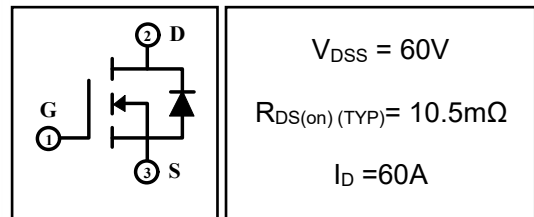


60A 60V N-channel Enhancement Mode Power MOSFET

1 Description

The 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

- Fast switching
- Low on resistance($R_{DS(on)} \leq 15m\Omega$)
- Low gate charge(Typ: 45nC)
- Low reverse transfer capacitances(Typ: 135pF)
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test

3 Applications

- Power switching applications
- DC-DC convertors
- UPS power supply
- Load switch
- Synchronous rectification



4 Electrical Characteristics

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

Parameter	Symbol	Rating	Units
Drian-to-Source Voltage	V_{DSS}	60	V
Gate-to-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	I_D	$T_C=25^\circ C$	60
		$T_C=100^\circ C$	45
Pulsed Drain Current ⁽¹⁾	I_{DM}	240	A
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	256	mJ
Avalanche Current ⁽⁴⁾	I_{AS}	32	A
Power Dissipation	P_{tot}	$T_a=25^\circ C$	2
		$T_C=25^\circ C$	88
Junction Temperature Range	T_j	175	$^\circ C$
Storage Temperature Range	T_{stg}	-55~175	$^\circ C$

4.2 Thermal Characteristics

Parameter	Symbol	Rating	Unit
Thermal Resistance, Junction to Case-sink	R_{thJC}	1.70	$^\circ C/W$
Thermal Resistance, Junction to Ambient	R_{thJA}	75	$^\circ C/W$

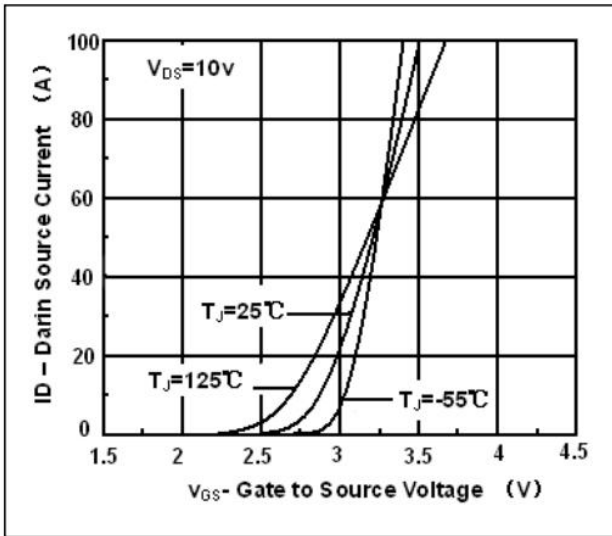
4.3 Electrical Characteristics (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Drain-source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	60	65	--	V
Drain-to-Source Leakage Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V, T _C =25°C	--	--	1	μA
		V _{DS} =48V, V _{GS} =0V, T _C =125°C	--	--	100	μA
Gate-to-Source Forward Leakage	I _{GSSF}	V _{GS} =+20V	--	--	100	nA
Gate-to-Source Reverse Leakage	I _{GSSR}	V _{GS} =-20V	--	--	-100	nA
On Characteristics ⁽³⁾						
Gate threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	--	3	V
Drain-source on Resistance	R _{DS(on)}	V _{GS} =10V, I _D =25A	--	10.5	15	mΩ
		V _{GS} =4.5V, I _D =20A	--	12.5	20	mΩ
Forward Transfer Conductance	g _{fs}	V _{DS} =15V, I _D =15A	--	13.8	--	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	--	1480	--	pF
Output Capacitance	C _{oss}		--	190	--	
Reverse Transfer Capacitance	C _{rss}		--	135	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, R _L =15Ω, V _{GS} =10V, R _{GEN} =2.5Ω	--	25	--	nS
Turn-on Rise Time	t _r		--	19	--	
Turn-off Delay Time	t _{d(off)}		--	47	--	
Turn-off Fall Time	t _f		--	12	--	
Total Gate Charge	Q _g	I _D =15A, V _{DS} =30V, V _{GS} =10V	--	45	--	nC
Gate-to-Source Charge	Q _{gs}		--	4	--	
Gate-to-Drain("Miller") Charge	Q _{gd}		--	18	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V _{FSD}	V _{GS} =0V, I _S =30A	--	0.88	1.2	V
Diode Forward Current	I _S		--	--	60	A
Reverse Recovery Time ⁽³⁾	t _{rr}	T _J =25°C, I _F =15A, dI _F /dt=100A/μS, V _{GS} =0V	--	33	--	nS
Reverse Recovery Charge ⁽³⁾	Q _{rr}		--	61	--	nC

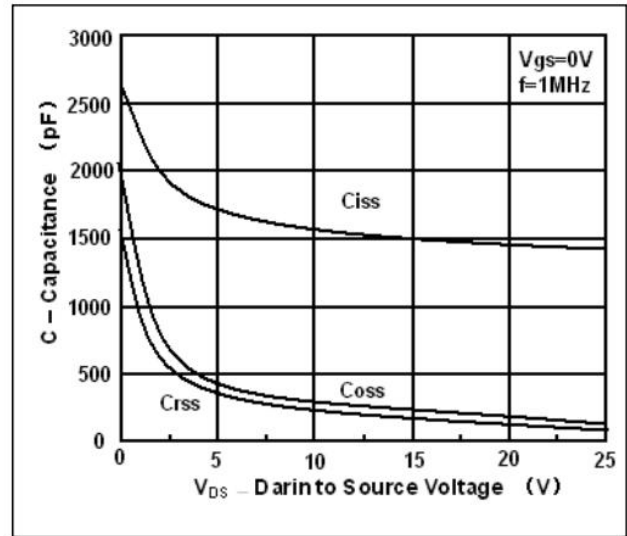
Notes:

- 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=32A, V_{DD}=50V, V_{GATE}=60V, Start T_J=25°C.

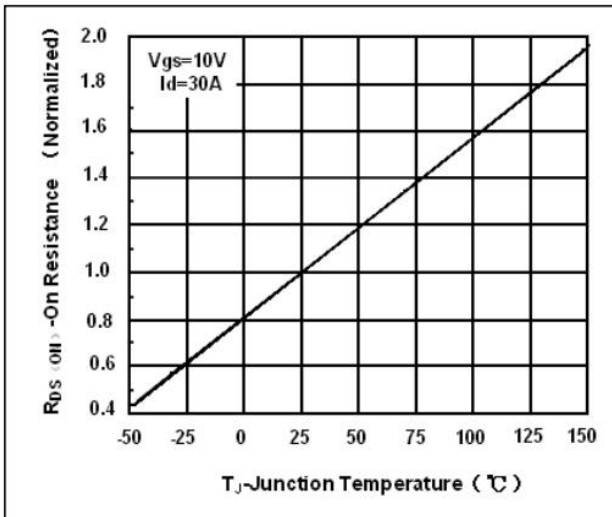
5 Typical characteristics diagrams



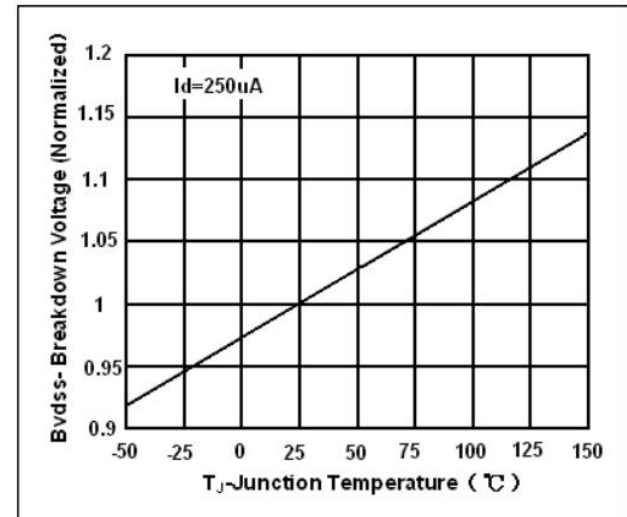
Transfer Characteristic



Capacitance

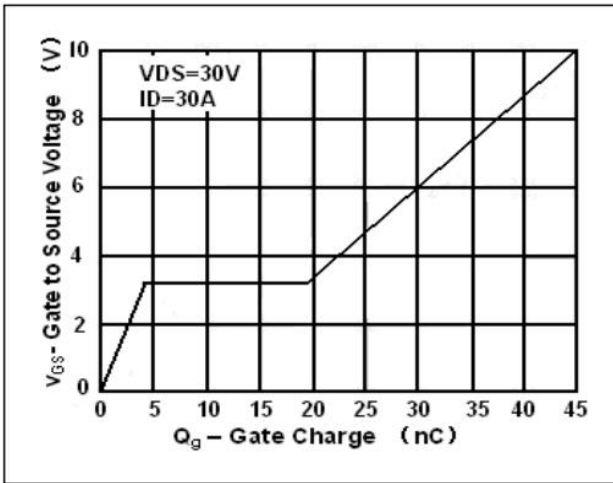


On Resistance vs. Junction Temperature

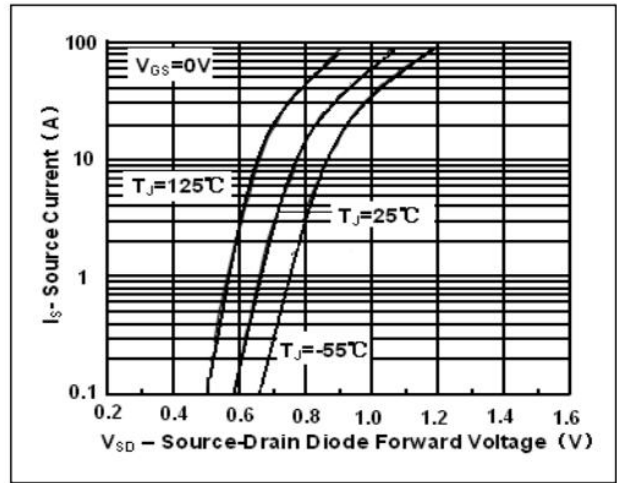


Breakdown Voltage vs. Junction Temperature

5 Typical characteristics diagrams(continues)

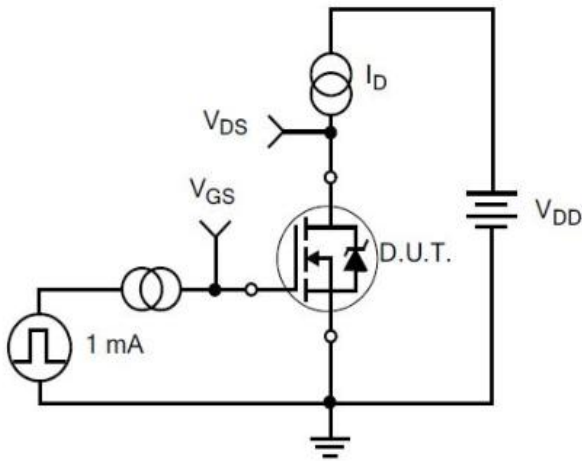


Gate Charge

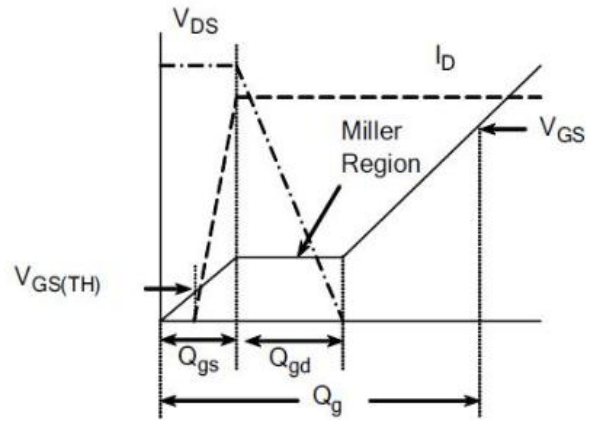


Source-Drain Diode Forward Voltage

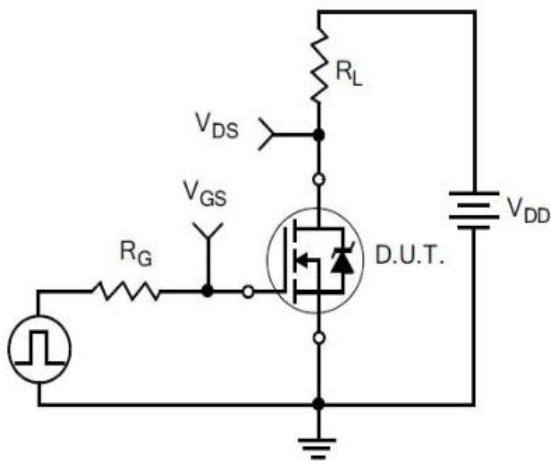
6 Typical Test Circuit and Waveform



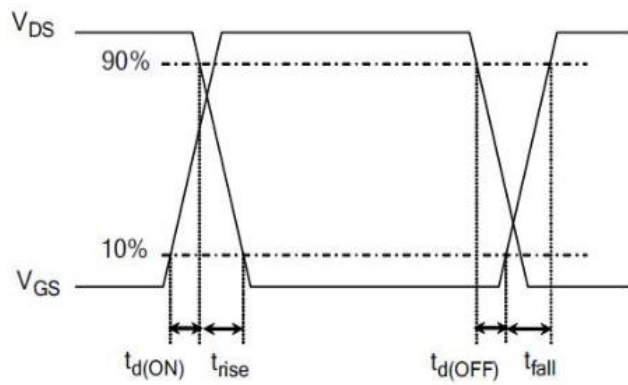
1) Gate Charge Test Circuit



2) Gate Charge Waveform

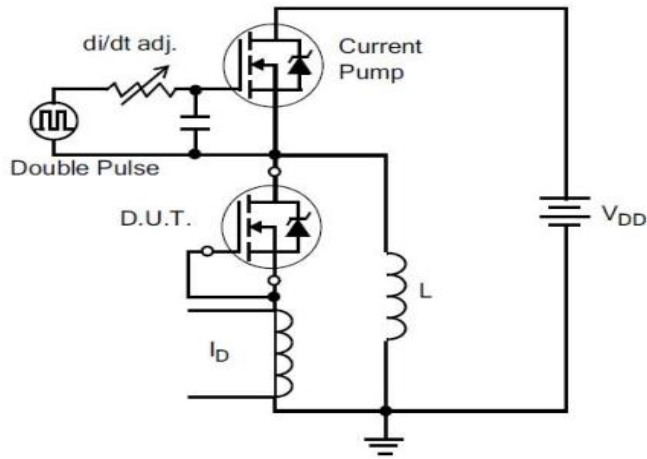


3) Resistive Switching Test Circuit

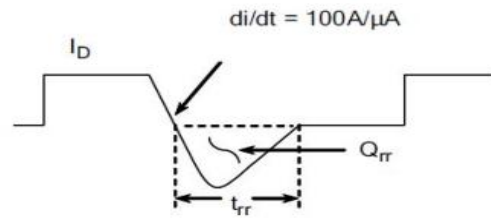


4) Resistive Switching Waveforms

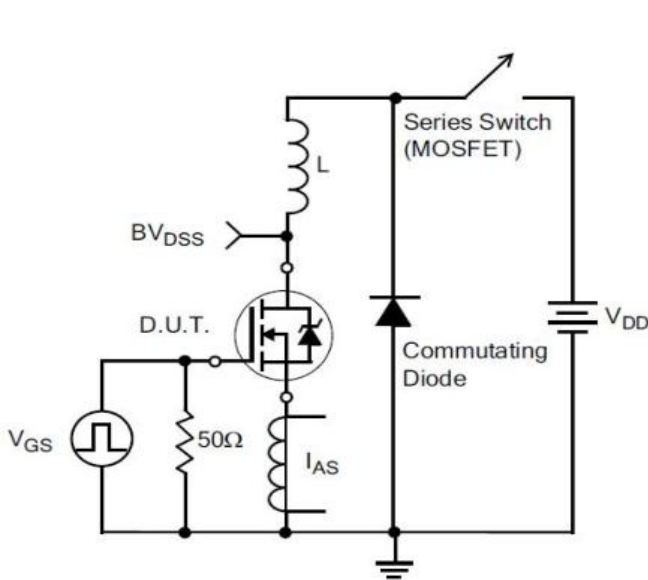
6 Typical Test Circuit and Waveform(continues)



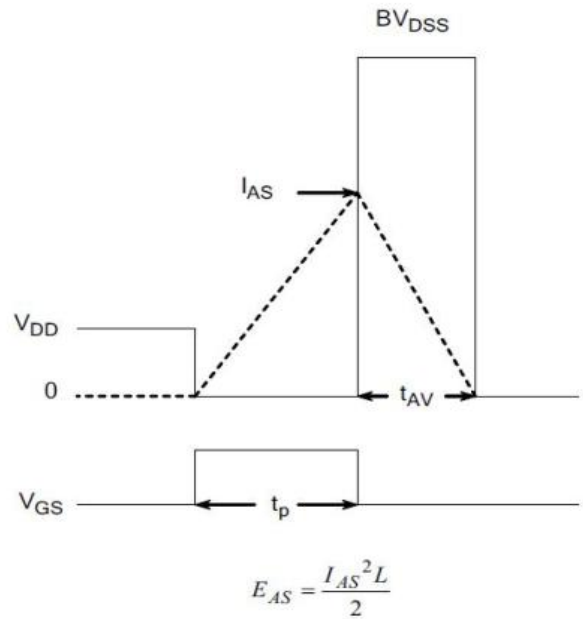
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

7 Product Names Rules

D H F X X N E X X

LOGO Code: DH

Packaging Code
 220F: F 220: Nothing
 251: B 252: D
 262: I 263: E

Rdson Specification Code
 With 3 Digital
 For Example:
 015 on behalf of 15mΩ
 004 on behalf of 4mΩ

Rated Voltage Code
 With 2 Digital, For Example:
 60 on behalf of 600V
 06 on behalf of 60V

Special Function Code
 E on behalf of build-in ESD
 Nothing on behalf of not ESD

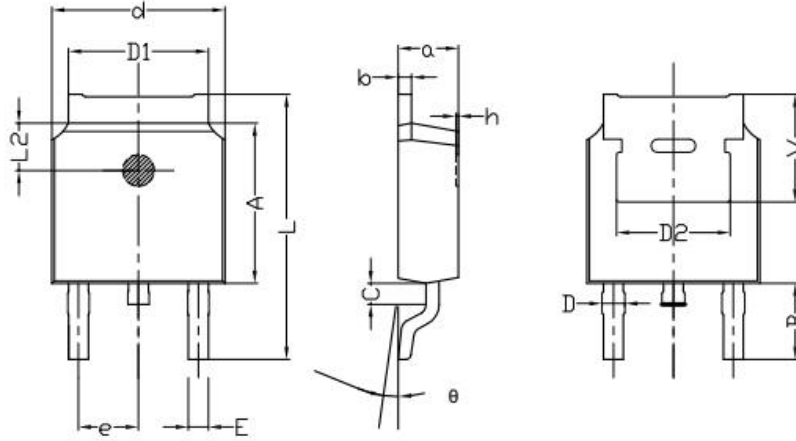
Channel Polarity Code
 N on behalf of N channel
 P on behalf of P channel

8 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	Identification Code	RoHS	Package	Quantity
DHD015N06	TO-252	DHD015N06	ZD	Pb-free	Tape & Reel	2500/box

9 Dimensions

TO-252B PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
a	2.20	2.40	0.087	0.095
b	0.46	0.58	0.018	0.023
c	0.70	0.90	0.028	0.035
D	0.80	1.00	0.032	0.039
d	6.30	6.70	0.248	0.264
D1	5.00	5.50	0.197	0.217
D2	TYP 4.83		TYP 0.190	
A	5.80	6.20	0.228	0.244
e	2.19	2.39	0.086	0.094
L	9.40	10.40	0.370	0.409
B	2.6	3.2	0.102	0.126
L2	1.5	1.8	0.059	0.071
θ	0	8	0	8
h	0	0.3	0	0.012
V	5.25	5.85	0.207	0.230
E	0.6	0.8	0.024	0.032

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
2018.08.12	1.0	Original	