HCNS0602

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)	177A
$R_{DS(ON)}$ (at V_{GS}=10V)	2.0mΩ(Typ)
$R_{DS(ON)}$ (at V_{GS}=4.5V)	2.6mΩ(Typ)

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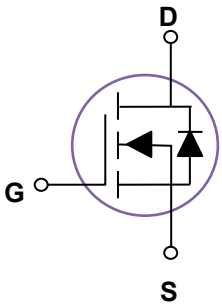

Absolute Maximum Ratings T_A=25°C unless otherwise noted

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	177	A
	TC=100°C	I_D	112	A
Drain Current – Pulsed		IDM	560	A
Maximum Power Dissipation		P_D	131	W
Single pulse avalanche energy(1)		E_{AS}	756	mJ
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		0.95	℃ /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	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A		2.0	2.5	mΩ
		V_{GS}=4.5V, I_D=15A		2.6	3.4	mΩ
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A		15		S
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=30V,V_{GS}=0V, F=1.0MHz		6312		pF
C_{oss}	Output Capacitance			2101		pF
C_{rss}	Reverse Transfer Capacitance			692		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V, R_L=1.5Ω, V_{GS}=10V, R_G=6Ω		19		nS
t_r	Turn-on Rise Time			15		nS
$t_{d(off)}$	Turn-Off Delay Time			77		nS
t_f	Turn-Off Fall Time			20		nS
Q_g	Total Gate Charge	V_{DS}=30V,I_D=20A , V_{GS}=10V		94		nC
Q_{gs}	Gate-Source Charge			17		nC
Q_{gd}	Gate-Drain Charge			13		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=10A			1.2	V
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		1.8		Ω
Drain-Source Diode Characteristics						
T_{rr}	Reverse Recovery Time	V_{GS}=10V,I_S=20A , di/dt=100A/μs		65		nS
Q_{rr}	Reverse Recovery Charge			82.3		nC

Note：

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=40V,V_{GS}=10V,L=0.5mH,IAS=92A., 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

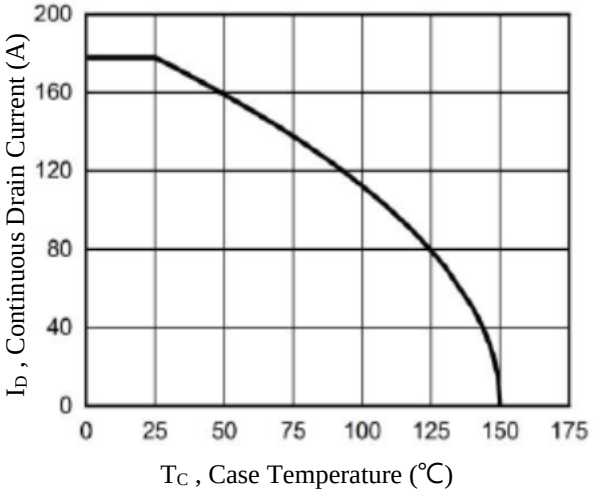

Fig.1 Continuous Drain Current vs. TC

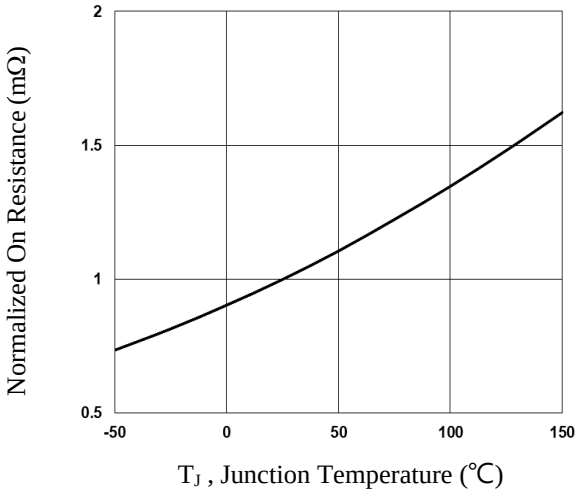

Fig.2 Normalized RDSON vs. TJ

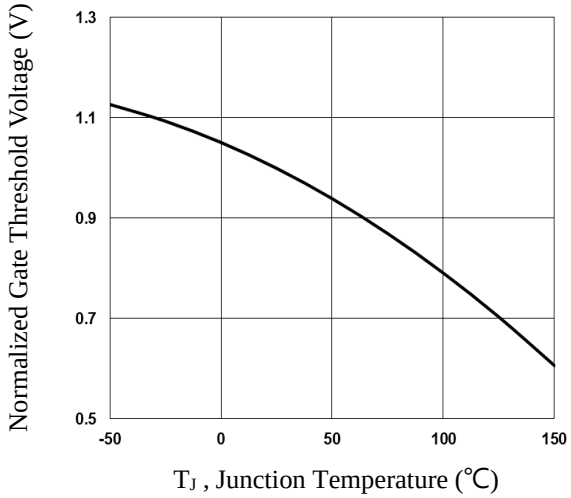

Fig.3 Normalized V_{th} vs. T_J

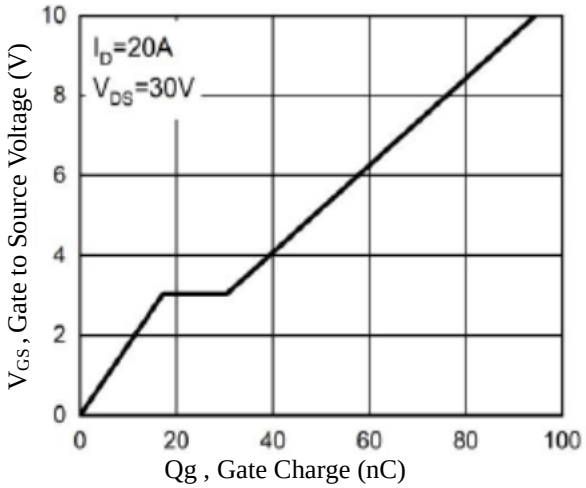

Fig.4 Gate Charge Characteristics

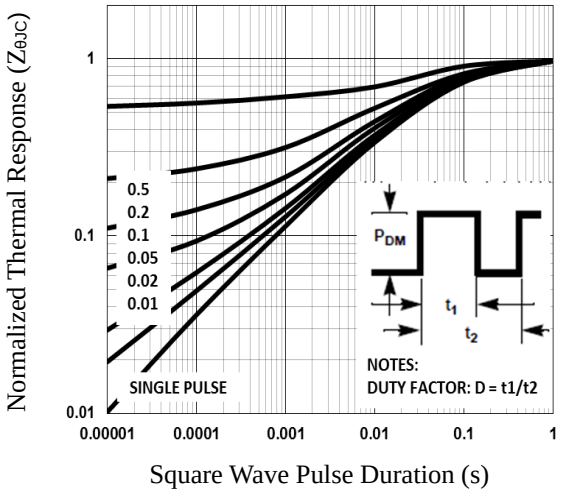

Fig.5 Normalized Transient Impedance

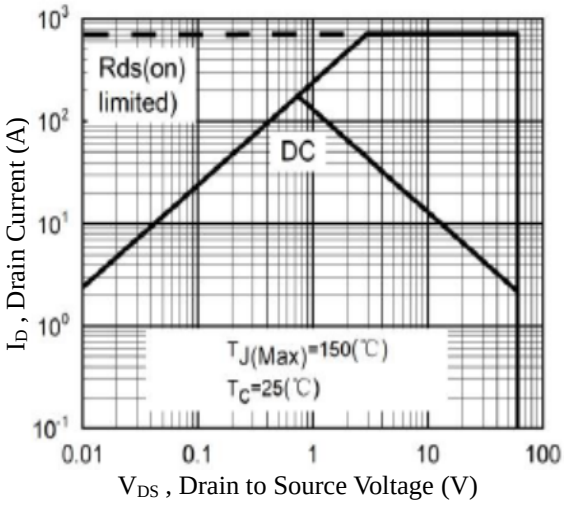

Fig.6 Maximum Safe Operation Area

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

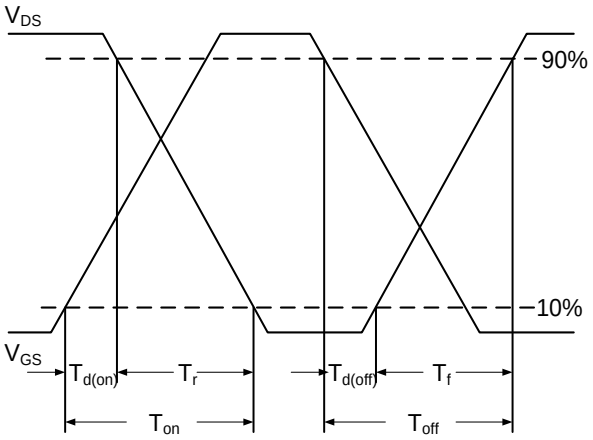

Fig.7 Switching Time Waveform

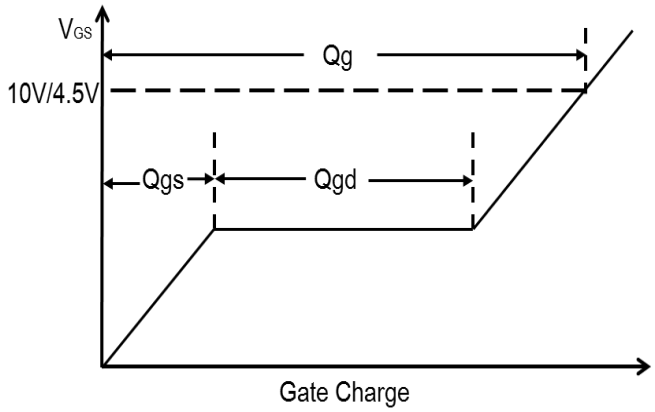

Fig.8 Gate Charge Waveform

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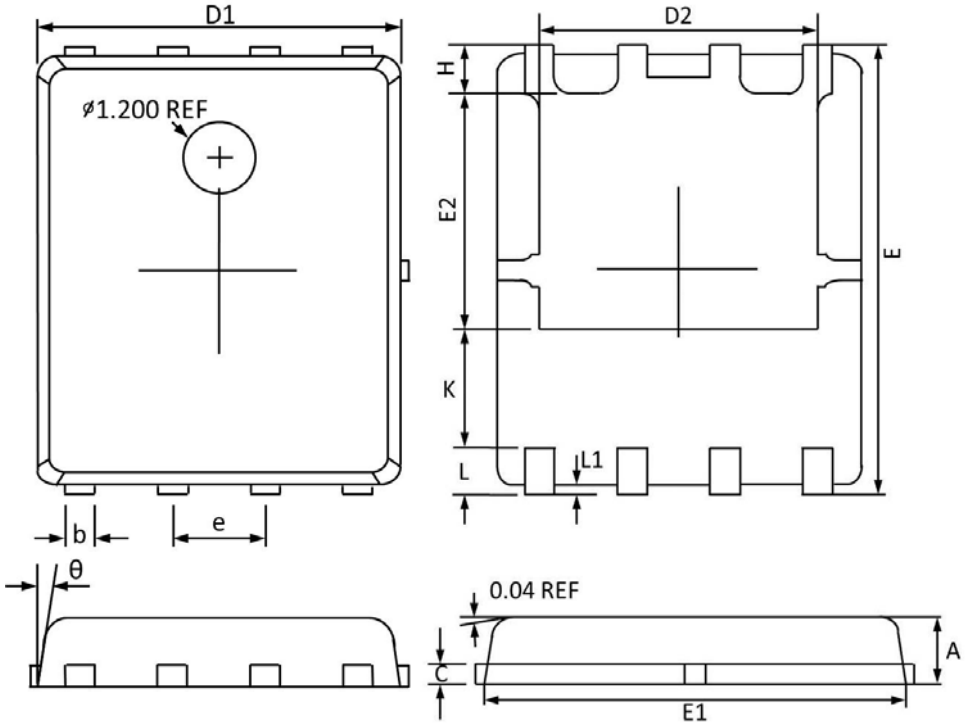

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.100	4.800	0.201	0.189
D2	4.100	3.610	0.161	0.142
E	6.200	5.900	0.244	0.232
E1	5.900	5.700	0.232	0.224
E2	3.780	3.350	0.149	0.132
e	1.27BSC		0.05BSC	
H	0.700	0.410	0.028	0.016
K	1.500	1.100	0.059	0.043
L	0.710	0.510	0.028	0.020
L1	0.200	0.060	0.008	0.002
θ	12°	0°	12°	0°