HCNS0600

60V N-Channel MOSFET

General Description

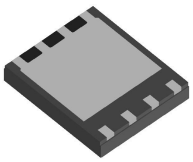
These N-Channel enhancement mode power field effect transistors are using SGT technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices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

Features

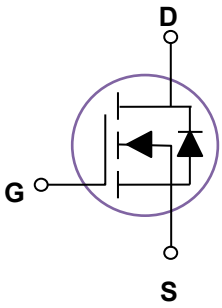
V_{DS}	60V
I_D (at V_{GS}=10V)	220A
$R_{DS(ON)}$ (at V_{GS}=10V)	1.35mΩ(Typ)

PDFN5*6

TOP VIEW



BOTTOM VIEW



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	220	A
	TC=100°C	I_D	139	A
Drain Current – Pulsed		IDM	880	A
Maximum Power Dissipation		P_D	278	W
Single pulse avalanche energy(1)		E_{AS}	1300	mJ
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		0.45	℃ /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	2.0	2.8	4.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A		1.35	1.6	mΩ
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A		30		S
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, F=1.0MHz		5800		pF
C_{oss}	Output Capacitance			1200		pF
C_{rss}	Reverse Transfer Capacitance			50		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V,I_D=1A, V_{GS}=10V, R_G=6Ω		19		nS
t_r	Turn-on Rise Time			9		nS
$t_{d(off)}$	Turn-Off Delay Time			36		nS
t_f	Turn-Off Fall Time			10		nS
Q_g	Total Gate Charge	V_{DS}=50V,I_D=10A, V_{GS}=10V		71		nC
Q_{gs}	Gate-Source Charge			22		nC
Q_{gd}	Gate-Drain Charge			13		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=10A		0.72	1.4	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. V_{DD}=30V,V_{GS}=10V,L=0.5mH,IAS=90A., 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

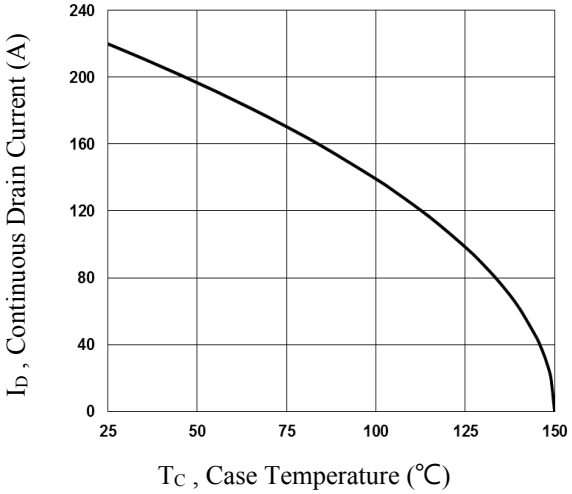


Fig.1 Continuous Drain Current vs. T_C

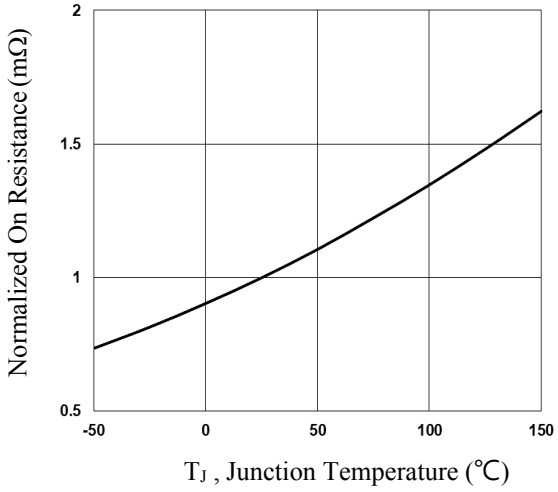


Fig.2 Normalized RDSON vs. T_J

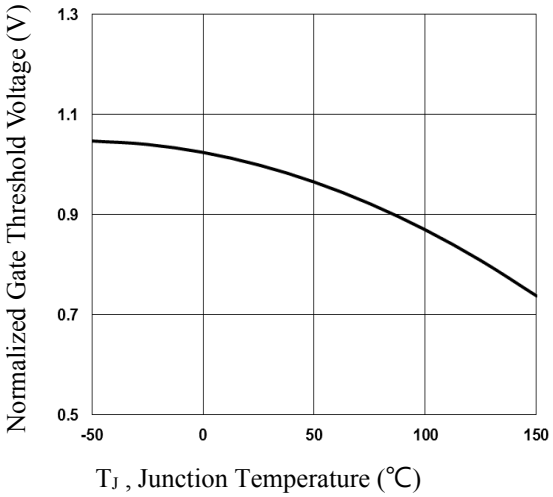


Fig.3 Normalized Vth vs. T_J

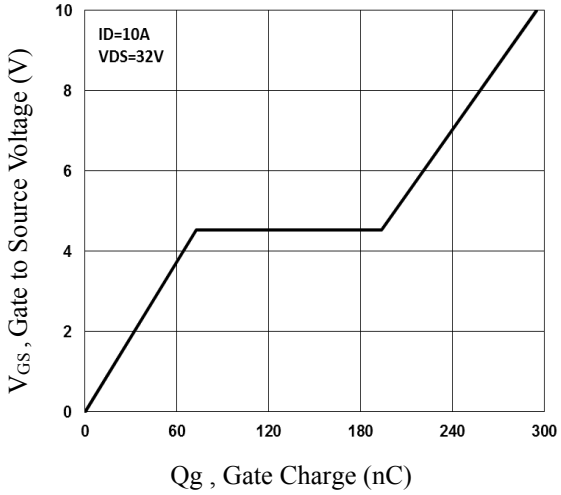


Fig.4 Gate Charge Characteristics

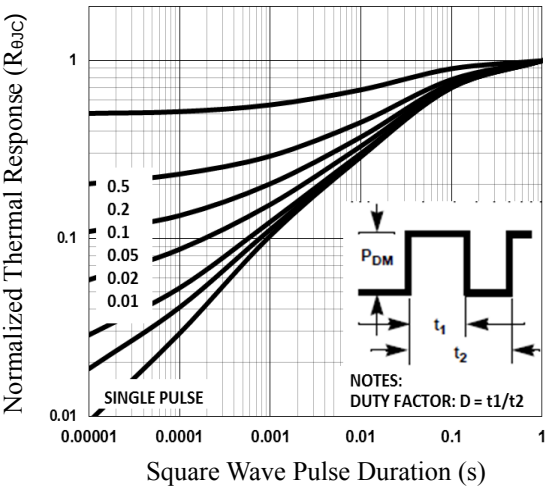


Fig.5 Normalized Transient Impedance

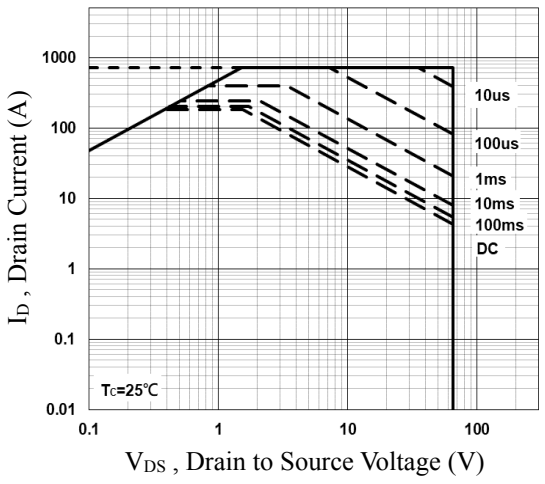


Fig.6 Maximum Safe Operation Area

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

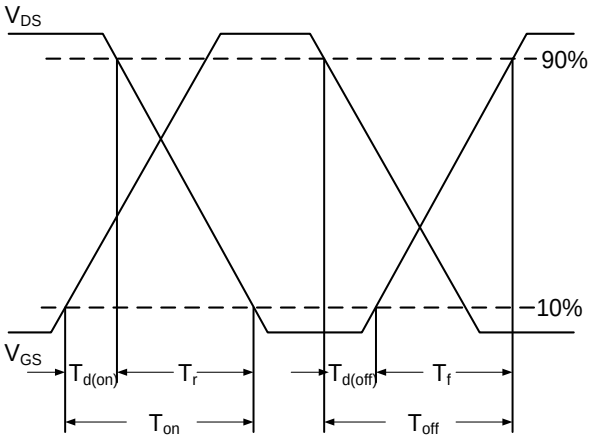


Fig.7 Switching Time Waveform

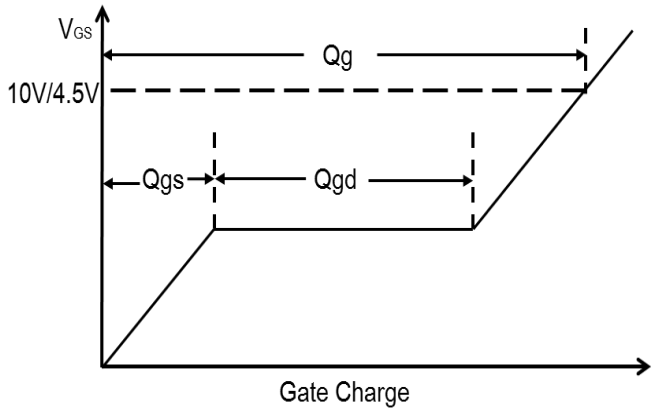
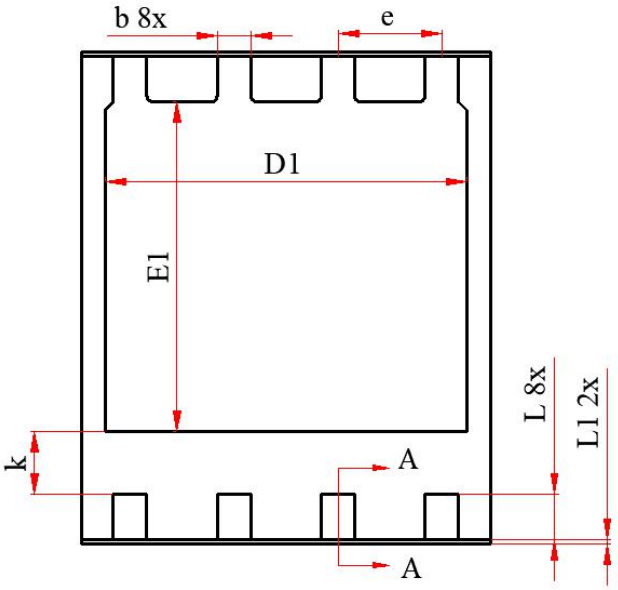
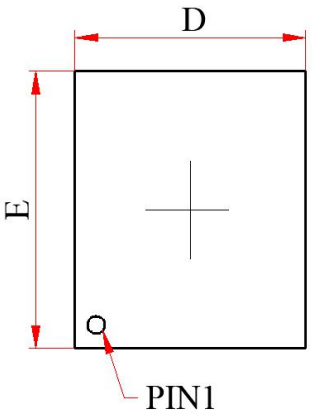


Fig.8 Gate Charge Waveform

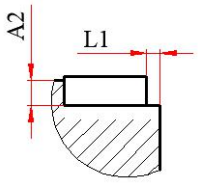
DFN5*6 PACKAGE INFORMATION



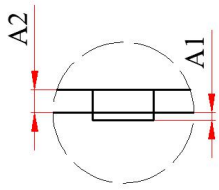
BOTTOM VIEW



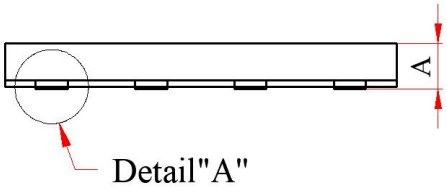
TOP VIEW



Section A-A



Detail “A”



SIDE VIEW

Symbol	Dimension In Millimeters			Dimension In Inches		
	Normal	Min	Max	Normal	Min	Max
A	--	0.500	0.600	--	0.020	0.024
A1	--	--	0.005	--	--	0.000
A2	--	0.100	0.250	--	0.004	0.010
D	5.000	4.900	5.100	0.197	0.193	0.201
E	6.000	5.900	6.100	0.236	0.232	0.240
D1	4.420	4.320	4.520	0.174	0.170	0.178
E1	4.020	3.920	4.120	0.158	0.154	0.162
b	0.410	0.360	0.460	0.016	0.014	0.018
L	0.560	0.510	0.610	0.022	0.020	0.024
L1	0.050	0.010	0.090	0.002	0.000	0.004
k	0.760 REF			0.030 REF		
e	1.270 BSC			0.050 BSC		