

General Description

The HSP0139 uses advanced trench MOSFET technology to provide excellent $R_{DS(ON)}$ and gate charge for use in a wide variety of other applications.

The HSP0139 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

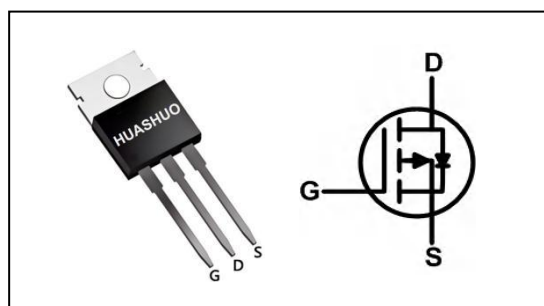
Features

- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench Technology

Product Summary

V_{DS}	-100	V
$R_{DS(ON),max}$	42	m Ω
I_D	-35	A

TO-220 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-35	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-23	A
I_{DM}	Pulsed Drain Current ²	-100	A
EAS	Single Pulse Avalanche Energy ³	345	mJ
I_{AS}	Avalanche Current	28	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	104	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.2	$^\circ C/W$

P-Ch 100V Fast Switching MOSFETs
Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-10A$	---	35	42	$m\Omega$
		$V_{GS}=-4.5V$, $I_D=-8A$	---	40	50	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.2	-1.8	-2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-100V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	-50	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-10V$, $I_D=-10A$	---	32	---	S
Q_g	Total Gate Charge	$V_{DS}=-80V$, $V_{GS}=-10V$, $I_D=-14A$	---	92	---	nC
Q_{gs}	Gate-Source Charge		---	17.5	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-50V$, $V_{GS}=-10V$, $R_G=3.3\Omega$, $I_D=-14A$	---	20.5	---	ns
T_r	Rise Time		---	32.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	123	---	
T_f	Fall Time		---	63.7	---	
C_{iss}	Input Capacitance	$V_{DS}=-25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	6516	---	pF
C_{oss}	Output Capacitance		---	223	---	
C_{rss}	Reverse Transfer Capacitance		---	125	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-35	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-14A$, $di/dt=-100A/\mu s$, $T_J=25^\circ\text{C}$	---	31.2	---	nS
Q_{rr}	Reverse Recovery Charge		---	31.97	---	nC

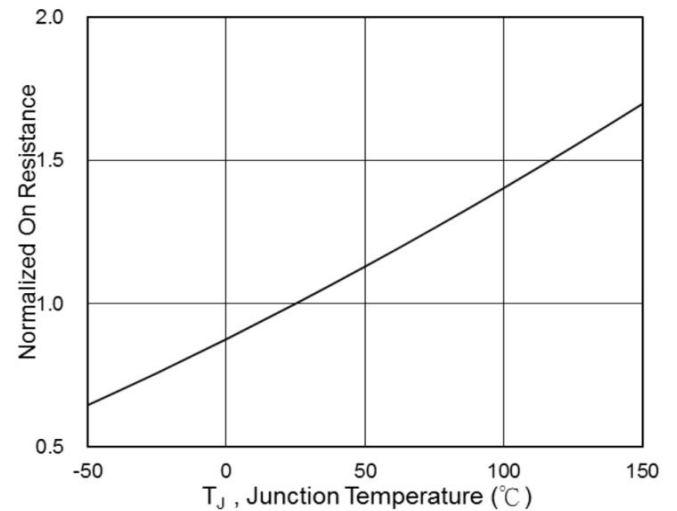
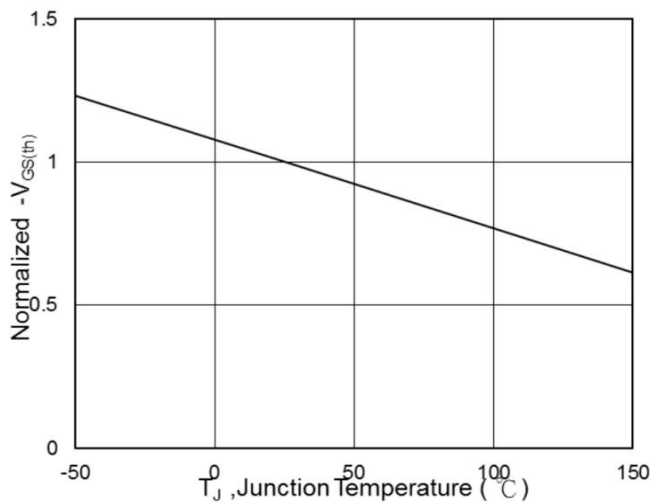
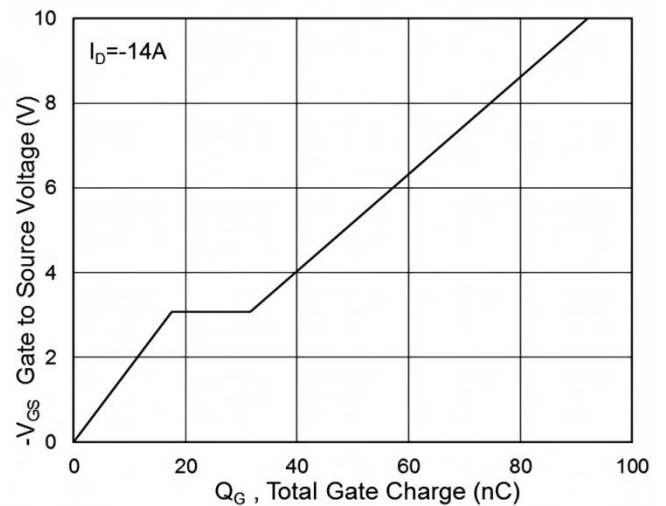
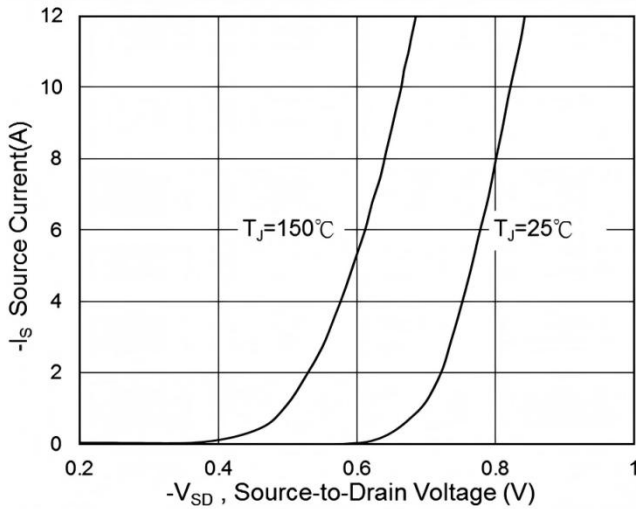
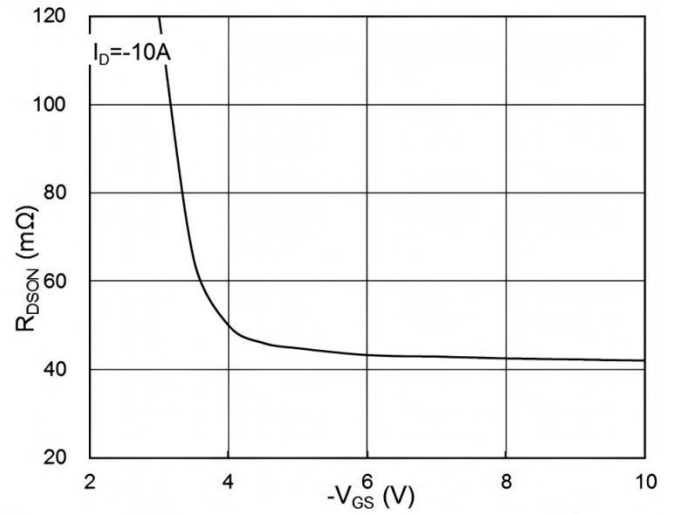
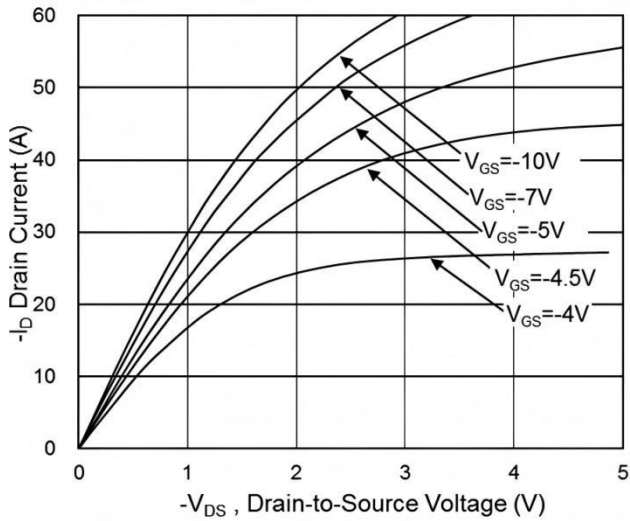
Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=-25V$, $V_{GS}=-10V$, $L=0.88mH$, $I_{AS}=-28A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Characteristics

P-Ch 100V Fast Switching MOSFETs





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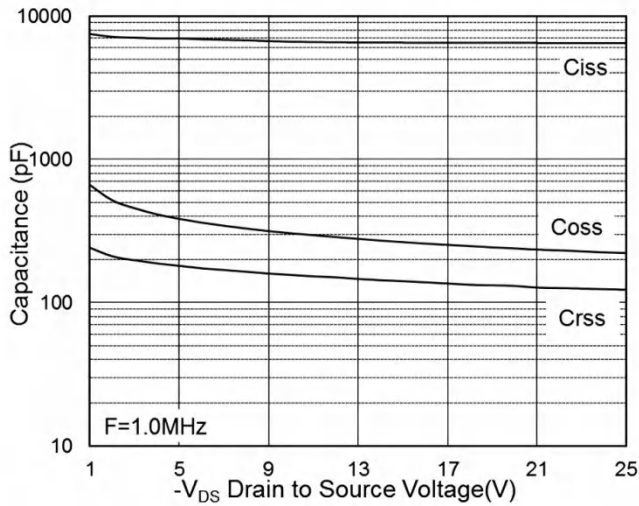


Fig.7 Capacitance

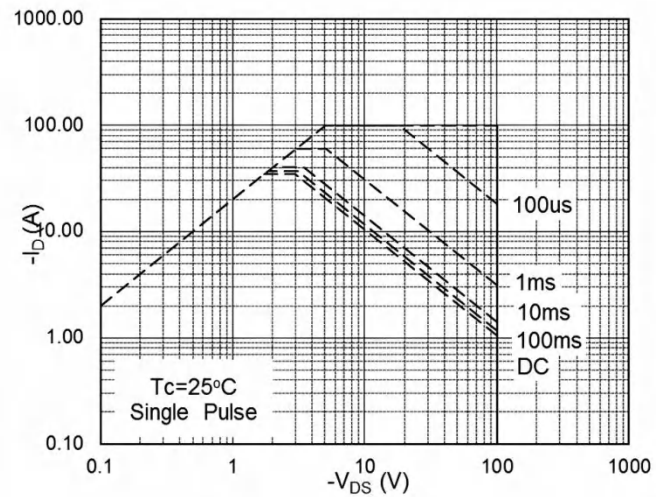


Fig.8 Safe Operating Area

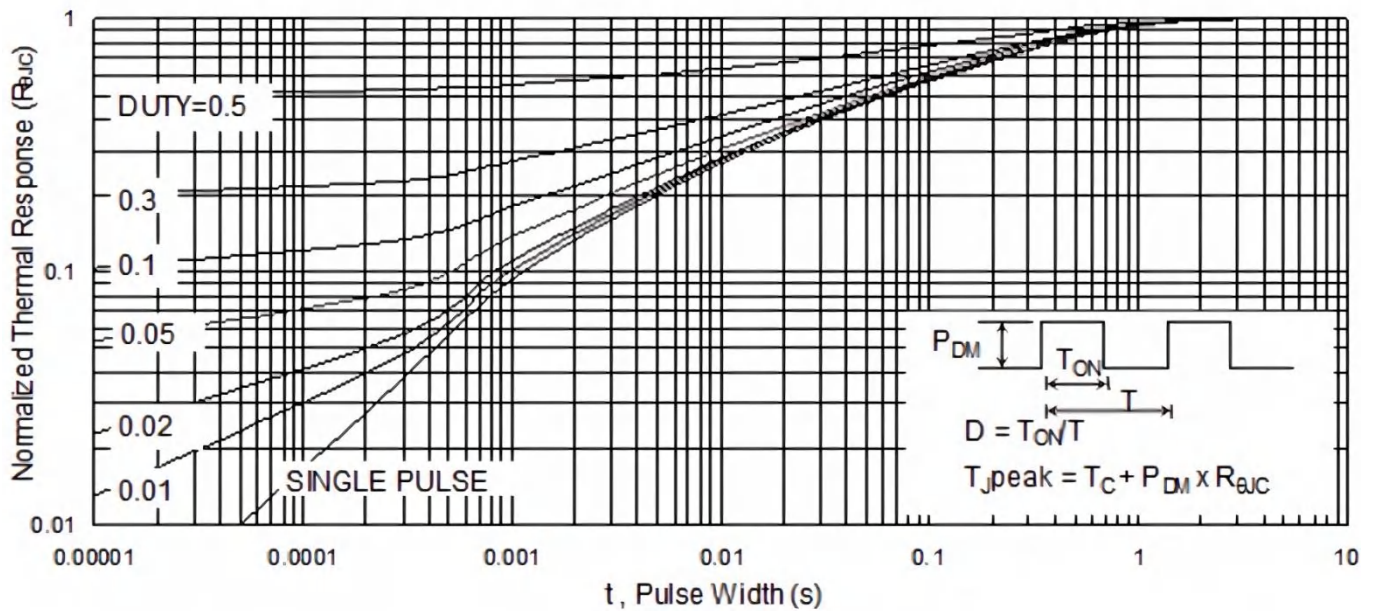


Fig.9 Normalized Maximum Transient Thermal Impedance

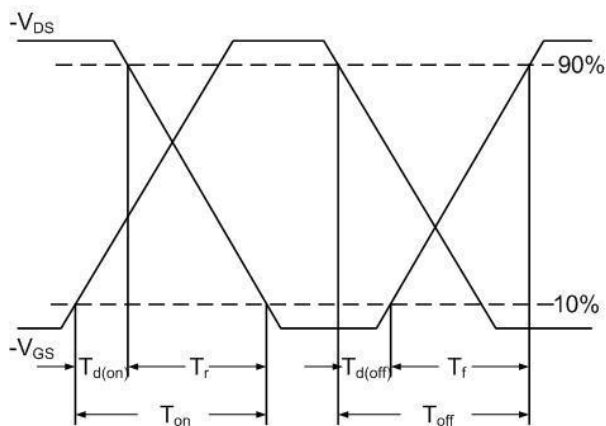


Fig.10 Switching Time Waveform

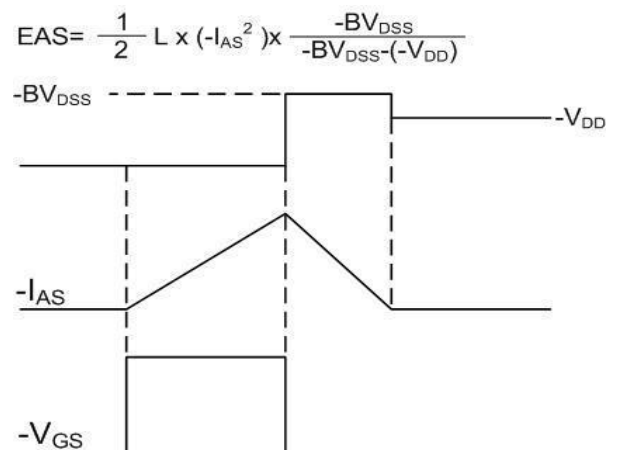
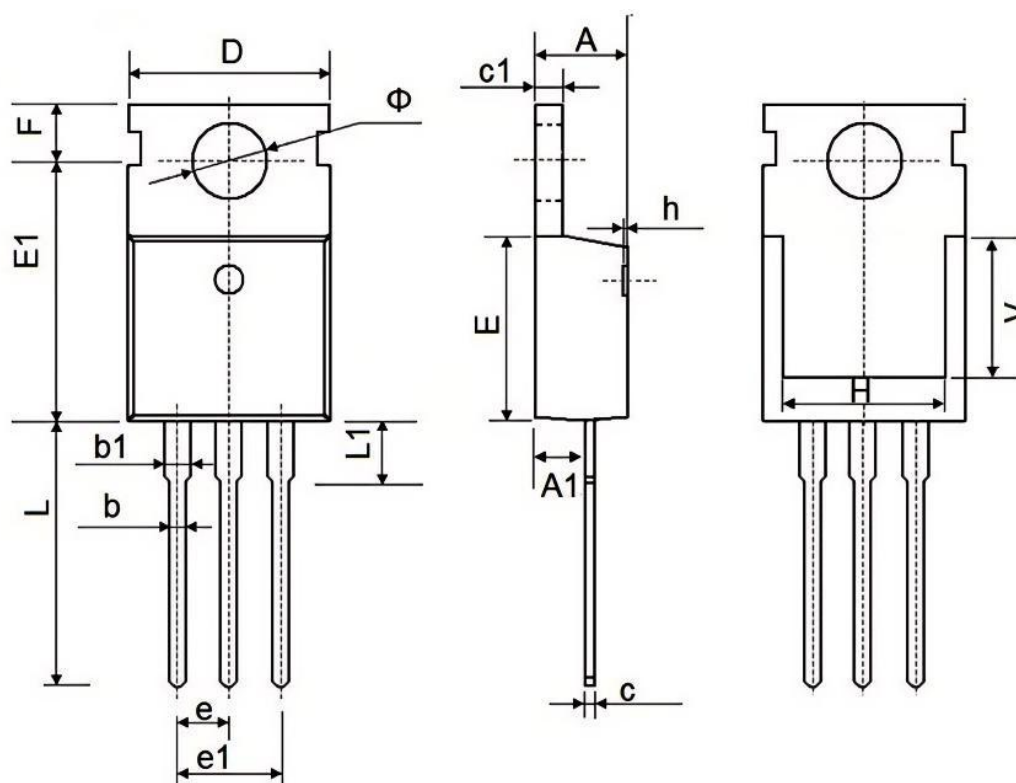


Fig.11 Unclamped Inductive Waveform

Ordering Information

Part Number	Package code	Packaging
HSP0139	TO-220	1000/Box

TO-220 Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	2.200	2.600	0.087	0.102
b	0.700	0.950	0.028	0.037
b1	1.170	1.410	0.046	0.056
C	0.450	0.650	0.018	0.026
c1	1.200	1.400	0.047	0.055
D	9.600	10.400	0.378	0.409
E	8.8500	9.750	0.348	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.750	14.300	0.502	0.563
L1	2.850	3.950	0.112	0.156
V	7.500 REF.		0.295 REF.	
Φ	3.400	4.000	0.134	0.157

HSP0139 Marking:

