HCNR4986

45V N-Channel MOSFET

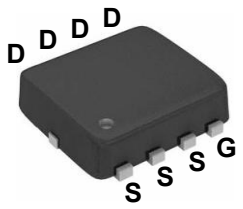
General Description

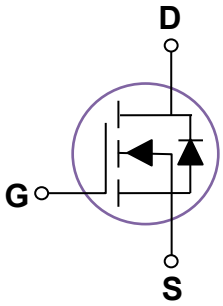
These N-Channel enhancement mode power field effect transistors are using SGT technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

V_{DS}	45V
I_D (at V_{GS}=10V)	36A
$R_{DS(ON)}$ (at V_{GS}=10V)	6.5mΩ(Typ)

PDFN3*3





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	45	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous	TC=25°C	I_D	36	A
	TC=100°C	I_D	25	A
Maximum Power Dissipation		P_D	30	W
Single pulse avalanche energy		E_{AS}	20	mJ
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		1.3	℃ /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	45			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V,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=15A		6.5	8.0	mΩ
		V_{GS}=4.5V, I_D=10A		10	13	mΩ
gfs	Forward Transconductance	V_{DS}=10V , I_D=40A		6		S
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=20V,V_{GS}=0V, F=1.0MHz		740		pF
C_{oss}	Output Capacitance			285		pF
C_{rss}	Reverse Transfer Capacitance			25		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=20V,I_D=40A, V_{GS}=10V, R_G=3Ω		5		nS
t_r	Turn-on Rise Time			47		nS
$t_{d(off)}$	Turn-Off Delay Time			15		nS
t_f	Turn-Off Fall Time			6.5		nS
Q_g	Total Gate Charge	V_{DS}=20V,I_D=40A, V_{GS}=10V		14		nC
Q_{gs}	Gate-Source Charge			2.6		nC
Q_{gd}	Gate-Drain Charge			3.3		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		1.7		Ω

Note：

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.5mH,IAS=8A, Starting TJ=25℃
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

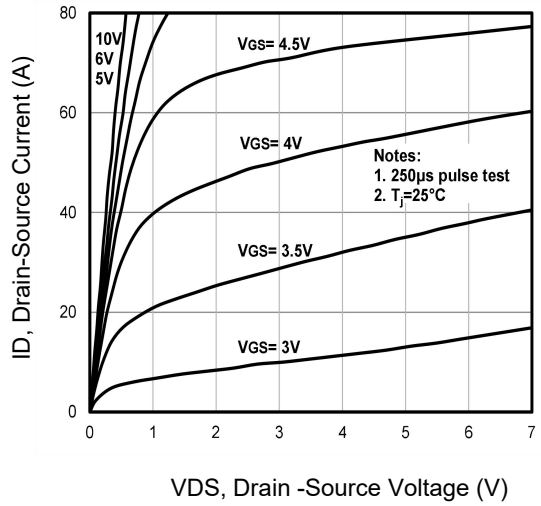


Fig1. Typical Output Characteristics

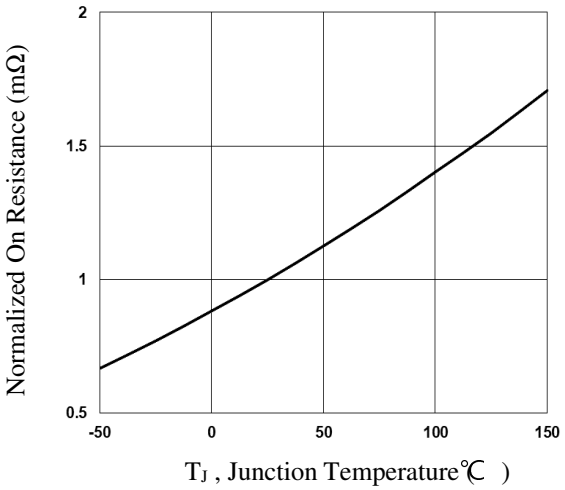


Fig.2 Normalized RDSON vs. T_J

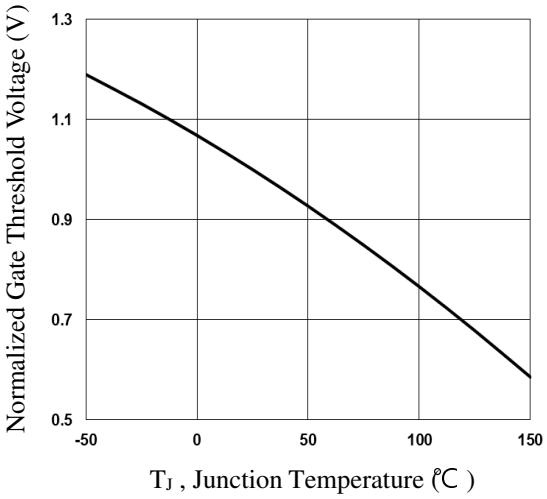


Fig.3 Normalized V_{th} vs. T_J

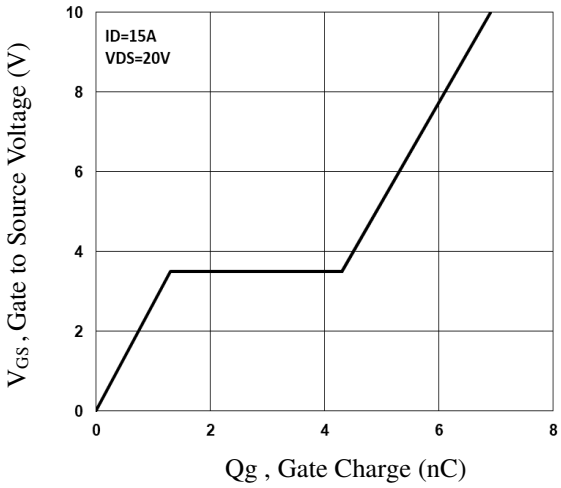


Fig.4 Gate Charge Waveform

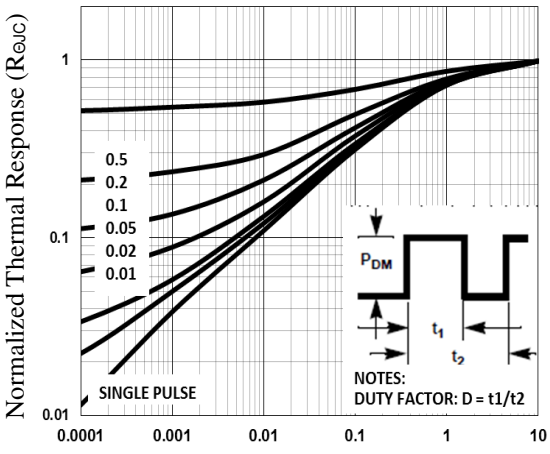


Fig.5 Normalized Transient Response

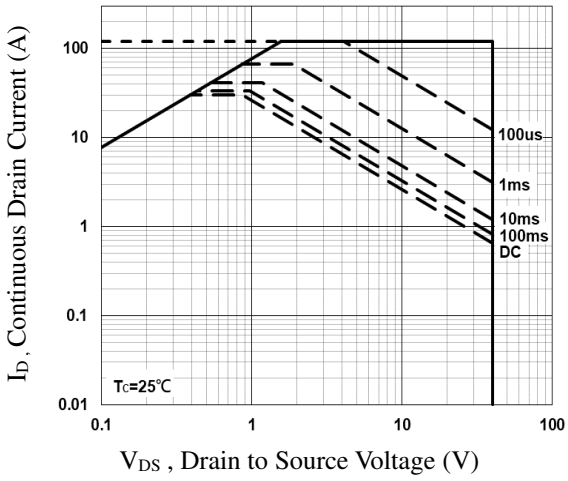


Fig.6 Maximum Safe Operation Area

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

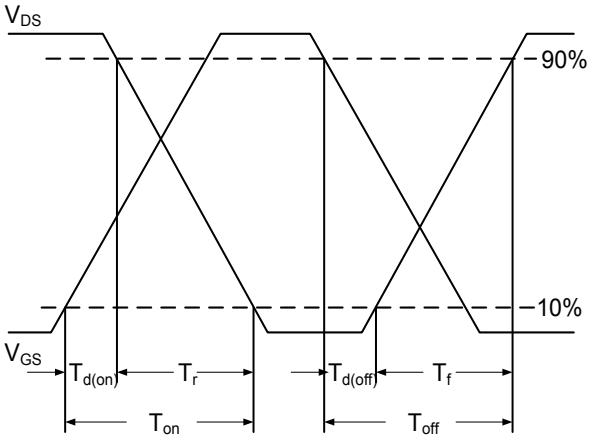


Fig.7 Switching Time Waveform

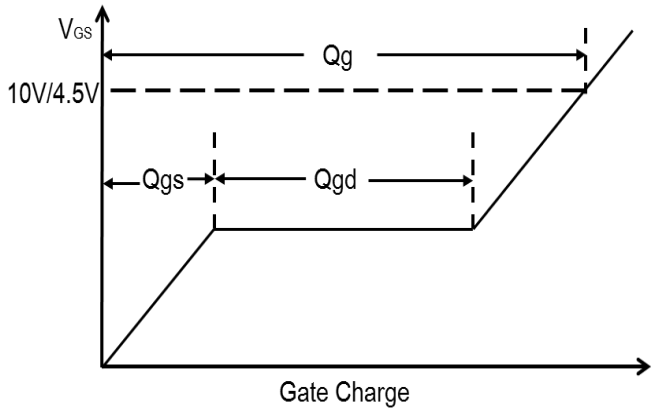
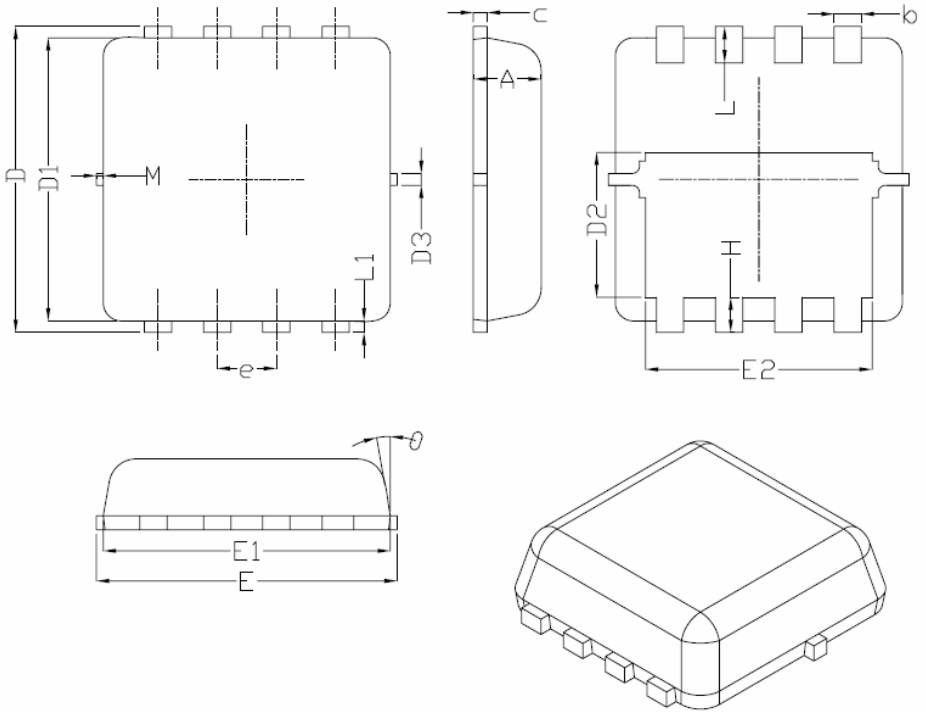


Fig.8 Gate Charge Waveform

PDFN3x3 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BS		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°