



Dual N-channel Enhancement Mode Power MOSFET

Features

- ◆ 30V, 12A
- ◆ $R_{DS(ON)} < 12m\Omega @ V_{GS}=10V$
- ◆ $R_{DS(ON)} < 18m\Omega @ V_{GS}=4.5V$
- ◆ Advanced Trench Technology
- ◆ Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- ◆ Lead free product is acquired



Application

- ◆ Load Switch
- ◆ PWM Application
- ◆ Power management

100% UIS TESTED!
100% ΔV_{ds} TESTED!



RoHS
COMPLIANT
HALOGEN
FREE

Marking and pin Assignment	SOP-8 top view	Schematic Diagram
<p>Top View Bottom View</p>		

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise specified)

Symbol	Parameter	Max.	Unit
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	± 20	
I_D	Continuous Drain Current	$T_A=25^\circ C$	12
		$T_A=100^\circ C$	8
I_{DM}	Pulsed Drain Current ^{note1}	48	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	16	mJ
P_D	Power Dissipation	$T_A=25^\circ C$	3
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	46	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55~+150	$^\circ C$

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Off Characteristic

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$	--	--	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	--	--	± 100	nA

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance ^{note3}	$V_{GS}=10V, I_D=13A$	--	9	12	m Ω
		$V_{GS}=4.5V, I_D=10A$	--	13	18	

Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
C_{iss}	Input Capacitance	$V_{DS}=15V$ $V_{GS}=0V$ $f=1.0MHz$	--	900	--	pF
C_{oss}	Output Capacitance		--	140	--	
C_{riss}	Reverse Transfer Capacitance		--	120	--	
Q_g	Total Gate Charge	$V_{DS}=15V$ $I_D=10A$ $V_{GS}=10V$	--	19	--	nC
Q_{gs}	Gate-Source Charge		--	6.3	--	
Q_{gd}	Gate-Drain("Miller") Charge		--	4.5	--	

Switching Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=15V, I_D=6A$ $R_{GEN}=3\Omega, V_{GS}=10V$	--	6	--	nS
t_r	Turn-on Rise Time		--	5	--	
$t_{d(off)}$	Turn-off Delay Time		--	25	--	
t_f	Turn-off Fall Time		--	7	--	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
I_S	Maximum Continuous Drain to Source Diode Forward Current		--	--	12	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		--	--	48	
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=12A$	--	--	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F=10A, dI/dt=100A/\mu s$	--	7	--	nS
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=10A, dI/dt=100A/\mu s$	--	6.3	--	nC

Notes:

- 1、Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- 2、 E_{AS} condition : $T_J=25^\circ\text{C}$, $V_{GS}=10V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=8A$
- 3、Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Performance Characteristics

Figure 1: Output Characteristics

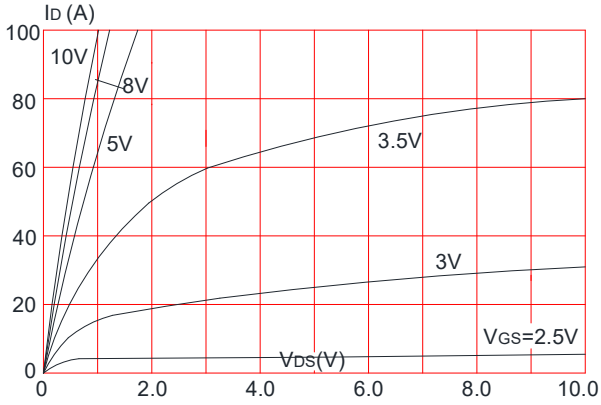


Figure 2: Typical Transfer Characteristics

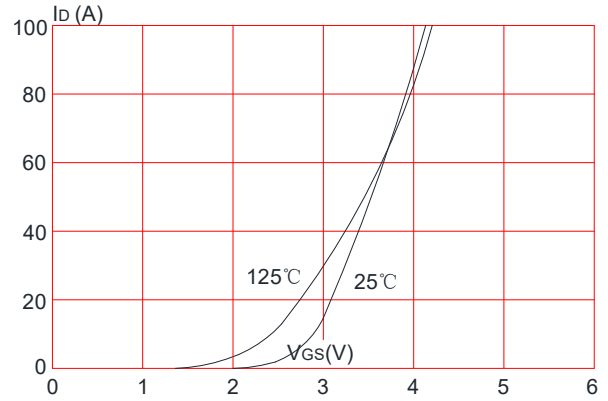


Figure 3: On-resistance vs. Drain Current

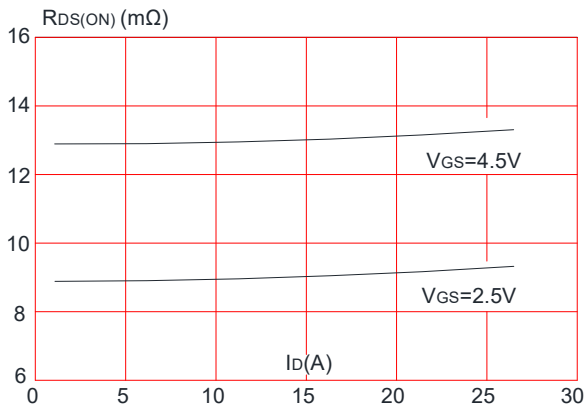


Figure 4: Body Diode Characteristics

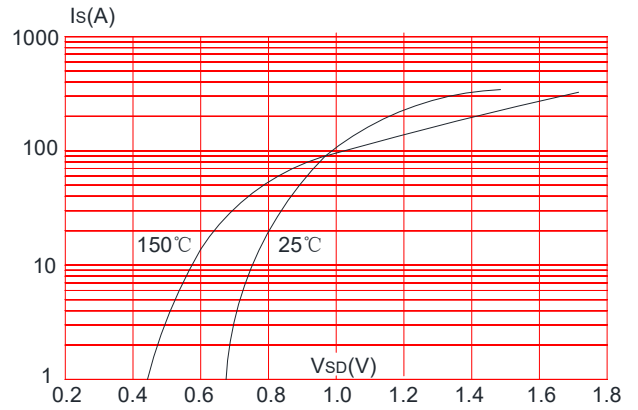


Figure 5: Gate Charge Characteristics

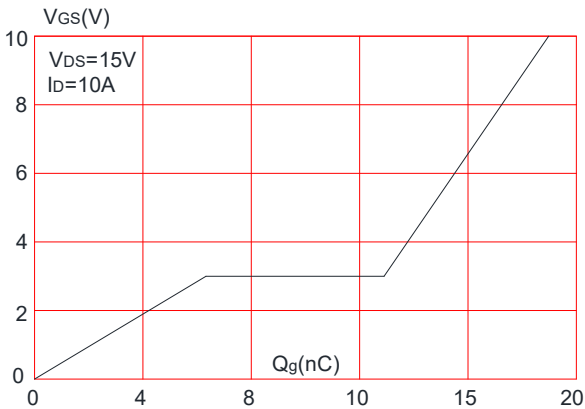


Figure 6: Capacitance Characteristics

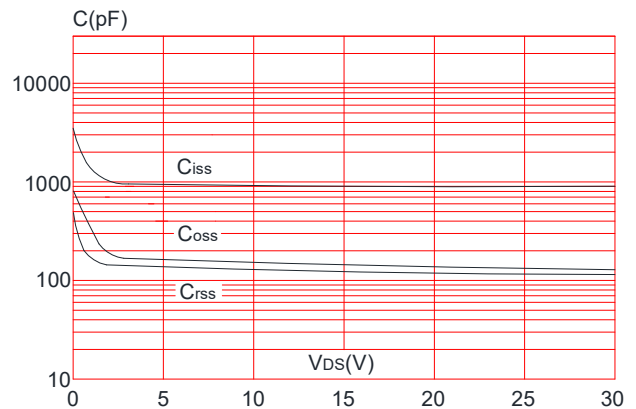




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

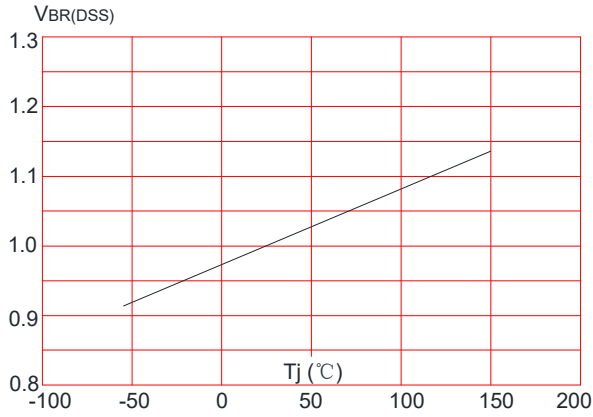


Figure 8: Normalized on Resistance vs. Junction Temperature

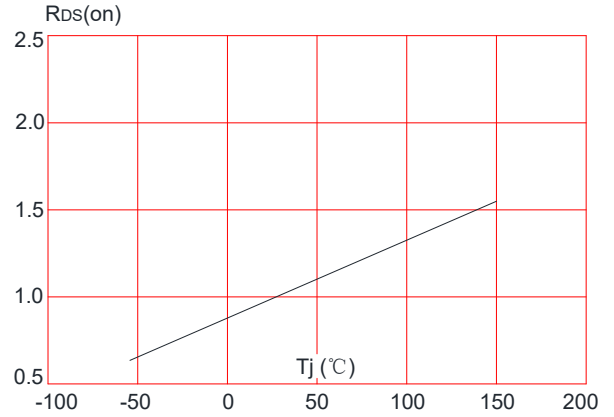


Figure 9: Maximum Safe Operating Area

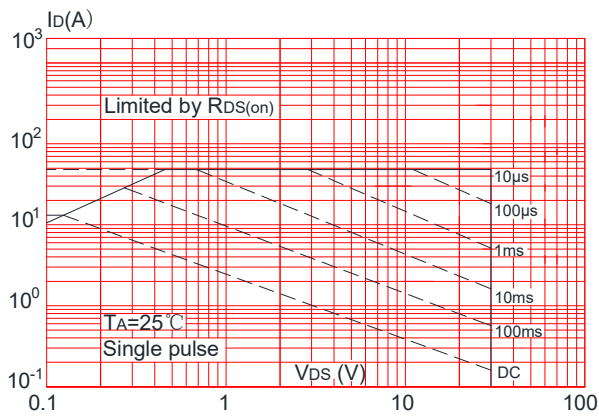


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

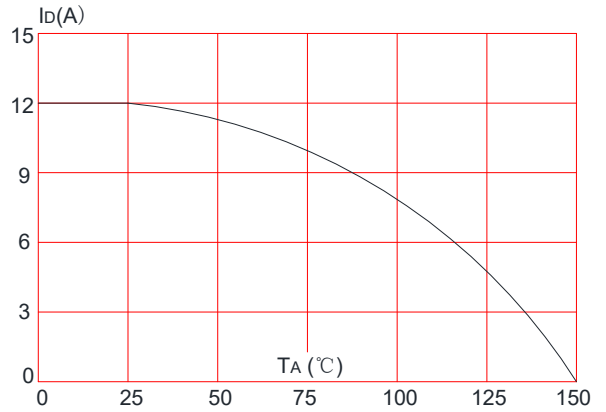
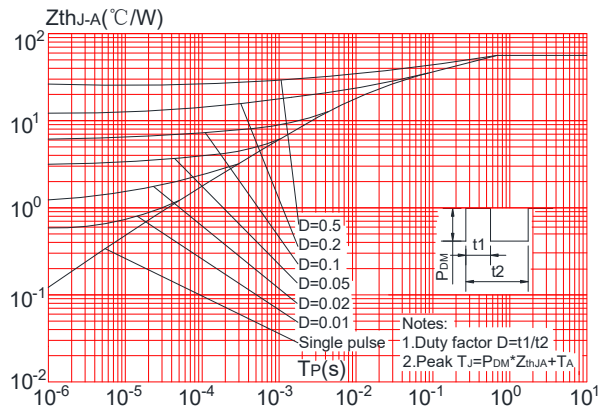


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

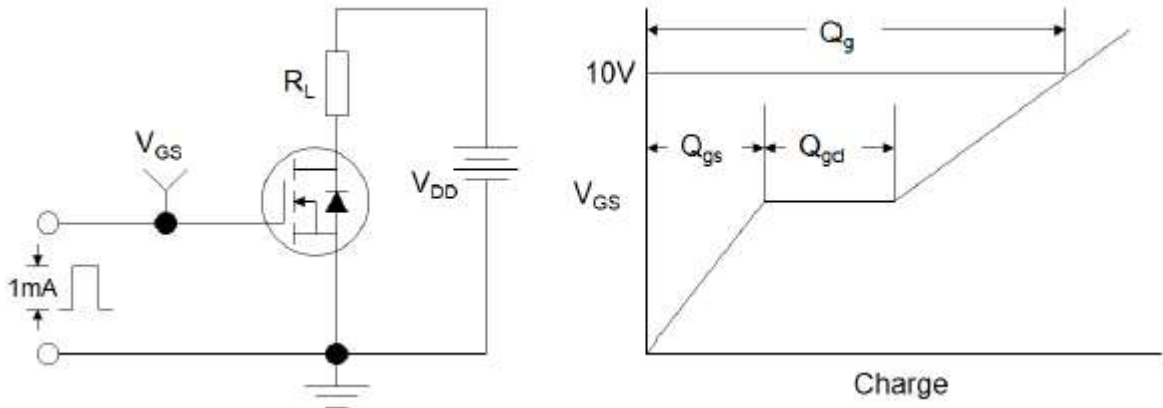


Figure1:Gate Charge Test Circuit & Waveform

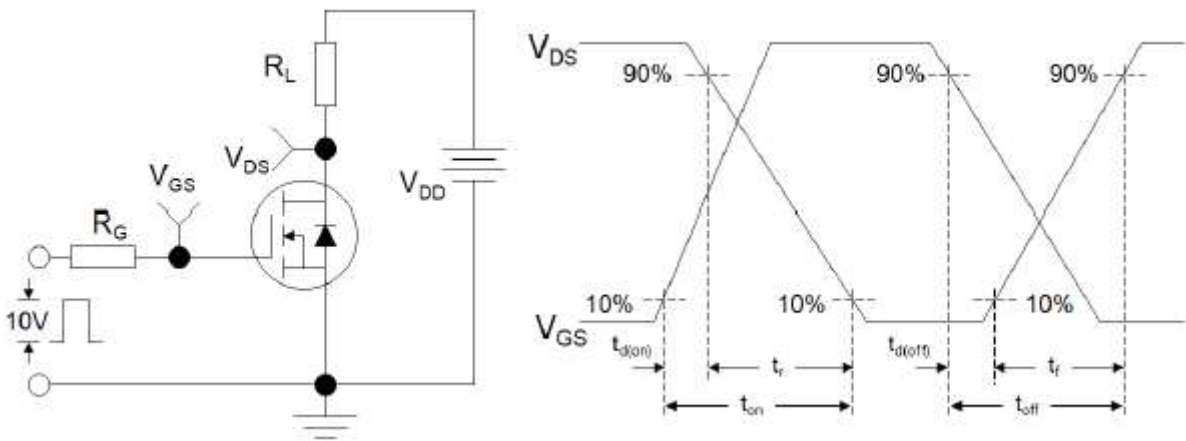


Figure 2: Resistive Switching Test Circuit & Waveforms

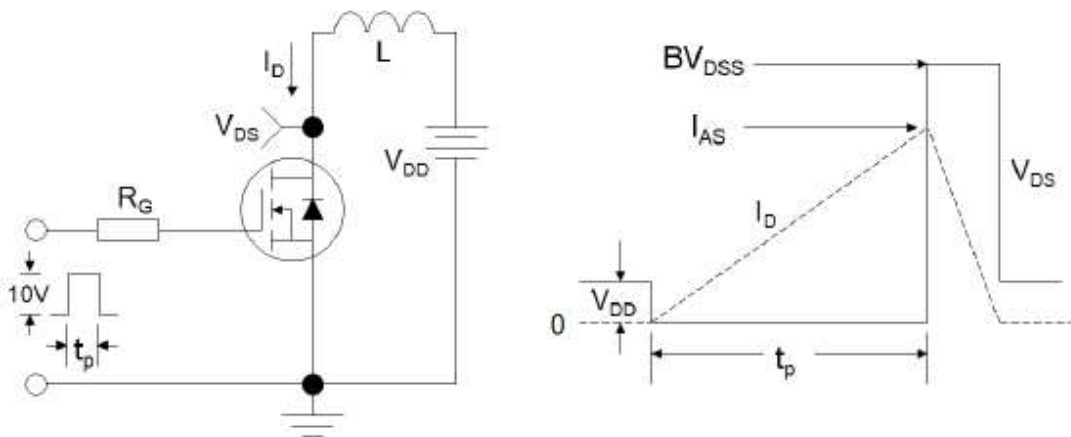
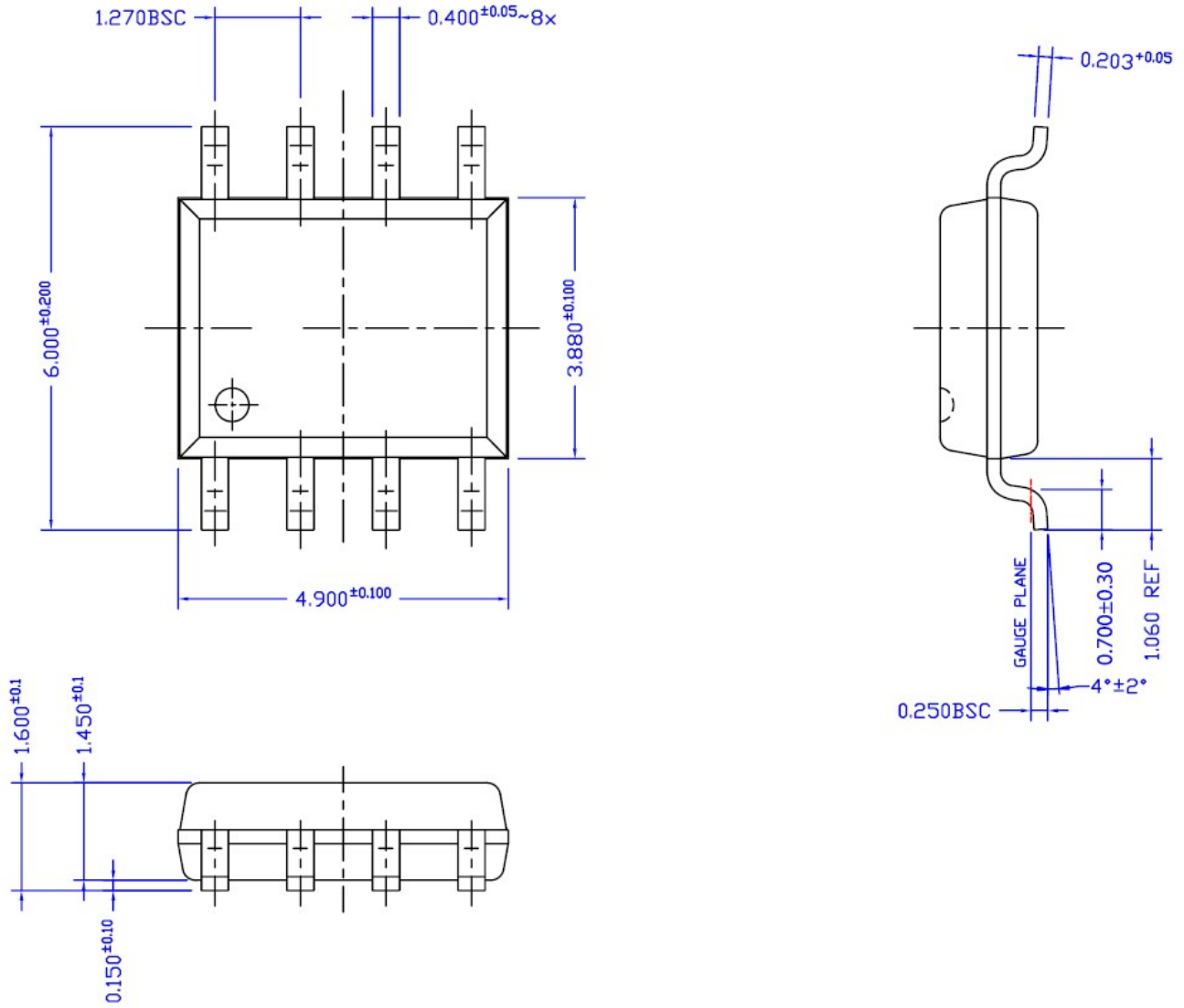


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



SOP-8 PACKAGE MECHANICAL DATA



SOP-8 PACKAGE INFORMATION

Device model	Marking	OUTLINE	Device Package	Reel Size	Reel (Pcs)	Per Carton (Pcs)
HMDN3010D	3010D	TAPING	SOP-8	13 Inch	4000	48000



Manufacturers version information

2020-11-19, HAOHAI™ Product Data-1.0



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