HC3906

30V N-Channel MOSFET

General Description

- Latest Trench Power MOSFET technology
- Very Low RDS(on) at 4.5V V_{GS}
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

Features

V_{DS}	30V
I_D (at V_{GS}=10V)	80A
$R_{DS(ON)}$ (at V_{GS}=10V)	6.0mΩ(Max)
$R_{DS(ON)}$ (at V_{GS}=4.5V)	9.0mΩ(Max)

100% UIS TESTED!
100% ∆Vds TESTED!

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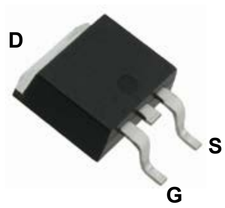
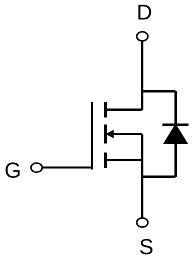




Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous	TC=25°C	I_D	80	A
	TC=100°C	I_D	51	A
Drain Current – Pulsed		I_{DM}	320	A
Maximum Power Dissipation		P_D	50	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 To 150	℃

Thermal Characteristics

Parameter	**Symbol**	**Typ**	**Max**	**Unit**
Thermal Resistance junction-case	$R_{\theta Jc}$		2.3	℃ /W
Thermal Resistance unction-to-Ambient	$R_{\theta JA}$		62	℃ /W

Electrical Characteristics (TJ=25℃ unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	1.6	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A		4.8	6.0	mΩ
		V_{GS}=4.5V, I_D=10A		6.8	9.0	mΩ
DYNAMIC PARAMETERS						
C_{Iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, F=1.0MHz		1160		pF
C_{oss}	Output Capacitance			200		pF
C_{rss}	Reverse Transfer Capacitance			180		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V V_{DS}=15V R_L=0.75Ω R_{GEN}=3Ω		7.3		nS
t_r	Turn-on Rise Time			14.5		nS
$t_{d(off)}$	Turn-Off Delay Time			35.8		nS
t_f	Turn-Off Fall Time			9.6		nS
Q_g	Total Gate Charge	V_{DS}=15V,I_D=4.5A, V_{GS}=4.5V		18		nC
Q_{gs}	Gate-Source Charge			4.1		nC
Q_{gd}	Gate-Drain Charge			3.6		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=1A		0.72	1.3	V
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		2.5		Ω

Note：

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

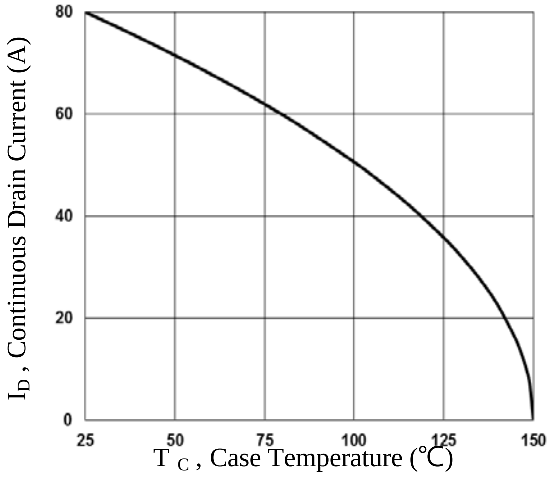


Fig.1 Continuous Drain Current vs. T_C

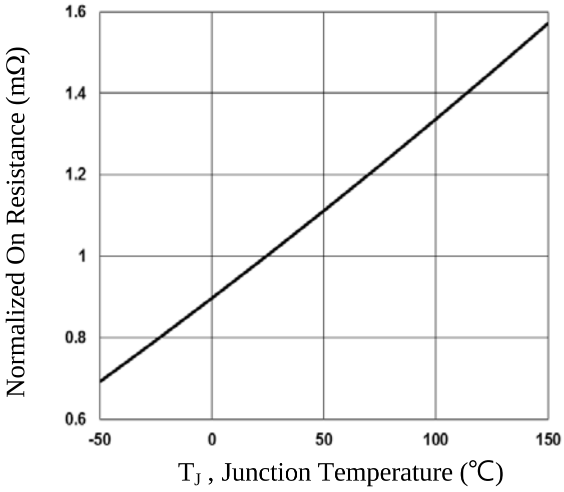


Fig.2 Normalized RDSON vs. T_J

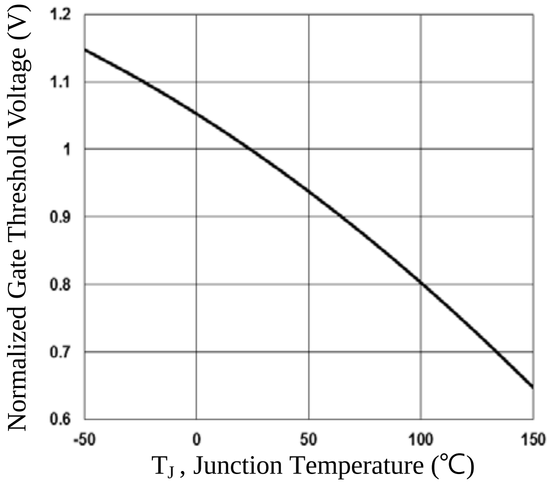


Fig.3 Normalized V_{th} vs. T_J

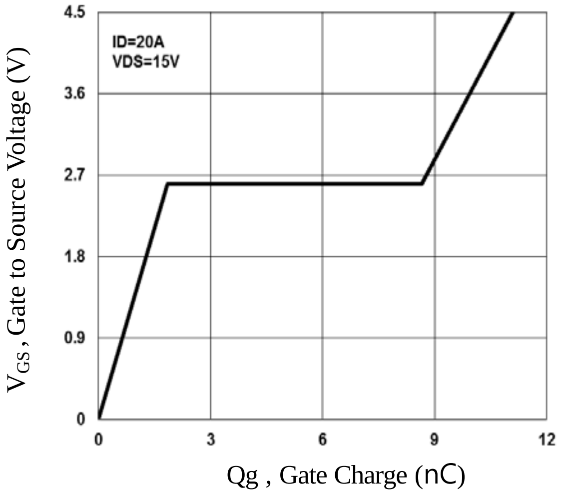


Fig.4 Gate Charge Waveform

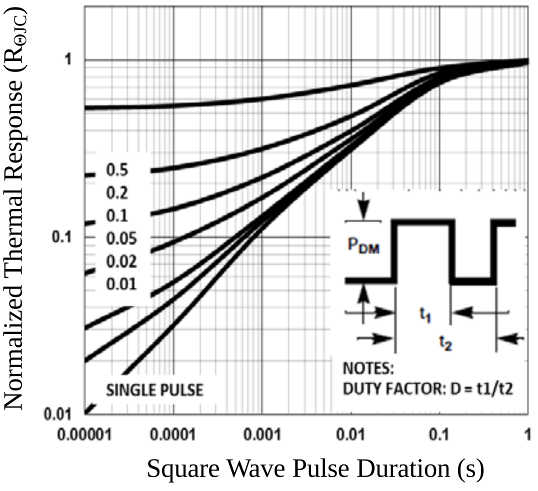


Fig.5 Normalized Transient Impedance

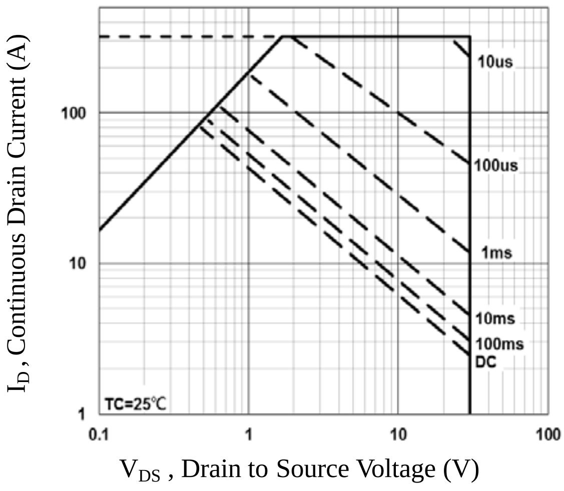


Fig.6 Maximum Safe Operation Area

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

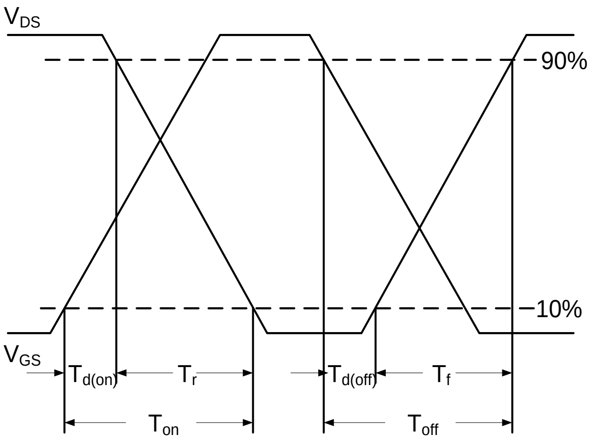


Fig.7 Switching Time Waveform

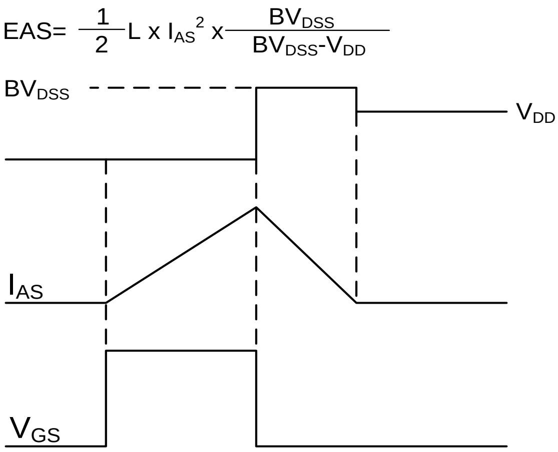
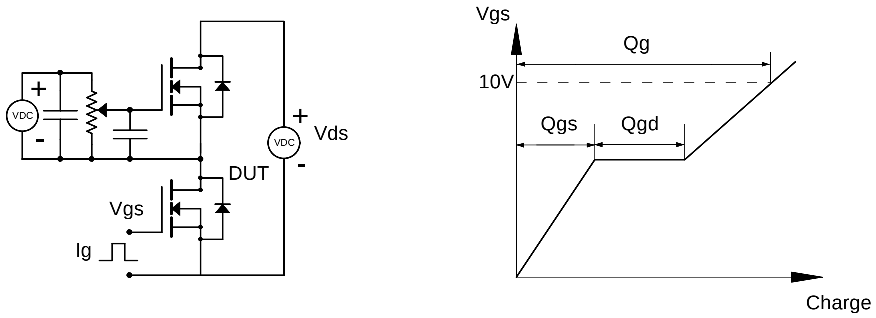
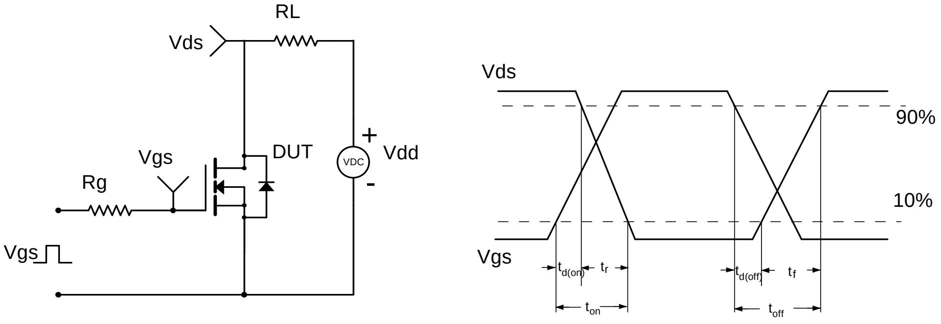


Fig.8 EAS Waveform

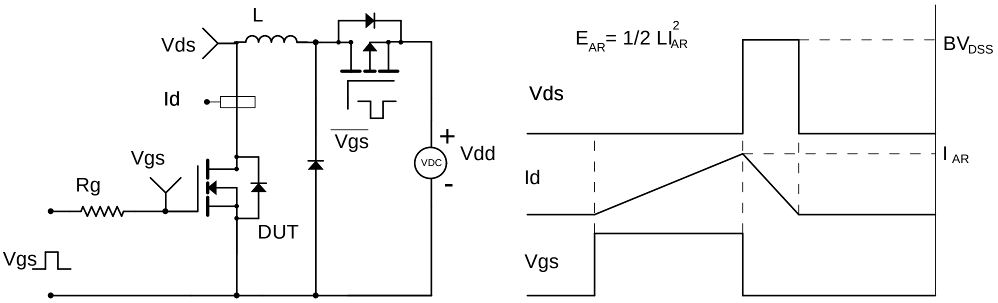
Gate Charge Test Circuit & Waveform



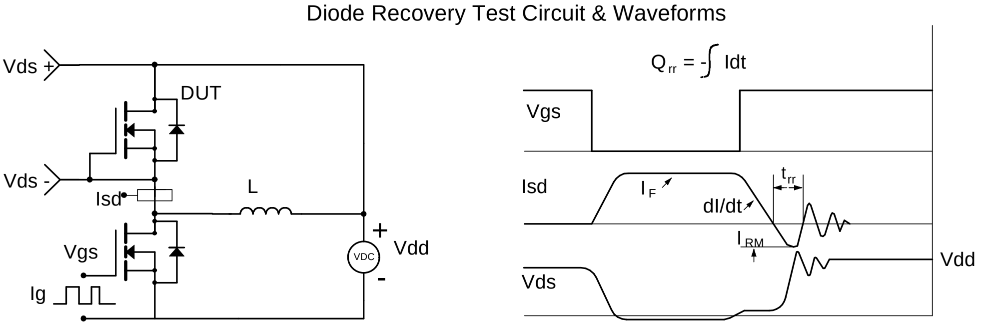
Resistive Switching Test Circuit & Waveforms



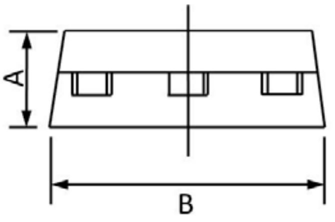
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

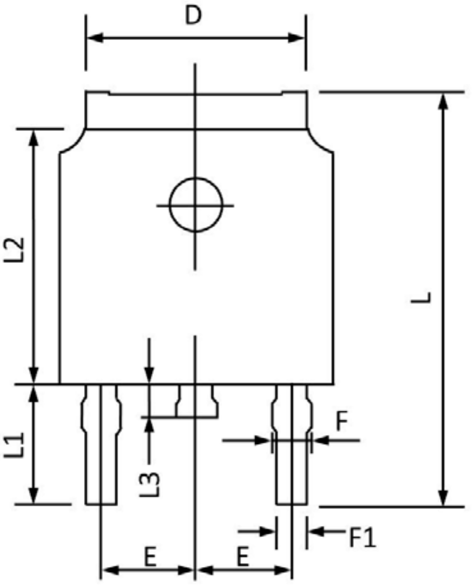


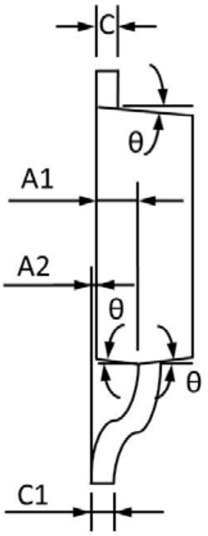
Diode Recovery Test Circuit & Waveforms



TO252 PACKAGE INFORMATION







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
A2	0.00	0.15	0.000	0.006
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3°	9°	3°	9°