HCNR3934E

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

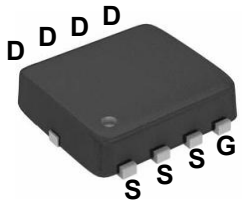
100% UIS TESTED!
100% ΔVds TESTED!

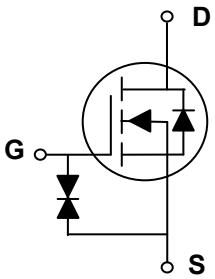
Features

V_{DS}	30V
I_D (at V_{GS}=10V)	60A
$R_{DS(ON)}$ (at V_{GS}=10V)	3.3mΩ(Typ)
$R_{DS(ON)}$ (at V_{GS}=4.5V)	4.5mΩ(Typ))

ESD protected up to 2KV

PDFN3*3





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	60	A
	TC=100°C	I_D	41	A
Drain Current – Pulsed		I_{DM}	240	A
Single Pulse Avalanche Energy		EAS	75	mJ
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 junction-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			±10	μA
$V_{GS(th)}$	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		3.3	4.0	mΩ
		V_{GS}=4.5V, I_D=10A		4.5	6.5	mΩ
DYNAMIC PARAMETERS						
C_{lss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, F=1.0MHz		2200		pF
C_{oss}	Output Capacitance			286		pF
C_{rss}	Reverse Transfer Capacitance			207		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V V_{DS}=15V R_L=0.75Ω R_{GEN}=3Ω		9.6		nS
t_r	Turn-on Rise Time			16.5		nS
$t_{d(off)}$	Turn-Off Delay Time			38.2		nS
t_f	Turn-Off Fall Time			11.6		nS
Q_g	Total Gate Charge	V_{DS}=15V,I_D=4.5A, V_{GS}=4.5V		18		nC
Q_{gs}	Gate-Source Charge			2.3		nC
Q_{gd}	Gate-Drain Charge			8.8		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		2.0		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

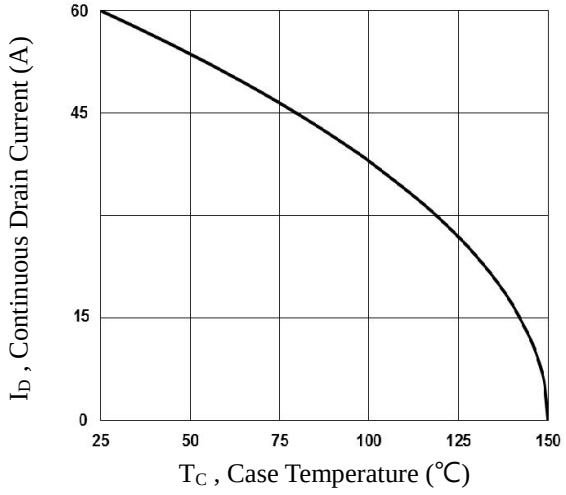


Fig.1 Continuous Drain Current vs. T_C

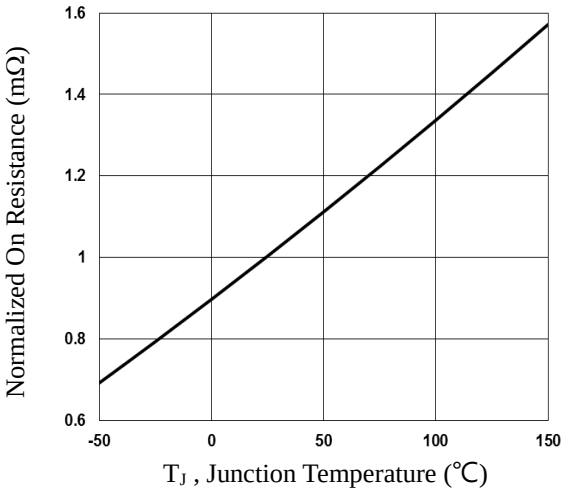


Fig.2 Normalized RDSON vs. T_J

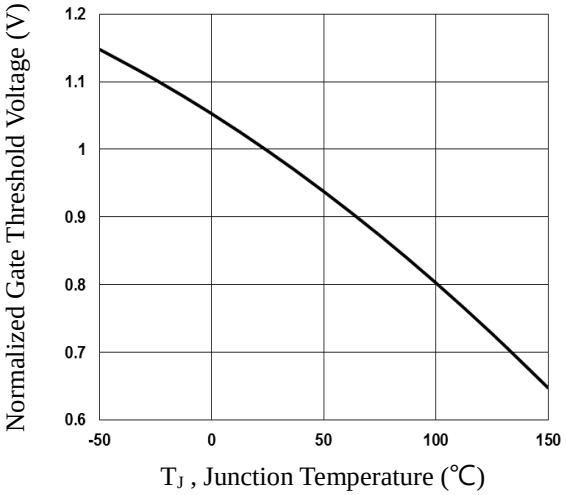


Fig.3 Normalized V_{th} vs. T_J

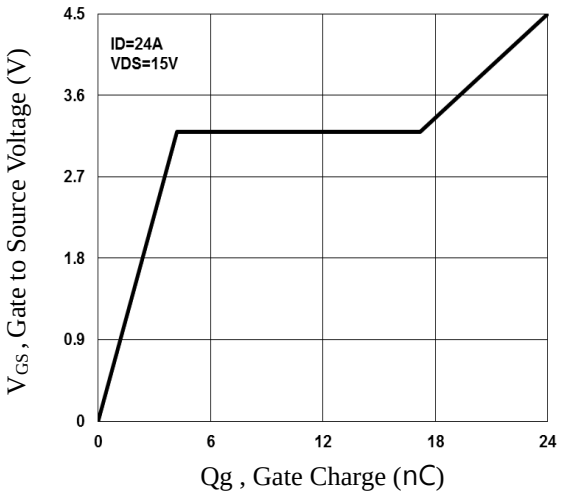


Fig. Gate Charge Waveform

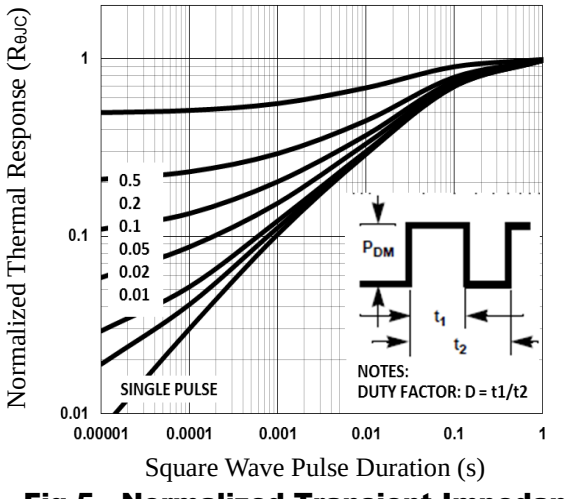


Fig.5 Normalized Transient Impedance

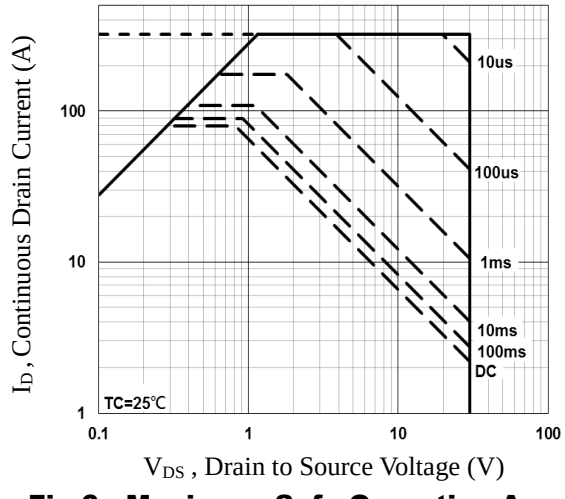


Fig.6 Maximum Safe Operation Area

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

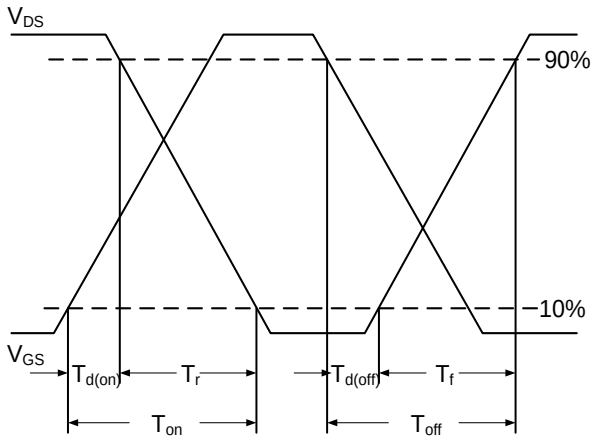


Fig.7 Switching Time Waveform

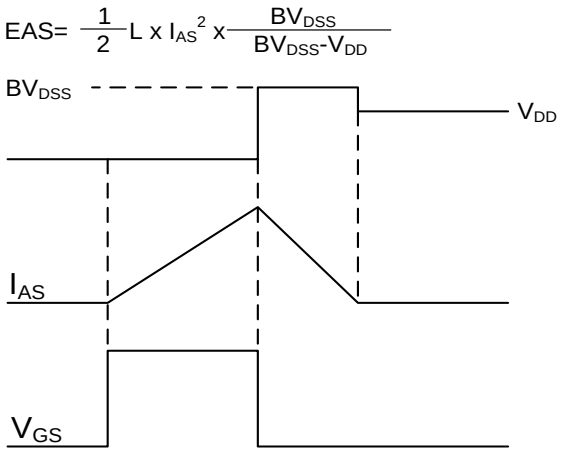
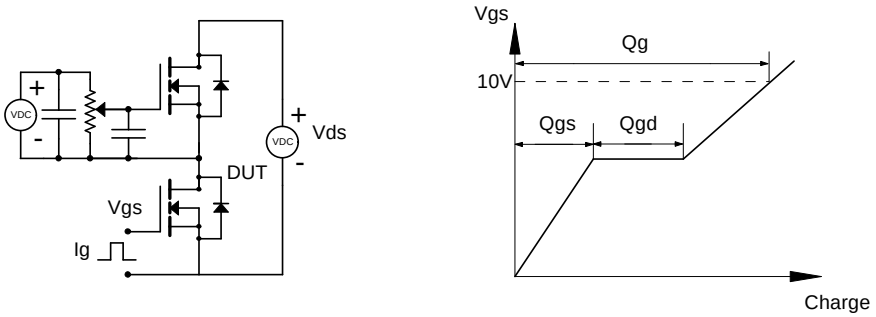
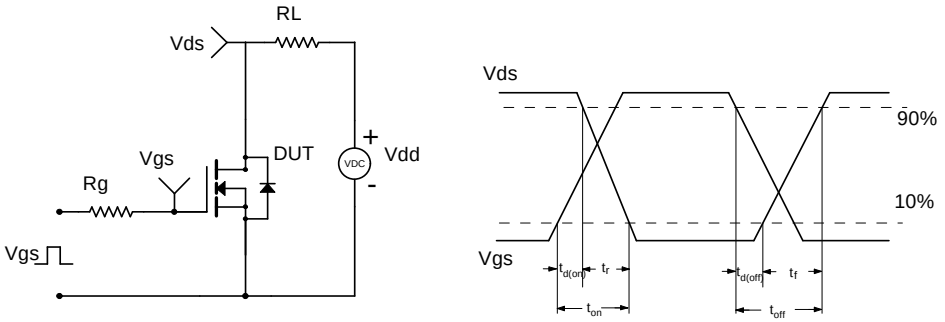


Fig.8 EAS Waveform

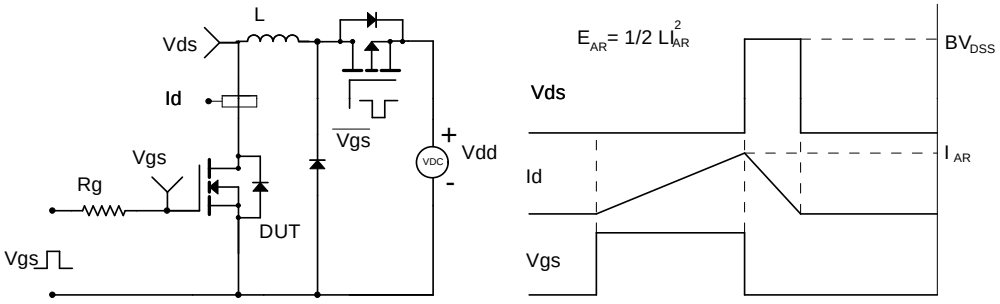
Gate Charge Test Circuit & Waveform



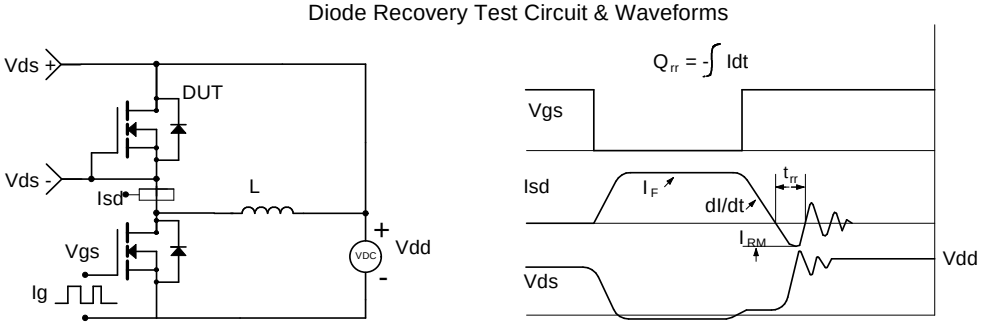
Resistive Switching Test Circuit & Waveforms



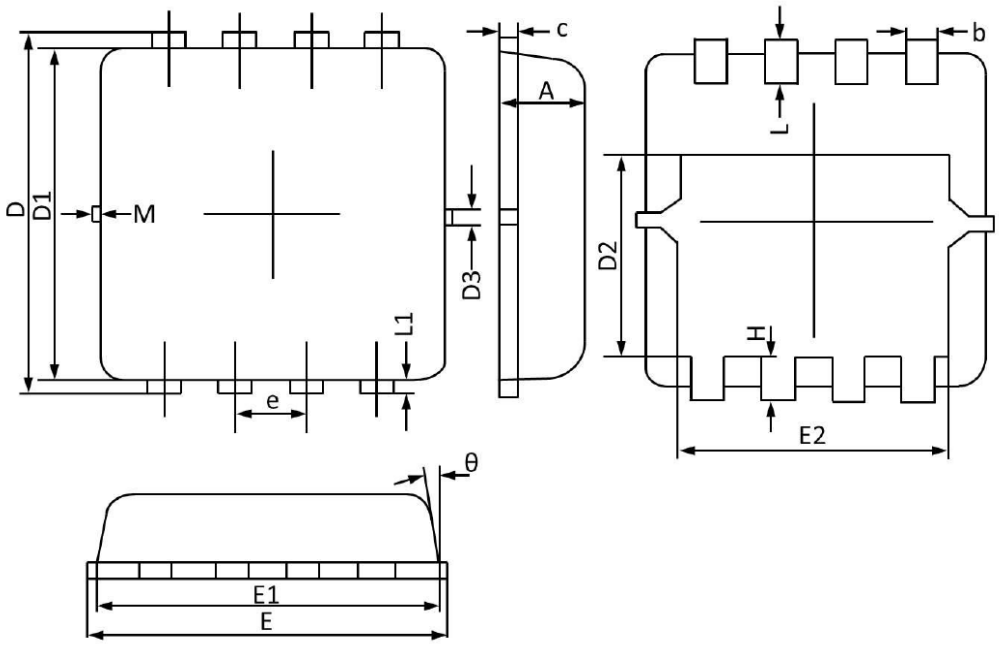
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



PDFN3x3 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.800	0.700	0.031	0.028
b	0.350	0.250	0.013	0.010
c	0.250	0.100	0.009	0.004
D	3.450	3.250	0.135	0.128
D1	3.200	3.000	0.125	0.119
D2	1.980	1.780	0.077	0.070
D3	0.130(REF)		0.005(REF)	
E	3.400	3.200	0.133	0.126
E1	3.200	3.000	0.125	0.119
E2	2.590	2.390	0.102	0.094
e	0.650(BSC)		0.026(BSC)	
H	0.500	0.300	0.019	0.011
L	0.500	0.300	0.019	0.011
L1	0.130(REF)		0.005(REF)	
θ	12°	0°	12°	0°
M	0.150(REF)		0.006(REF)	