

17A 650V N-channel Super Junction Power MOSFET

1 Description

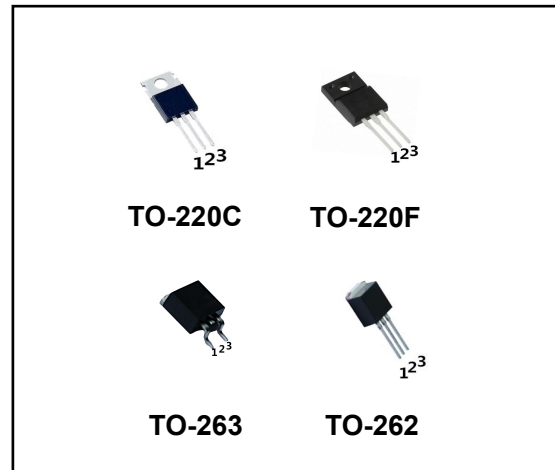
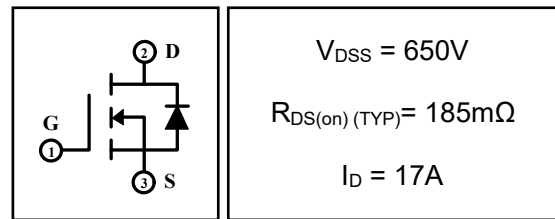
These N-channel enhanced vdmofets, is using advanced super junction technology and design to provide excellent Rds(on) with low gate charge. Which accords with the RoHS standard.

2 Features

- Fast switching
- Low on resistance(Rdson≤ 210mΩ)
- Low gate charge(Typ: 40nC)
- Low reverse transfer capacitances(Typ: 3.4pF)
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test

3 Applications

- Power factor correction(PFC).
- Switched mode power supplies(SMPS).
- Uninterruptible power supply(UPS).
- TV power & LED Lighting Power
- AC to DC Converters
- Telecom,Solar



4 Electrical Characteristics

4.1 Absolute Maximum Rating (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Rating			Units	
		DHSJ17N65	DHISJ17N65 DHESJ17N65	DHFSJ17N65		
Drain-to-Source Voltage	V_{DSS}	650			V	
Gate-to-Source Voltage	V_{GSS}	±20			V	
Continuous Drain Current	I_D	$T_C=25^\circ C$	17		A	
		$T_C=100^\circ C$	11		A	
Pulsed Drain Current ⁽¹⁾	I_{DM}	51			A	
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	250			mJ	
Repetitive Avalanche Current ⁽⁴⁾	I_{AR}	2.4			A	
Power Dissipation	$T_a=25^\circ C$	P_{tot}	2	2	2	W
	$T_C=25^\circ C$	P_{tot}	130	130	33	W
Isolation Voltage	V_{ISO}	/			2500	V
Gate-Source ESD (HBM-C=100pF,R=1.5KΩ)	$V_{ESD(G-S)}$	2000			V	
Junction Temperature Range	T_j	-55~150			°C	
Storage Temperature Range	T_{stg}	-55~150			°C	

4.2 Thermal Characteristics

Parameter	Symbol	Rating			Unit
		DHSJ17N65	DHISJ17N65 DHESJ17N65	DHFSJ17N65	
Thermal Resistance,Junction to Case-sink	R_{thJC}	0.96	0.96	3.79	°C/W
Thermal Resistance,Junction to Ambient	R_{thJA}	62.5	62.5	62.5	°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	650	--	--	V
Drain-to-Source Leakage Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _C =25°C	--	--	1	μA
		V _{DS} =650V, V _{GS} =0V, T _C =150°C	--	--	100	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} =±20V	--	--	±1000	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	--	4	V
Drain-to-Source on-state Resistance	R _{DS(on)}	V _{GS} =10V, I _D =6.2A	--	185	210	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =400V, f=1.0MHz	--	1750	--	pF
Output Capacitance	C _{oss}		--	39	--	
Reverse Transfer Capacitance	C _{rss}		--	3.4	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	I _D =8.7A, V _{DD} =325V, V _{GS} =10V, R _G =25Ω	--	39	--	nS
Turn-on Rise Time	t _r		--	21	--	
Turn-off Delay Time	t _{d(off)}		--	171	--	
Turn-off Fall Time	t _f		--	18	--	
Total Gate Charge	Q _g	I _D =8.7A, V _{DD} =520V, V _{GS} =10V	--	40	--	nC
Gate-to-Source Charge	Q _{gs}		--	8	--	
Gate-to-Drain("Miller") Charge	Q _{gd}		--	12	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V _{FSD}	V _{GS} =0V, I _S =8.7A	--	--	1.2	V
Diode Forward Current	I _S		--	--	17	A
Reverse Recovery Time ⁽³⁾	t _{rr}	T _J =25°C, I _F =48.7A, dI _F /dt=100A/μS, V _{RR} =400V	--	340	--	nS
Reverse Recovery Charge ⁽³⁾	Q _{rr}		--	4700	--	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=10mH, I_D=7.1A, V_{DD}=50V, V_{GS}=10V, R_G=25Ω, V_{GATE}=650V, Start T_J=25°C.

5 Typical characteristics diagrams

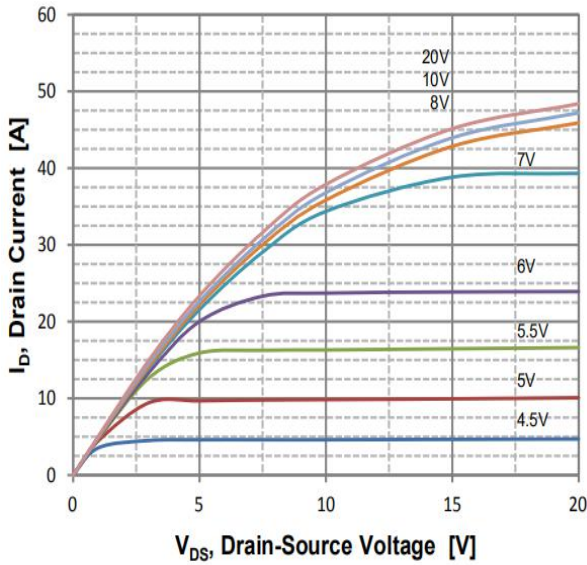


Figure 1. On Region Characteristics

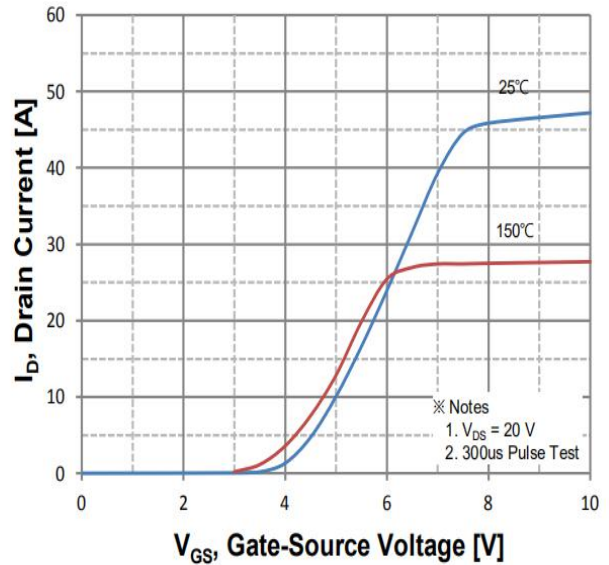


Figure 2. Transfer Characteristics

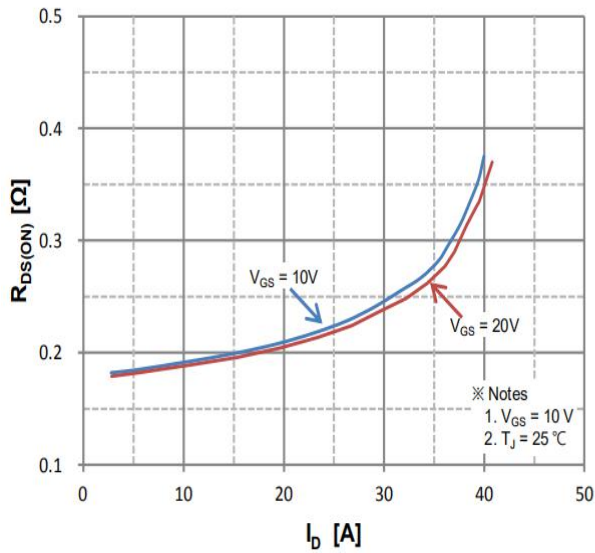


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

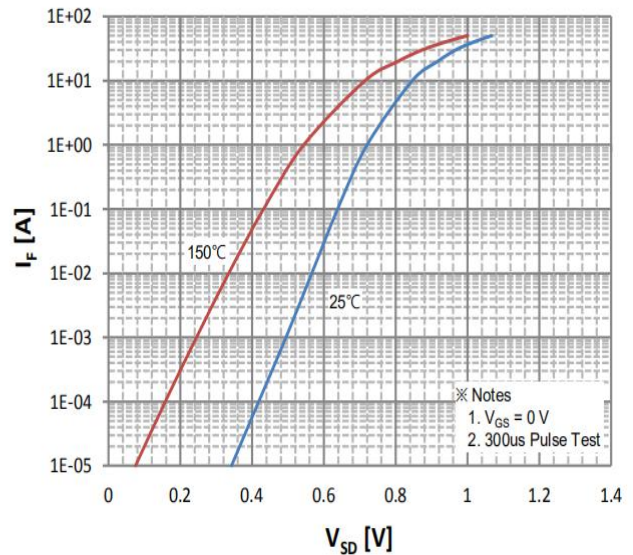


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

5 Typical characteristics diagrams(continues)

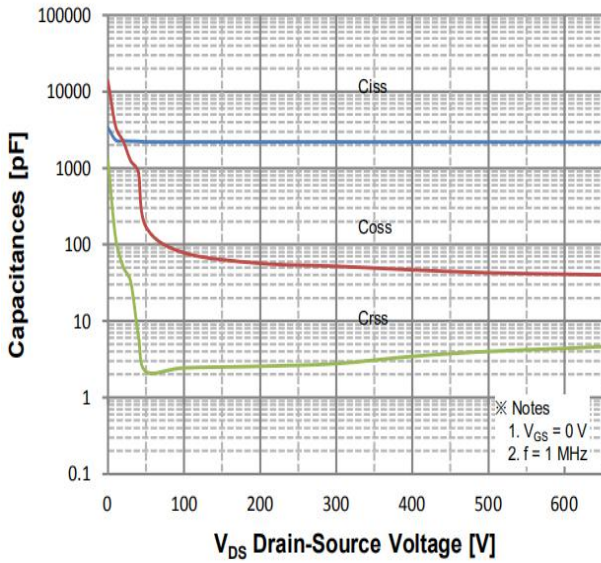


Figure 5. Capacitance Characteristics

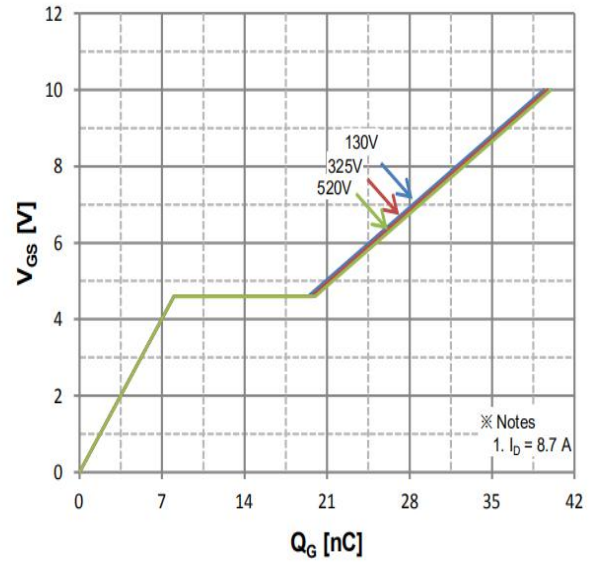


Figure 6. Gate Charge Characteristics

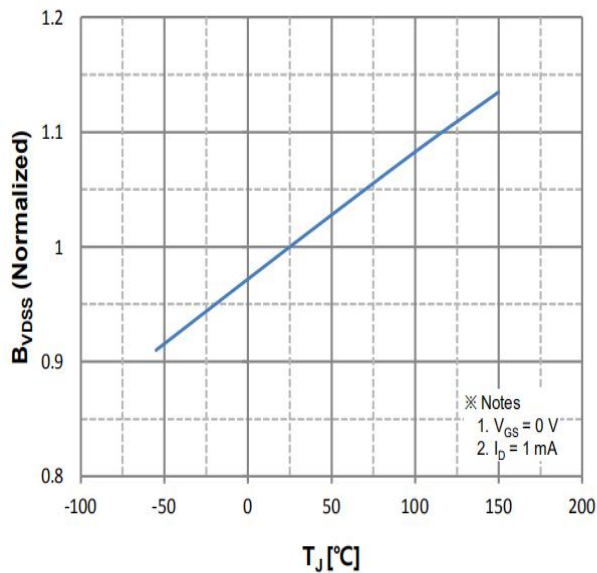


Figure 7. Breakdown Voltage Variation vs. Temperature

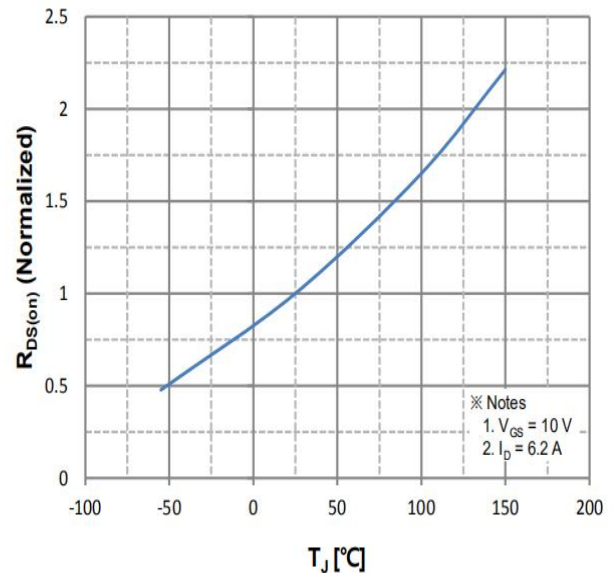


Figure 8. On-Resistance Variation vs. Temperature

5 Typical characteristics diagrams(continues)

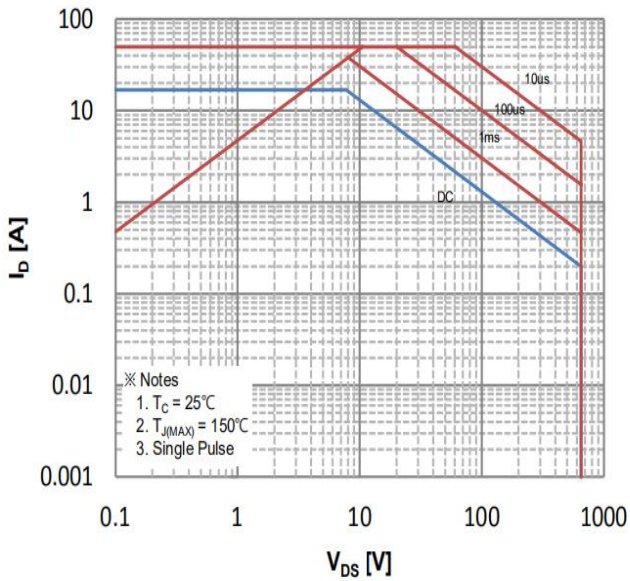


Figure 9. Maximum Safe Operating Area

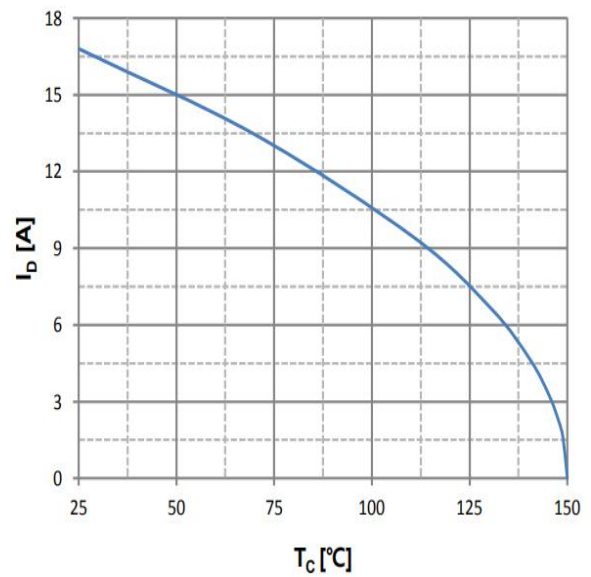


Figure 10. Maximum Drain Current vs. Case Temperature

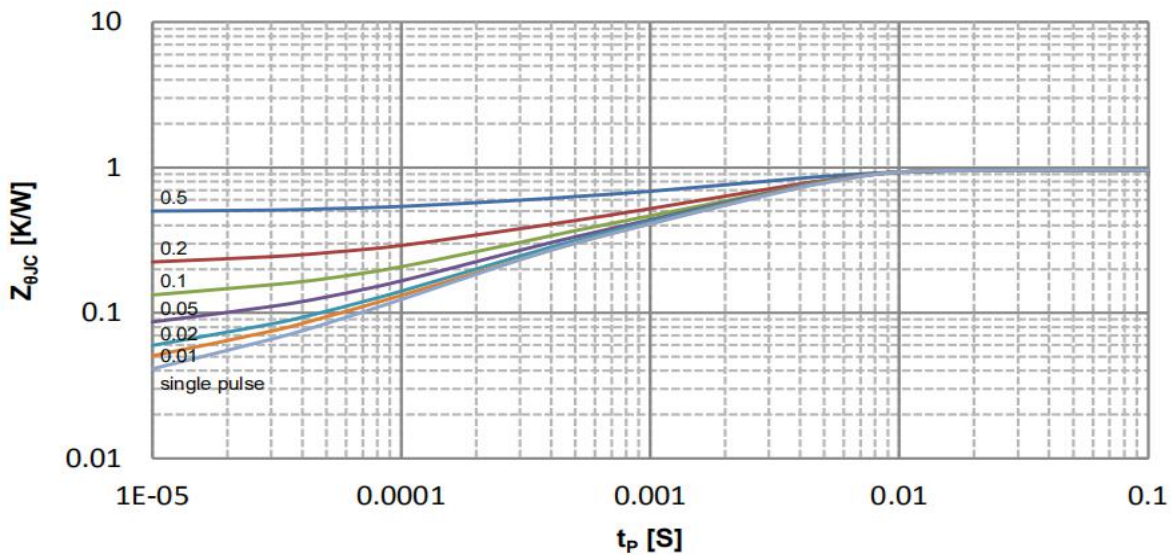
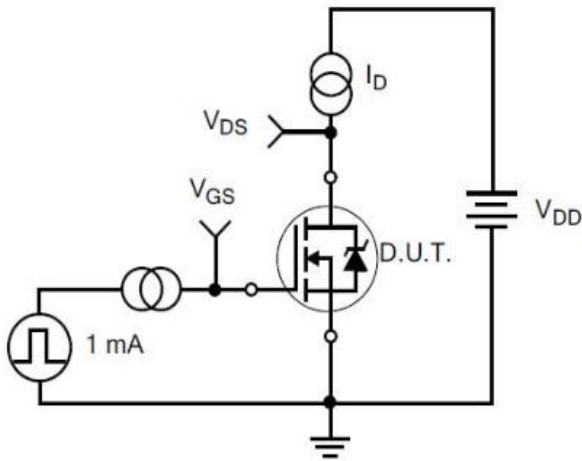
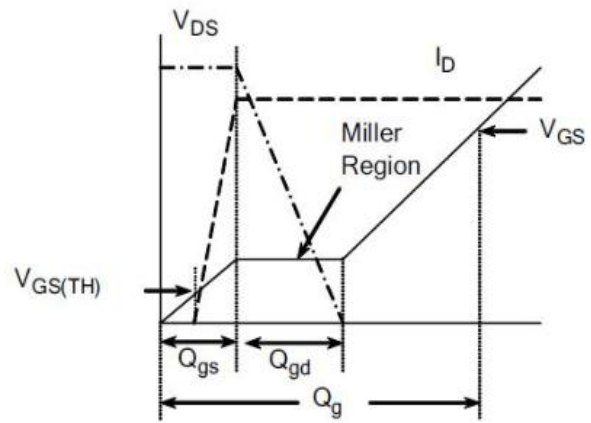


Figure 11. Transient Thermal Response Curve

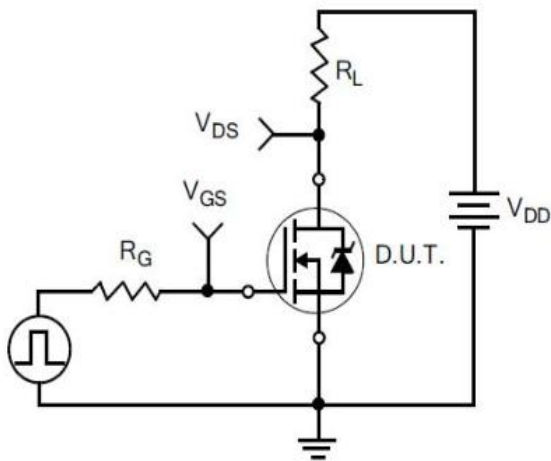
6 Typical Test Circuit and Waveform



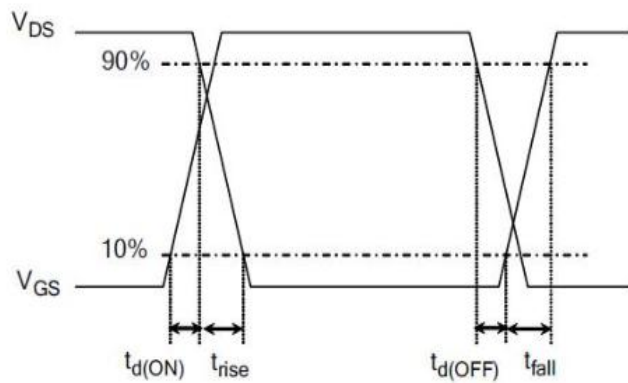
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

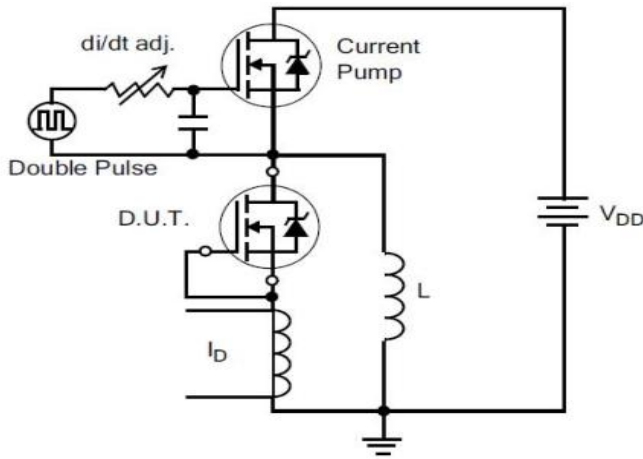


3) Resistive Switching Test Circuit

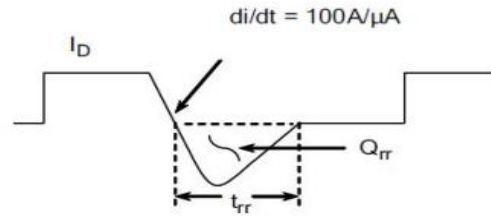


4) Resistive Switching Waveforms

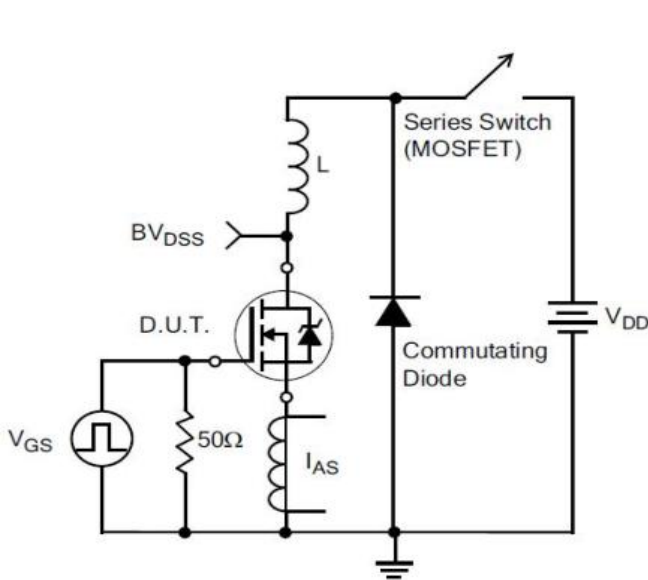
6 Typical Test Circuit and Waveform(continues)



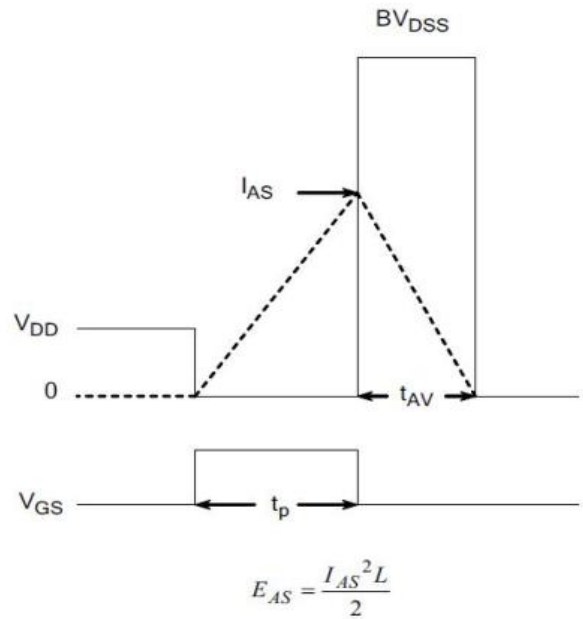
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

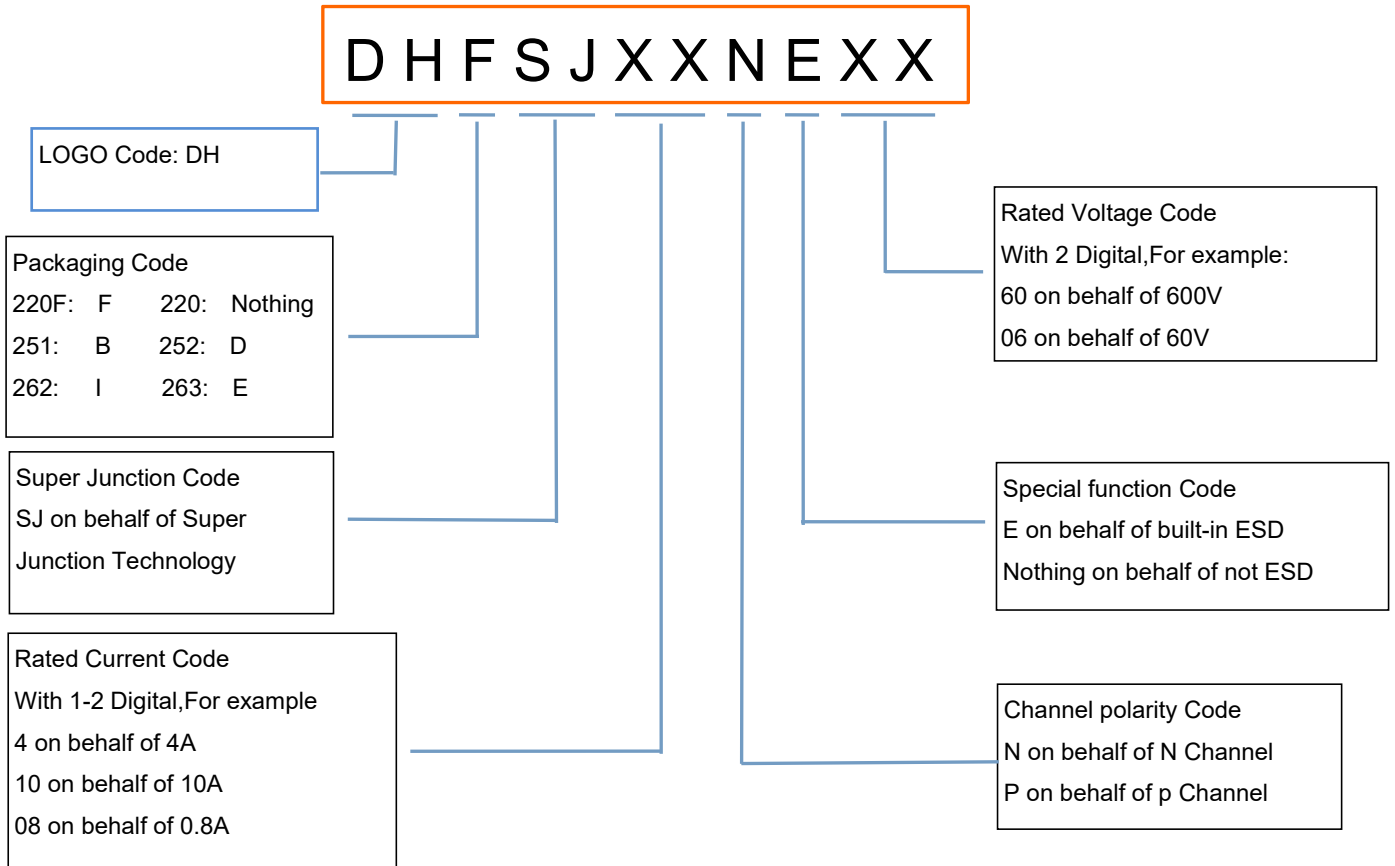


7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

7 Product Names Rules

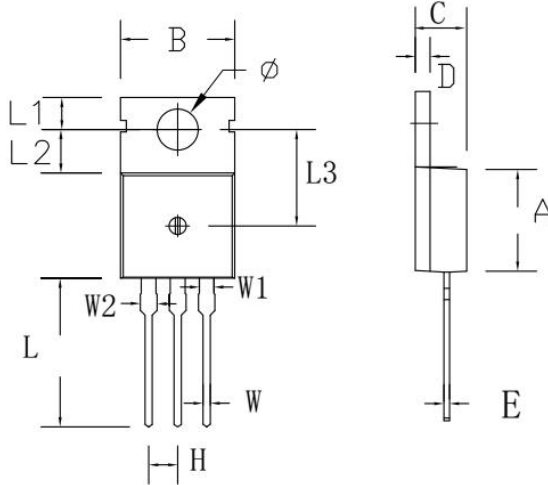


8 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	Identification Code	RoHS	Package	Quantity
DHSJ17N65	TO-220	DHSJ17N65	S19	Pb-free	Tube	1000/box
DHFSJ17N65	TO-220F	DHFSJ17N65	S19	Pb-free	Tube	1000/box
DHISJ17N65	TO-262	DHISJ17N65	S19	Pb-free	Tube	1000/box
DHESJ17N65	TO-263	DHESJ17N65	S19	Pb-free	Tape & Reel	800/box

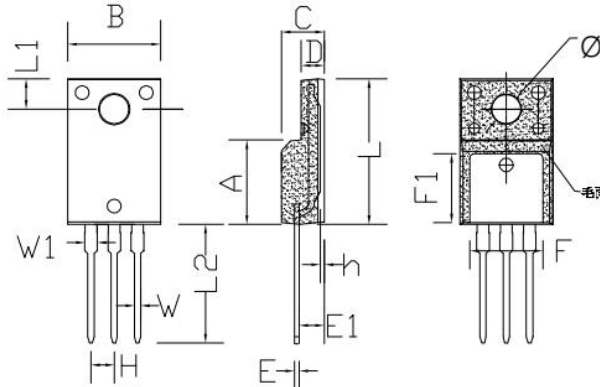
9 Dimensions

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

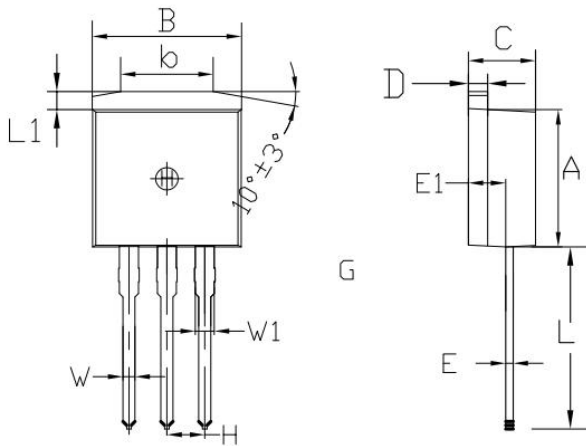
TO-220F PACKAGE OUTLINE DIMENSIONS



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

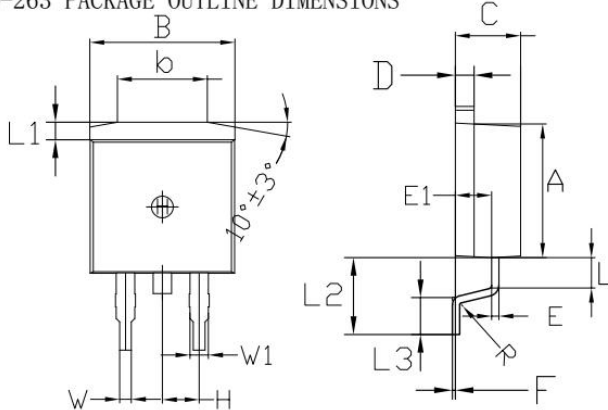
9 Dimensions(continues)

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
2020.06.14	1.0	Original	