HCNR0616

60V N-Channel MOSFET

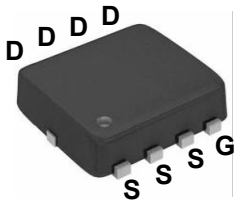
General Description

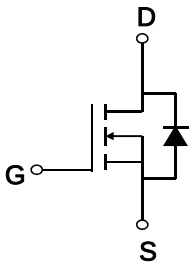
These N-Channel enhancement mode power field effect transistors are using SGT technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices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

Features

V_{DS}	60V
I_D (at V_{GS}=10V)	35A
$R_{DS(ON)}$ (at V_{GS}=10V)	12.6mΩ(Typ)

PDFN3*3





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous	TC=25°C	I_D	35	A
	TC=100°C	I_D	22	A
Maximum Power Dissipation		P_D	34	W
Drain Current – Pulsed		I_{DM}	140	A
Single pulse avalanche energy		E_{AS}	100	mJ
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		3.7	℃ /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	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V,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=12A		12.6	16	mΩ
		V_{GS}=4.5V, I_D=5A		19	25	mΩ
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=30V,V_{GS}=0V, F=1.0MHz		650		pF
C_{oss}	Output Capacitance			191		pF
C_{rss}	Reverse Transfer Capacitance			27		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V,I_D=1A, V_{GS}=10V, R_G=3.3Ω		8		nS
t_r	Turn-on Rise Time			12		nS
$t_{d(off)}$	Turn-Off Delay Time			25		nS
t_f	Turn-Off Fall Time			18		nS
Q_g	Total Gate Charge	V_{DS}=30V,I_D=12A, V_{GS}=10V		11		nC
Q_{gs}	Gate-Source Charge			1.5		nC
Q_{gd}	Gate-Drain Charge			4.5		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=1A		0.72	1.3	V

Note：

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V,L=0.5mH,IAS=20A., 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

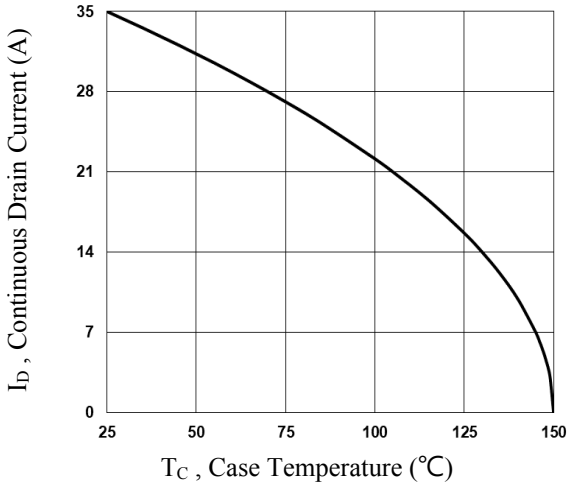


Fig.1 Continuous Drain Current vs. T_C

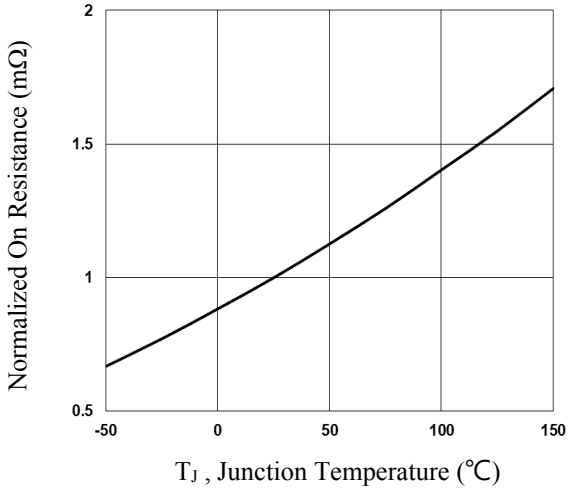


Fig.2 Normalized RDSON vs. T_J

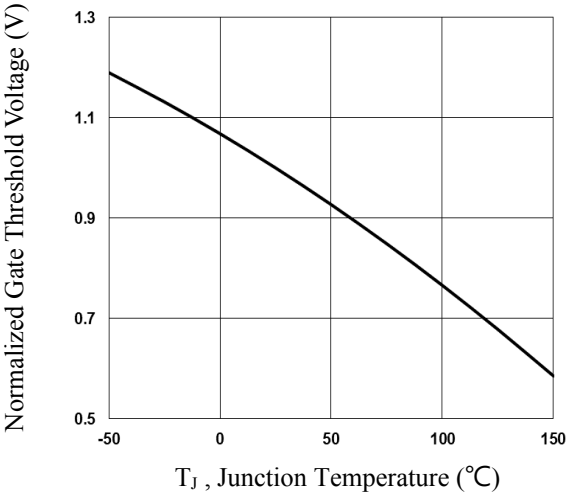


Fig.3 Normalized V_{th} vs. T_J

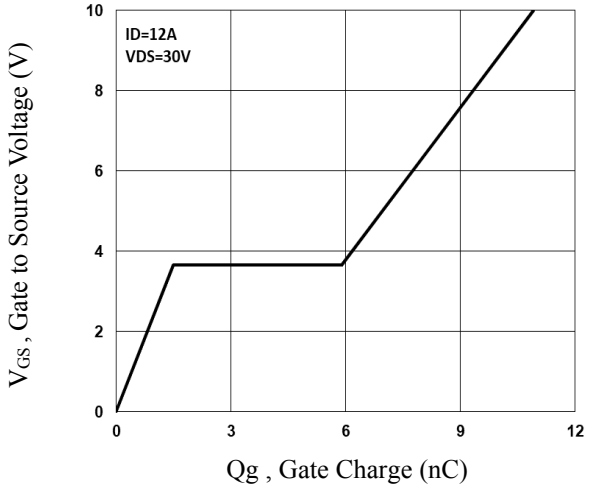


Fig.4 Gate Charge Waveform

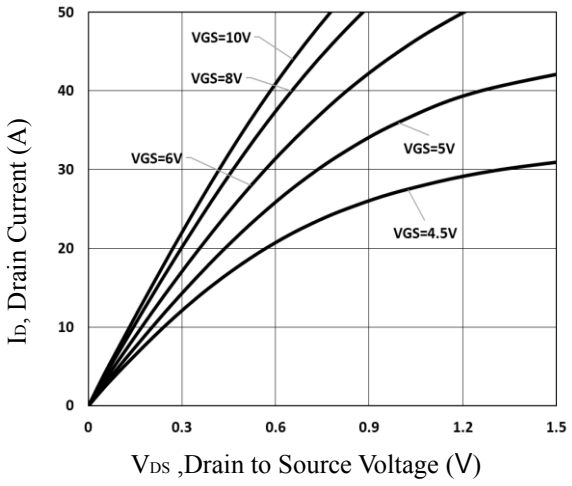


Fig.5 Typical Output Characteristics

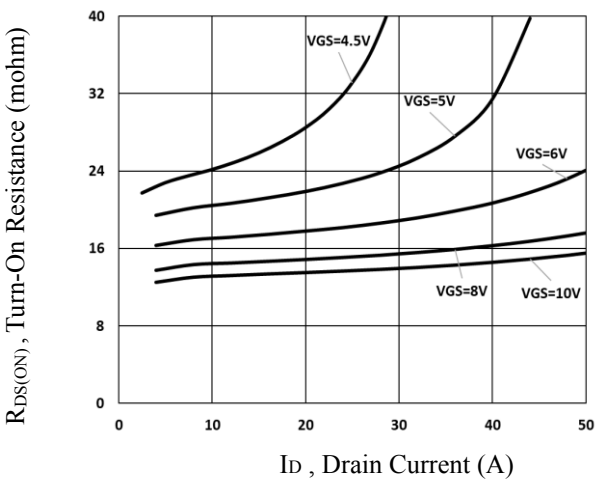


Fig.6 Turn-On Resistance vs. I_D

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

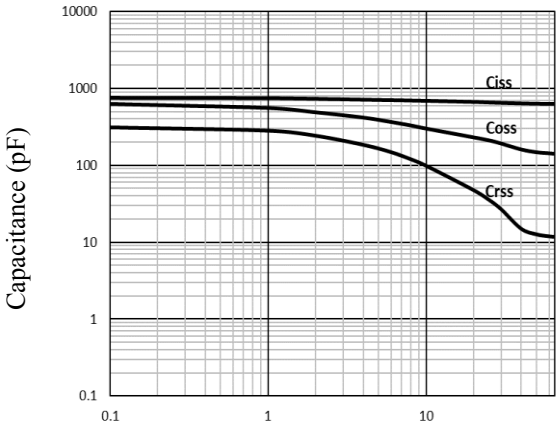


Fig.7 Capacitance Characteristics

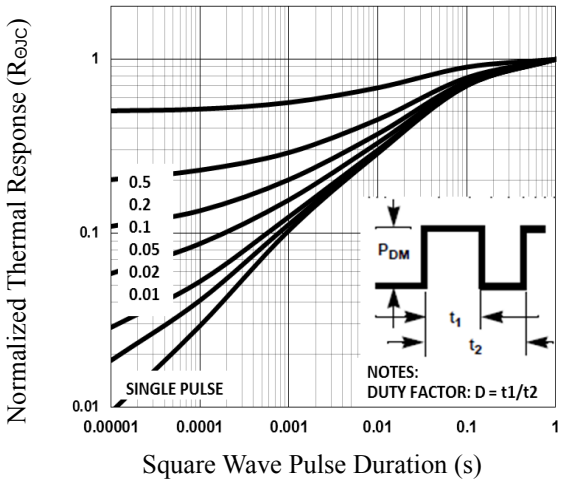


Fig.8 Normalized Transient Response

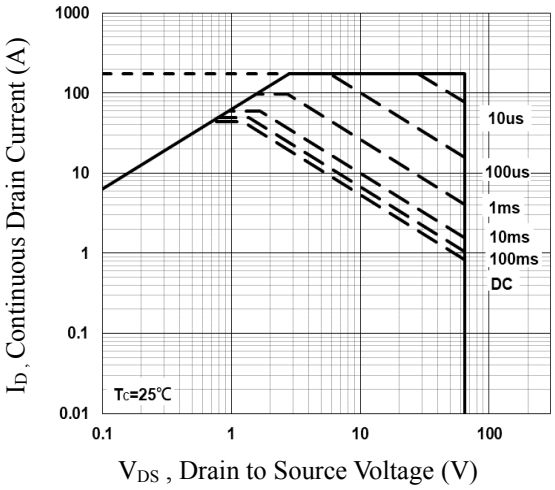


Fig.9 Maximum Safe Operation Area

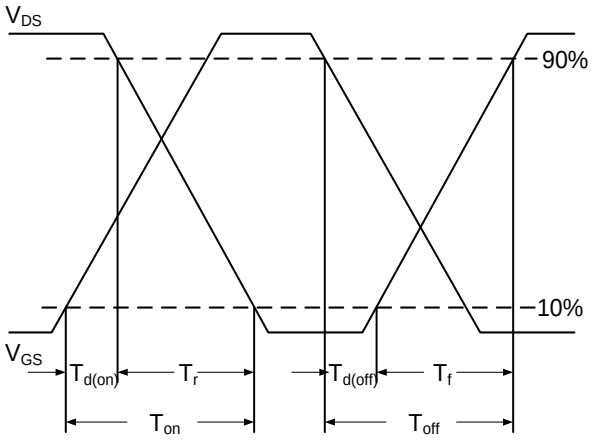


Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

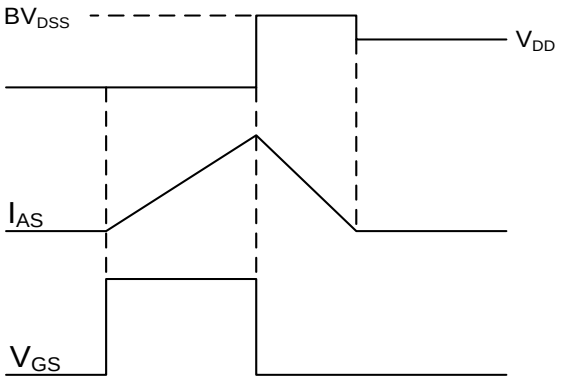
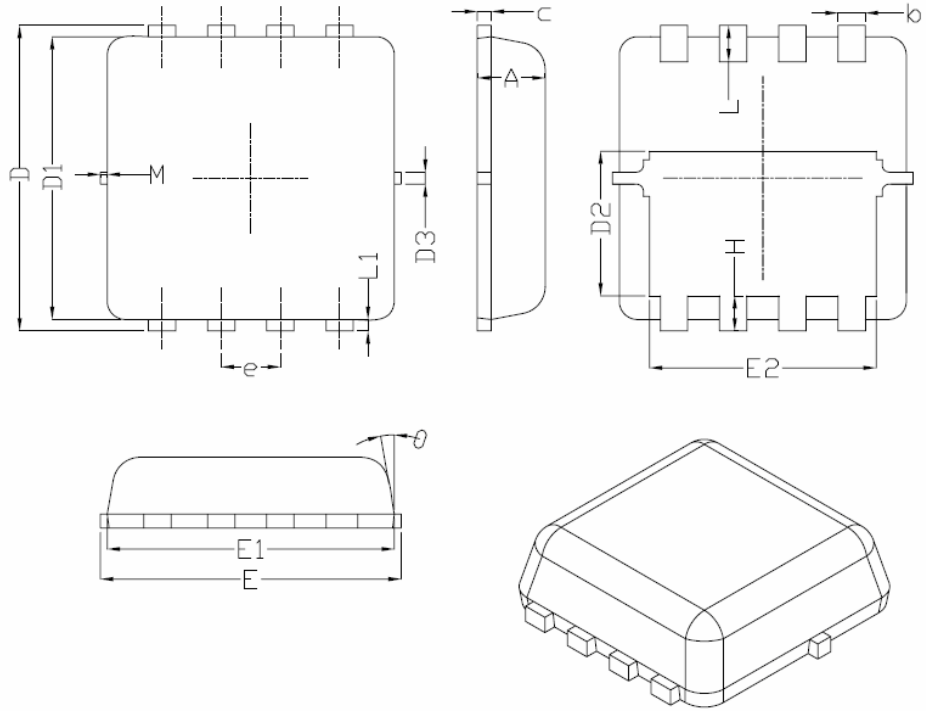


Fig.11 EAS Waveform

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°