杭芯科技 HUTCHIP

HC3415

20V P-Channel MOSFET

General Description

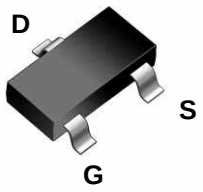
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

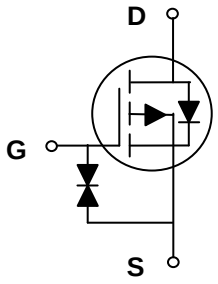
Features

V_{DS}	-20V
I_D (at V_{GS}=-4.5V)	-5A
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	28mΩ(Typ)

ESD protected

SOT23





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±10	V
Drain Current-Continuous	TC=25°C	I_D	-5.0	A
	TC=100°C	I_D	-3.2	A
Maximum Power Dissipation		P_D	1.1	W
Drain Current – Pulsed1		I_{DM}	-30	A
Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance junction-case	$R_{\theta Jc}$		80	℃ /W
Thermal Resistance junction-to-Ambient	$R_{\theta JA}$		120	℃ /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	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±10V,V_{DS}=0V			±10	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=-250μA	-0.4	-0.8	-1.2	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-4.5V, I_D=-4.0A		28	40	mΩ
		V_{GS}=-2.5V, I_D=-3.0A		46	70	mΩ
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{DS}=-10V,V_{GS}=0V, F=1.0MHz		540		pF
C_{oss}	Output Capacitance			120		pF
C_{rss}	Reverse Transfer Capacitance			100		pF
SWITCHING PARAMETERS						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-10V,I_D=-1A, V_{GS}=-4.5V, R_G=3Ω		5		nS
t_r	Turn-on Rise Time			47		nS
$t_{d(off)}$	Turn-Off Delay Time			52		nS
t_f	Turn-Off Fall Time			69		nS
Q_g	Total Gate Charge	V_{DS}=-10V,I_D=-4A, V_{GS}=-4.5V		13		nC
Q_{gs}	Gate-Source Charge			2.0		nC
Q_{gd}	Gate-Drain Charge			2.0		nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_{SD}=-1A		0.9	1.2	V

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

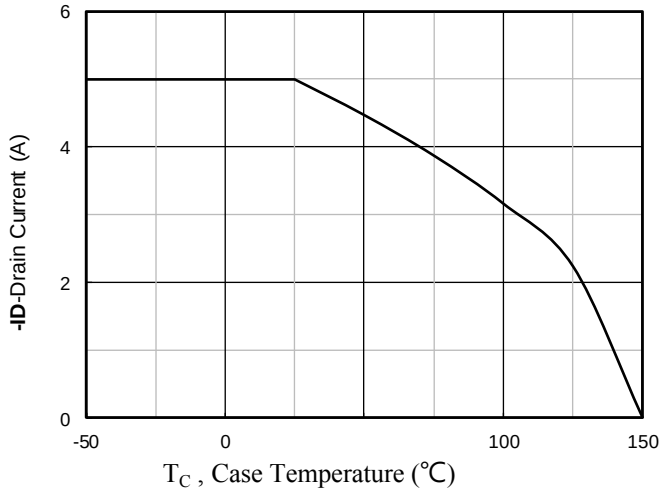


Fig.1 Typical Output Characteristics

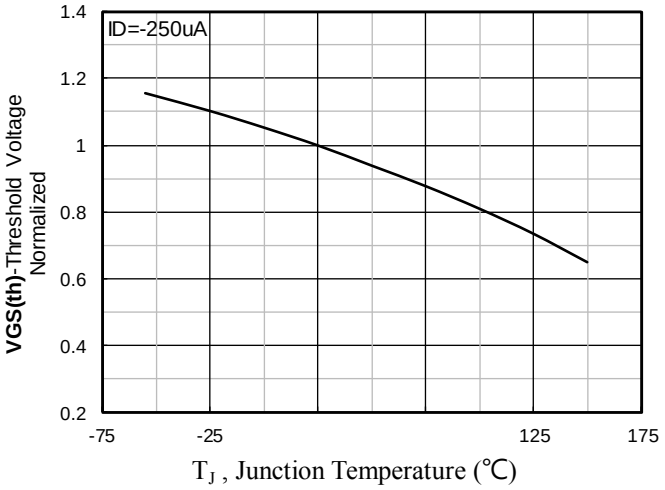


Fig.2 Normalized Vth vs. Junction Temperature

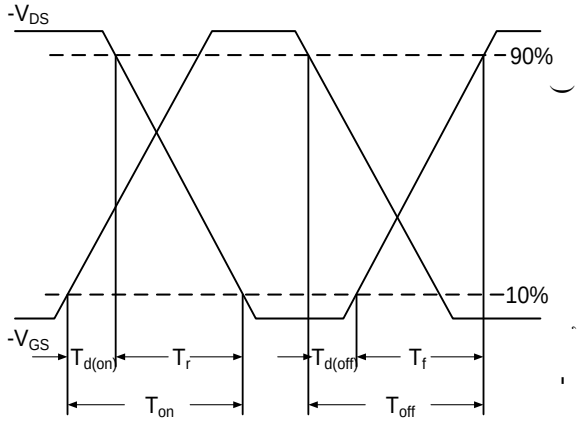


Fig.**3** Switching Time Waveform

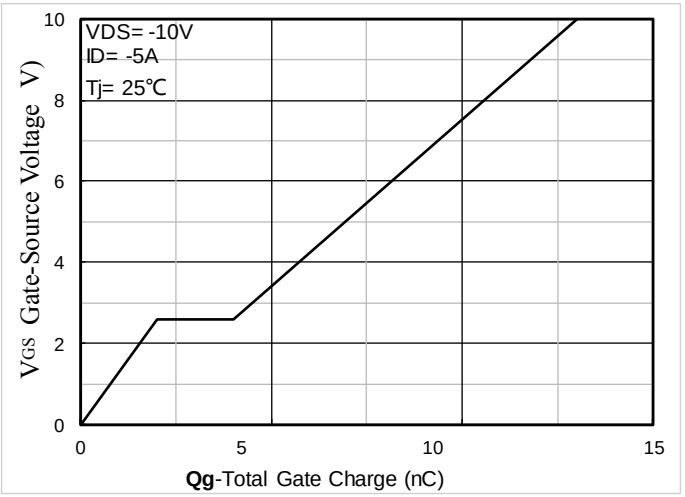


Fig.**4** Gate Charge Waveform

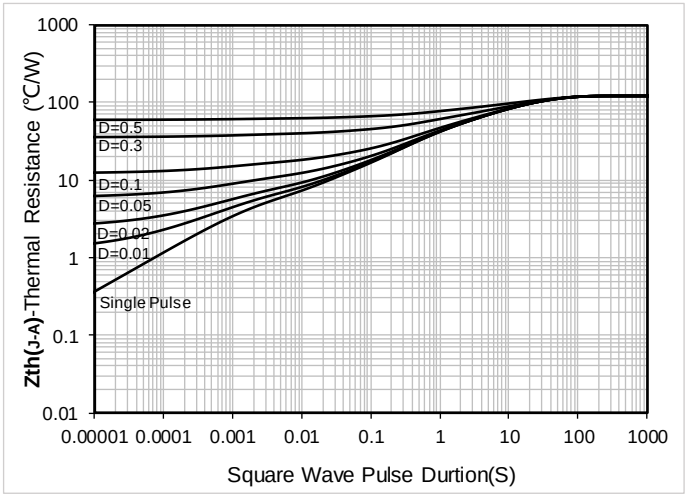


Figure 5. Maximum Transient Thermal Impedance

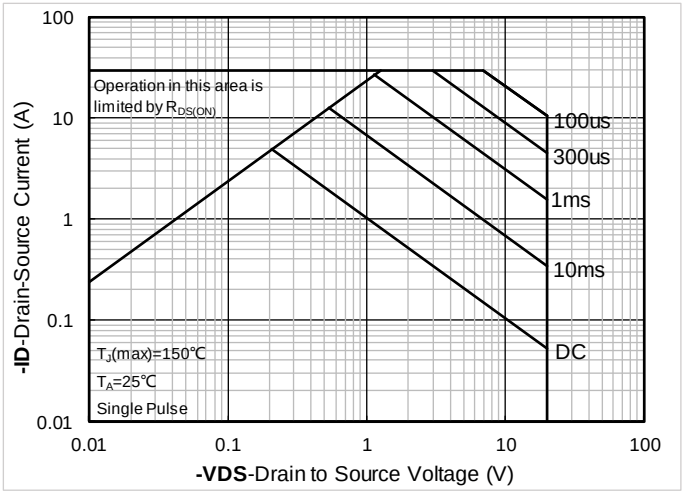
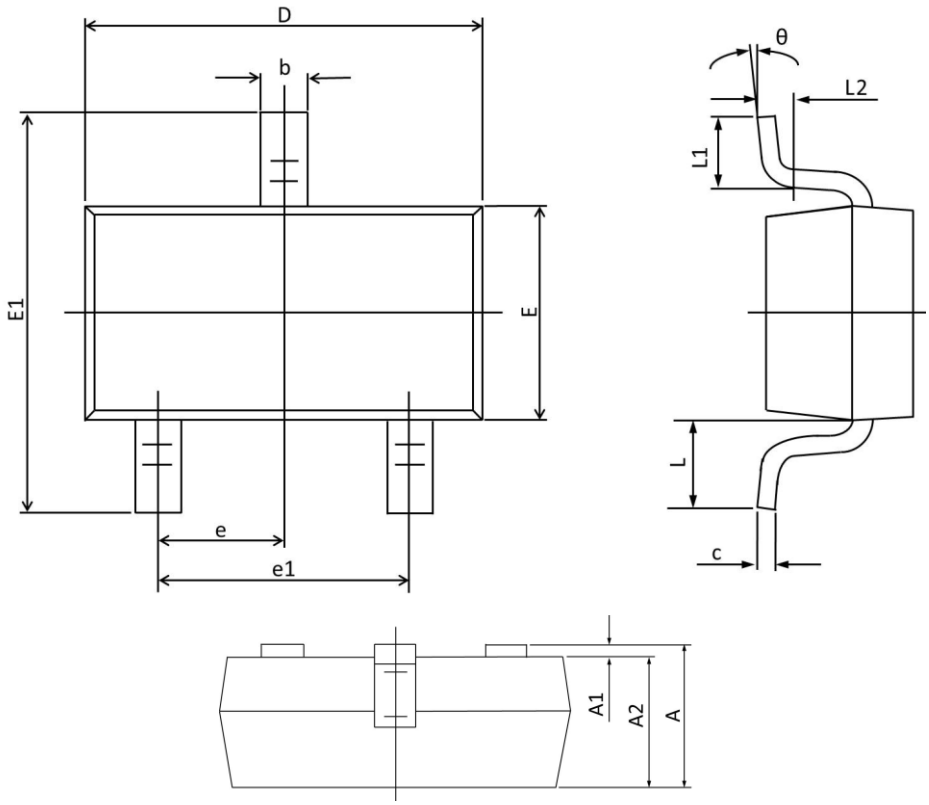


Figure 6. Safe Operation Area

SOT23 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Max	Min	Max	Min
A	1.150	0.900	0.045	0.035
A1	0.100	0.000	0.004	0.000
A2	1.050	0.900	0.041	0.035
b	0.500	0.300	0.020	0.012
c	0.150	0.080	0.006	0.003
D	3.000	2.800	0.118	0.110
E	1.400	1.200	0.055	0.047
E1	2.550	2.250	0.100	0.089
e	0.95 TYP.		0.037 TYP.	
e1	2.000	1.800	0.079	0.071
L	0.55 REF.		0.022 REF.	
L1	0.500	0.300	0.020	0.012
L2	0.25 TYP.		0.01 TYP.	
θ	8°	0°	8°	0°