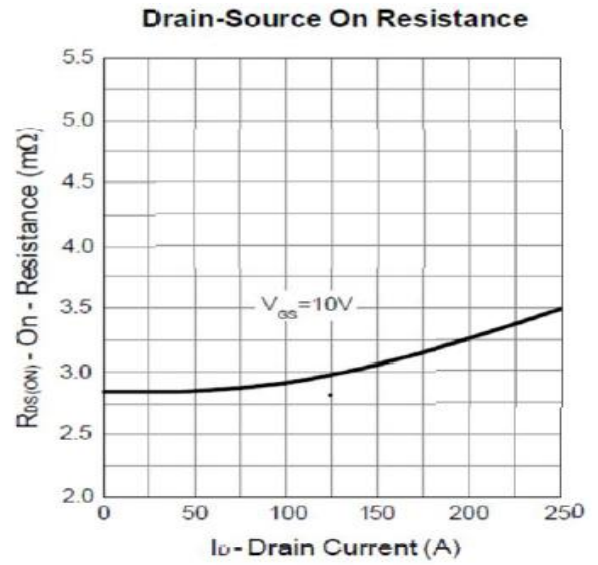
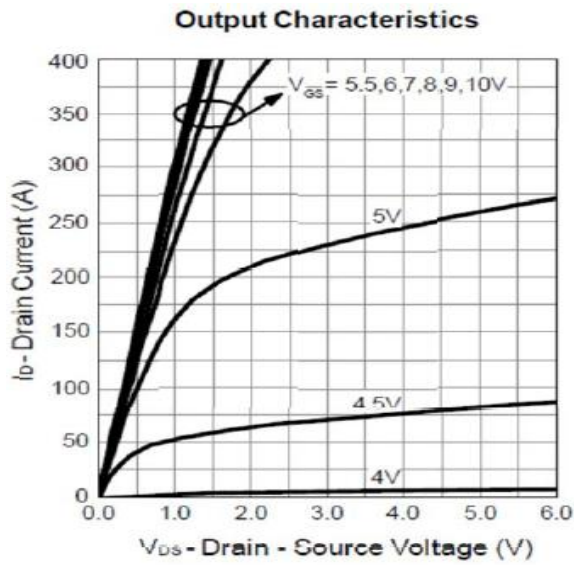
4.3 Electrical Characteristics (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Drain-to-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	80	85	--	V
Drain-to-Source Leakage Current	I _{DSS}	V _{DS} =80V, V _{GS} =0V, T _C =25°C	--	--	1	μA
		V _{DS} =64V, V _{GS} =0V, T _C =125°C	--	--	100	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} =±25V, V _{DS} =0V	--	--	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
Drain-to-Source on-state Resistance	R _{DS(on)}	V _{GS} =10V, I _D =80A	--	2.9	4	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz	--	8200	--	pF
Output Capacitance	C _{oss}		--	1030	--	
Reverse Transfer Capacitance	C _{rss}		--	660	--	
Gate Resisitance	R _G	V _{DD} =0V, V _{GS} =0V, f=1MHz	--	3.2	--	Ω
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	I _D =40A, V _{DS} =40V, V _{GS} =10V, R _{GEN} =6Ω	--	28	--	nS
Turn-on Rise Time	t _r		--	18	--	
Turn-off Delay Time	t _{d(off)}		--	44	--	
Turn-off Fall Time	t _f		--	55	--	
Total Gate Charge	Q _g	I _D =40A, V _{DS} =40V, V _{GS} =10V	--	195	--	nC
Gate-to-Source Charge	Q _{gs}		--	32	--	
Gate-to-Drain("Miller") Charge	Q _{gd}		--	74	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V _{FSD}	V _{GS} =0V, I _S =180A	--	--	1.3	V
Diode Forward Current	I _S		--	--	180	A
Reverse Recovery Time ⁽³⁾	t _{rr}	T _J =25°C, I _F =40A, di _F /dt=100A/μS, V _{GS} =0V	--	30	--	nS
Reverse Recovery Charge ⁽³⁾	Q _{rr}		--	54	--	nC

Notes:

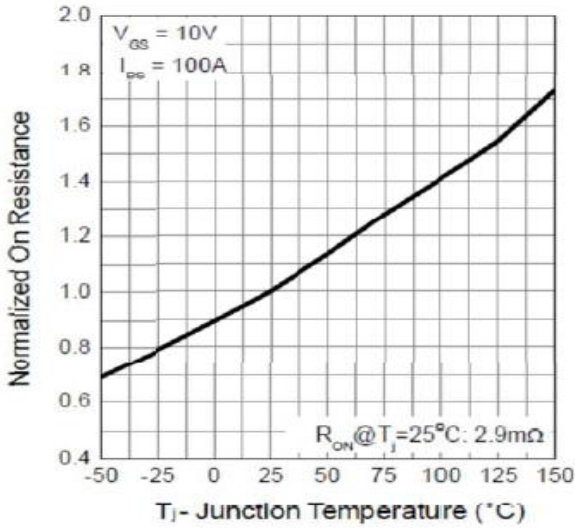
- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t_s≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: L=0.5mH, I_D=83A, V_{DD}=64V, V_{GATE}=80V, Start T_J=25°C.

5 Typical characteristics diagrams

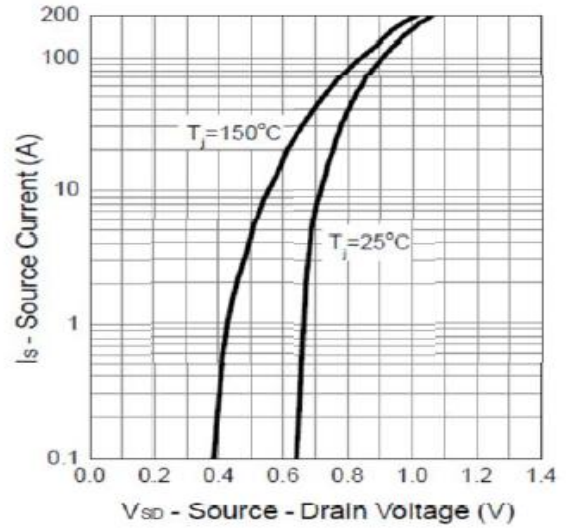


5 Typical characteristics diagrams(continues)

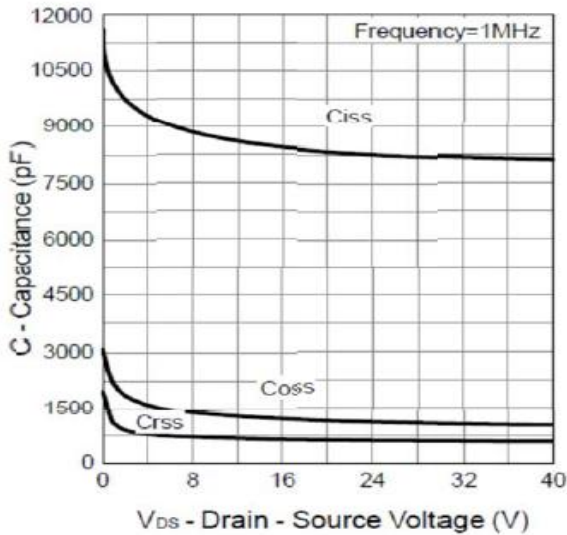
Drain-Source On Resistance



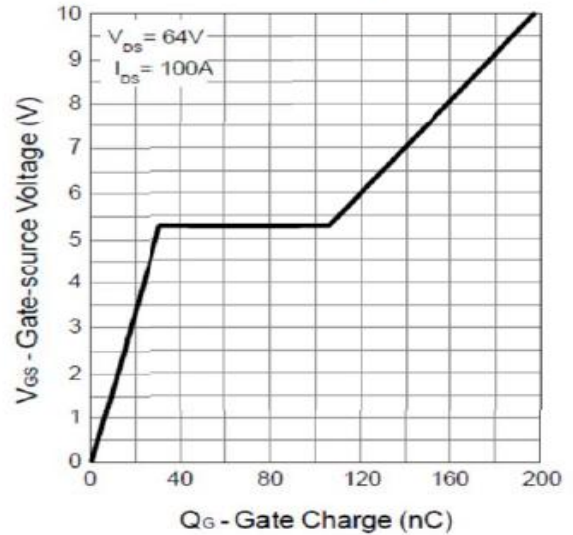
Source-Drain Diode Forward



Capacitance

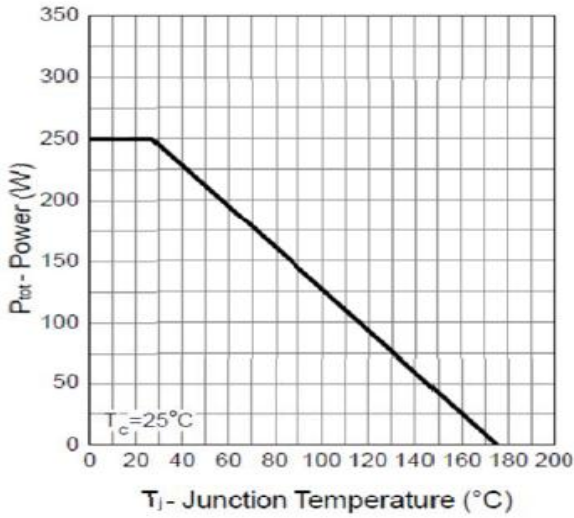


Gate Charge

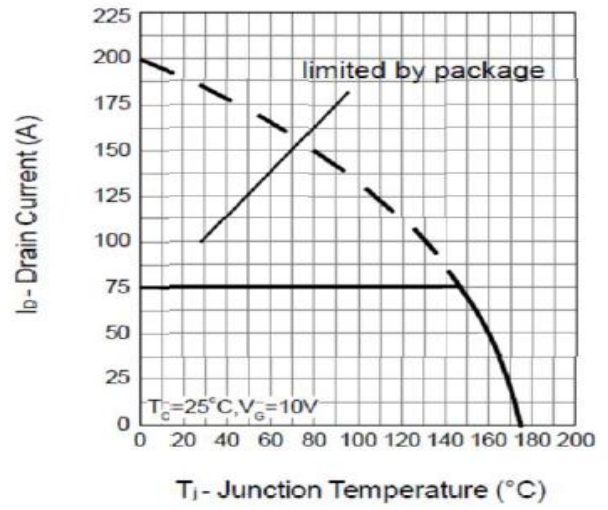


5 Typical characteristics diagrams(continues)

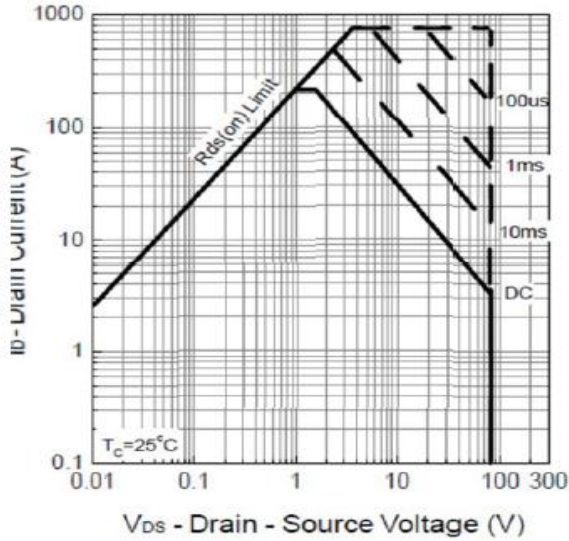
Power Dissipation



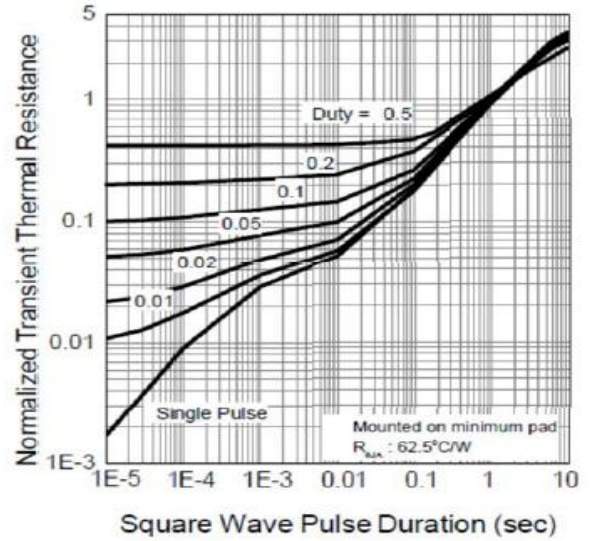
Drain Current



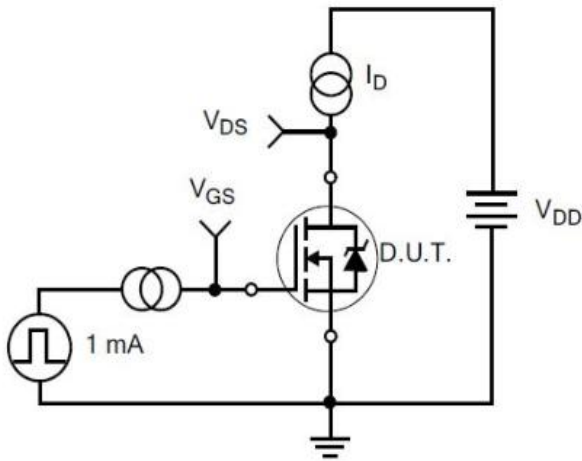
Safe Operation Area



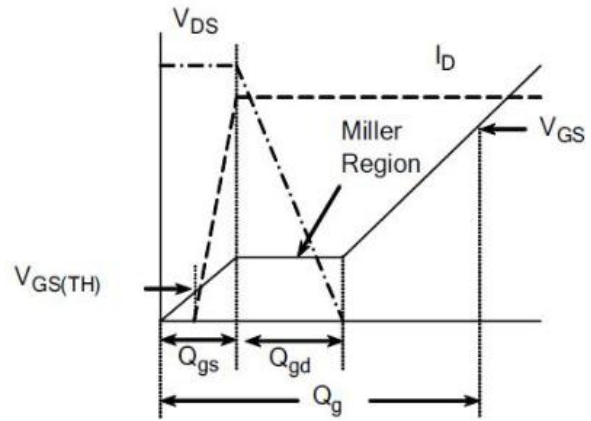
Thermal Transient Impedance



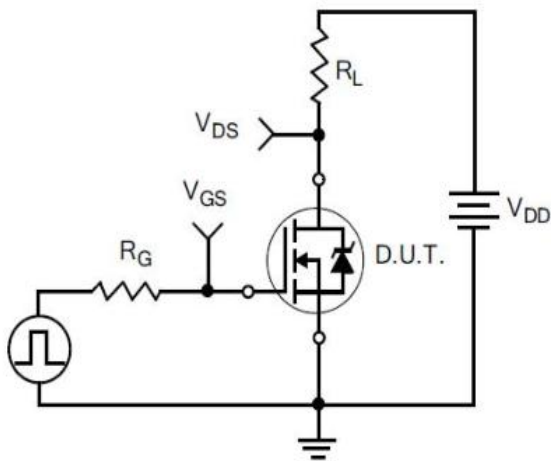
6 Typical Test Circuit and Waveform



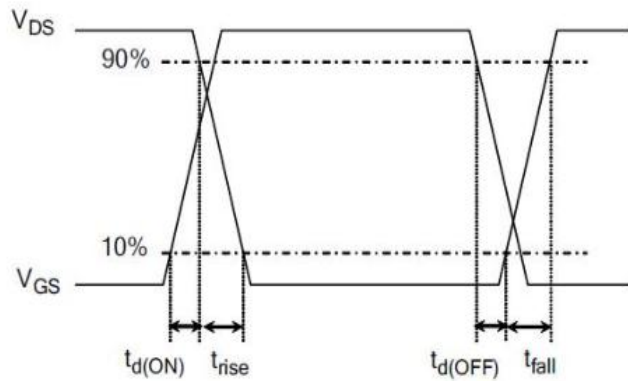
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

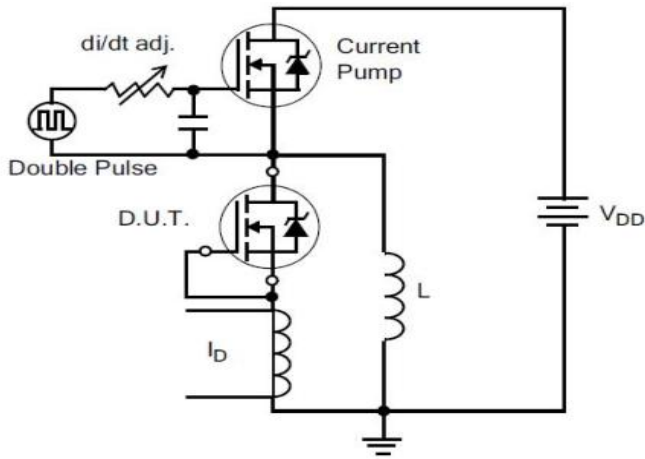


3) Resistive Switching Test Circuit

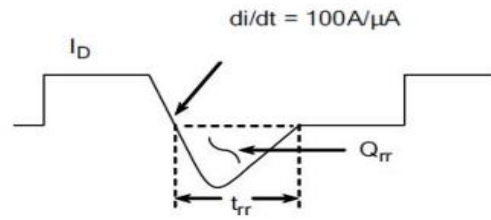


4) Resistive Switching Waveforms

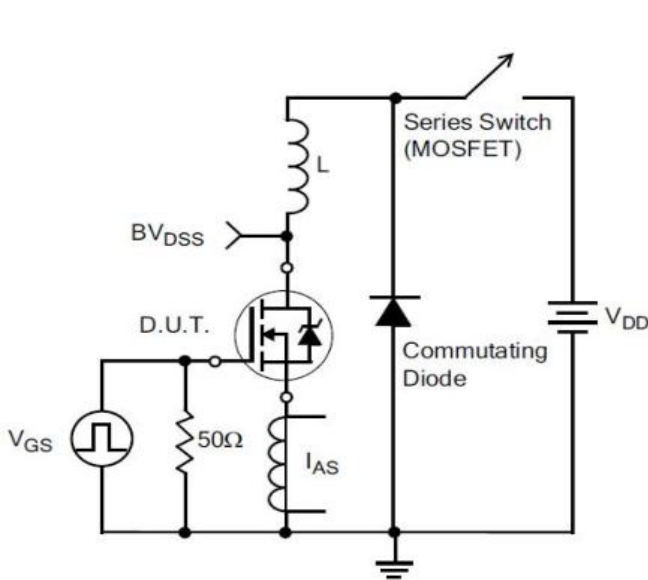
6 Typical Test Circuit and Waveform(continues)



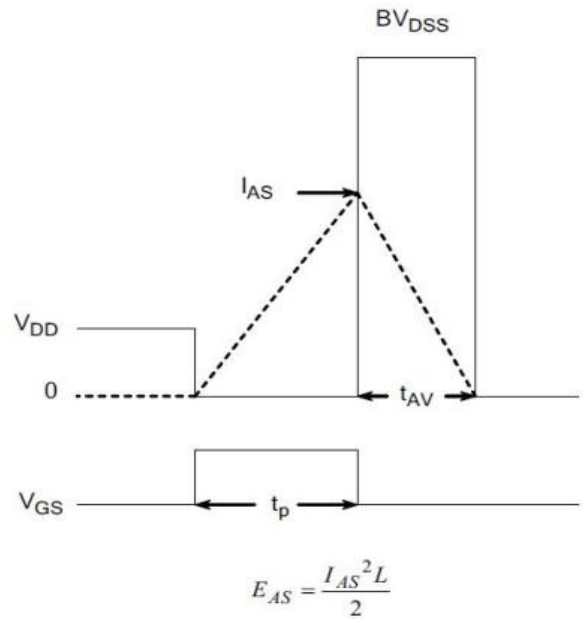
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

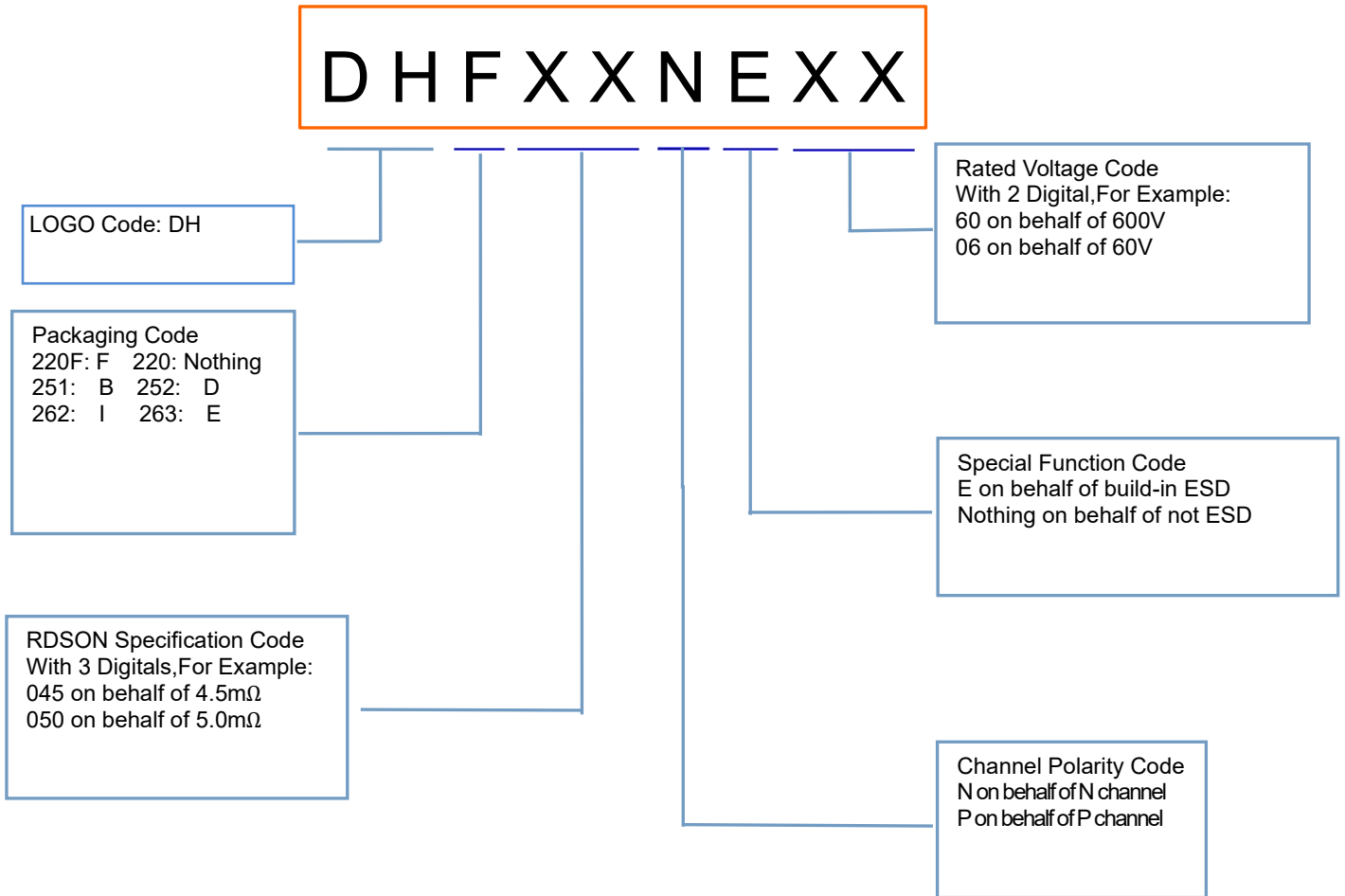


7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

7 Product Names Rules

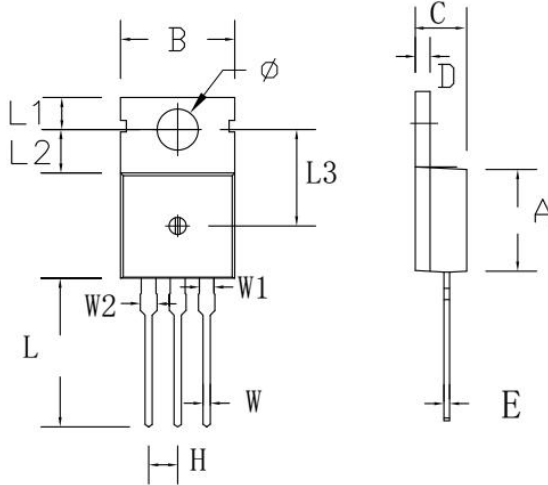


8 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
DH029N08	TO-220	DH029N08	Pb-free	Tube	1000/box
DHI029N08	TO-262	DHI029N08	Pb-free	Tube	1000/box
DHE029N08	TO-263	DHE029N08	Pb-free	Tape & Reel	800/box
DH029N08D	TO-3P	DH029N08D	Pb-free	Tube	600/box
DH029N08B	TO-247	DH029N08B	Pb-free	Tube	600/box

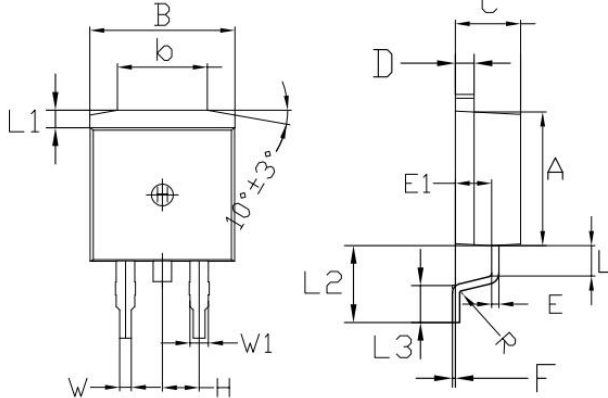
9 Dimensions

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

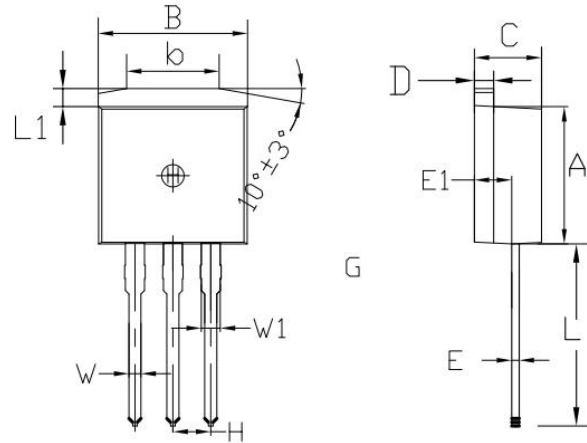
TO-263 PACKAGE OUTLINE DIMENSIONS



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

9 Dimensions(continues)

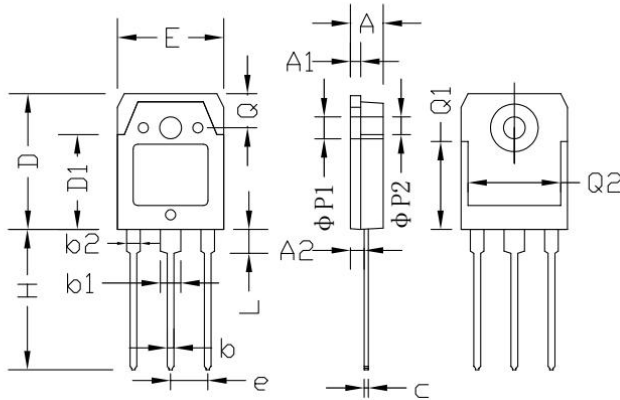
TO-262 PACKAGE OUTLINE DIMENSIONS



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

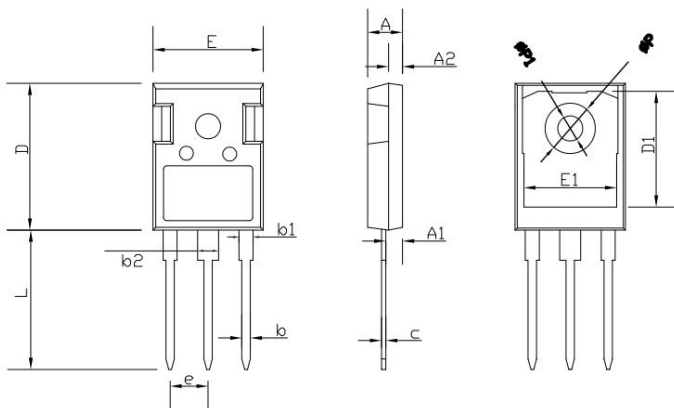
9 Dimensions(continues)

TO-3PN PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	4.60	5.00	0.181	0.197
A1	1.45	1.65	0.057	0.065
A2	2.20	2.60	0.087	0.102
b	0.80	1.20	0.032	0.047
b1	2.80	3.20	0.110	0.126
b2	1.80	2.20	0.071	0.087
C	0.55	0.75	0.022	0.030
D	19.20	19.70	0.756	0.776
D1	13.10	14.70	0.516	0.578
E	15.40	15.80	0.607	0.623
e	5.45 TYP		0.215 TYP	
H	19.80	20.20	0.780	0.826
L	3.30	3.70	0.130	0.146
ΦP1	3.20 TYP		0.126 TYP	
ΦP2	3.50 TYP		0.138 TYP	
Q	5.00 TYP		0.197 TYP	
Q1	12.40 TYP		0.488 TYP	
Q2	12.6	-	0.496	-

TO-247 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	4.90	5.10	0.193	0.201
A1	2.31	2.51	0.091	0.099
A2	1.90	2.10	0.075	0.083
b	1.16	1.26	0.046	0.050
b1	1.96	2.06	0.0772	0.0812
b2	2.96	3.06	0.117	0.121
c	0.59	0.66	0.0232	0.0260
D	20.90	21.10	0.8235	0.8313
D1	16.25	16.85	0.6403	0.6639
E	15.70	15.90	0.6186	0.6265
E1	13.10	13.50	0.5161	0.5319
e	5.44		0.2143	
L	19.80	20.10	0.7801	0.7919
ΦP	3.50	3.70	0.1379	0.1458
ΦP1	0	7.30	0	0.2876

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
2017.04.11	1.0	Original	