

P-Ch 100V Fast Switching MOSFETs
Description

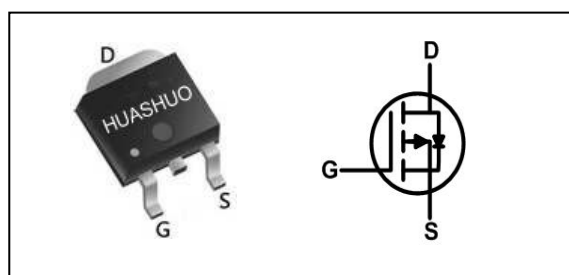
The HSU50P10 uses advanced trench MOSFET technology to provide excellent $R_{DS(ON)}$ and gate charge for use in a wide variety of other applications.

The HSU50P10 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- 100% EAS Guaranteed
- Green Device Available
- Portable equipment and battery powered systems
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

Product Summary

V_{DS}	-100	V
$R_{DS(ON),typ}$	24	m Ω
I_D	-50	A

TO-252 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V^1$	-50	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V^1$	-30	A
I_{DM}	Pulsed Drain Current ²	-150	A
EAS	Single Pulse Avalanche Energy ³	650	mJ
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	50	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	50	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.7	$^\circ\text{C/W}$

P-Ch 100V Fast Switching MOSFETs
Electrical Characteristics ($T_J=25\text{ }^{\circ}\text{C}$, 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	$V_{GS}=-10V$, $I_D=-20A$	---	24	30	$m\Omega$
		$V_{GS}=-4.5V$, $I_D=-20A$	---	25	35	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.0	-1.8	-2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-100V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{GS}=0V$, $V_{DS}=0V$, $f=1\text{MHz}$	---	2.7	---	Ω
g_{fs}	Forward Transconductance	$V_{DS}=-10V$, $I_D=-10A$	---	40	---	S
Q_g	Total Gate Charge	$V_{DS}=-50V$, $V_{GS}=-10V$, $I_D=-20A$	---	180	---	nC
Q_{gs}	Gate-Source Charge		---	24	---	
Q_{gd}	Gate-Drain Charge		---	41	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-50V$, $V_{GS}=-10V$, $R_G=4\Omega$, $I_D=-20A$	---	26	---	ns
T_r	Rise Time		---	33	---	
$T_{d(off)}$	Turn-Off Delay Time		---	278	---	
T_f	Fall Time		---	90	---	
C_{iss}	Input Capacitance	$V_{DS}=-50V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	11660	---	pF
C_{oss}	Output Capacitance		---	519	---	
C_{rss}	Reverse Transfer Capacitance		---	469	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-50	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-20A$, $T_J=25^{\circ}\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-20A$, $di/dt=-100A/\mu s$, $T_J=25^{\circ}\text{C}$	---	70	---	nS
Q_{rr}	Reverse Recovery Charge		---	145	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch²FR-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 $V_{DD}=-60V$, $V_{GS}=-10V$, $L=0.5mH$
- 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.

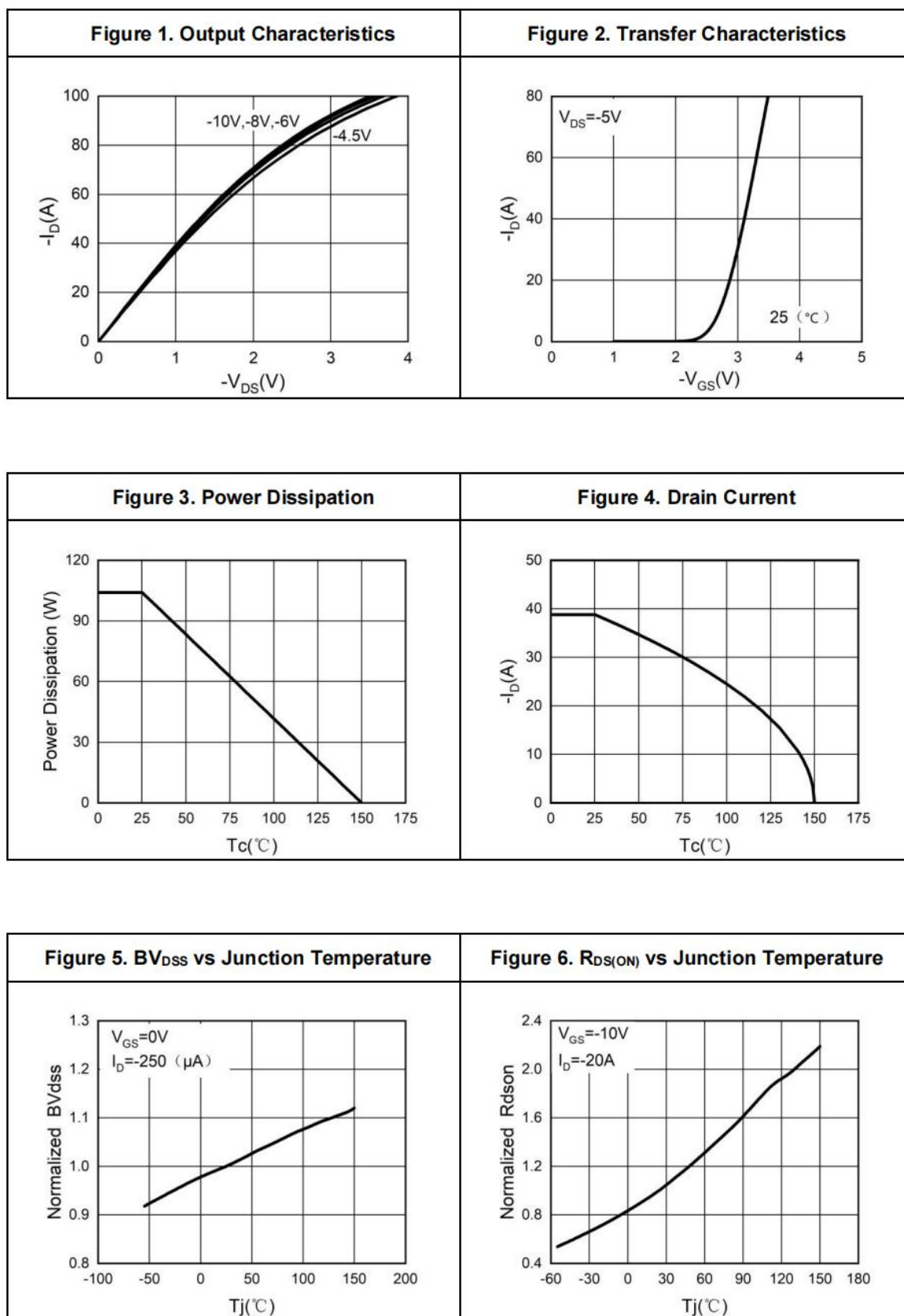
Typical Characteristics




Figure 7. Gate Charge Waveforms

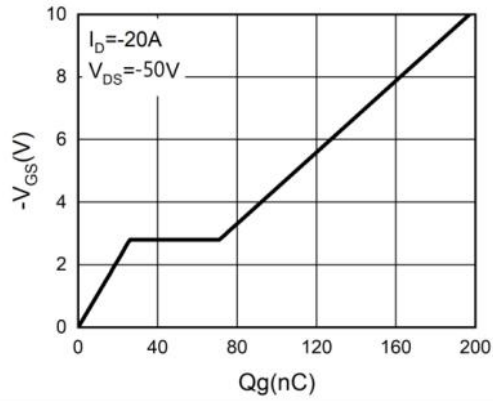


Figure 8. Capacitance

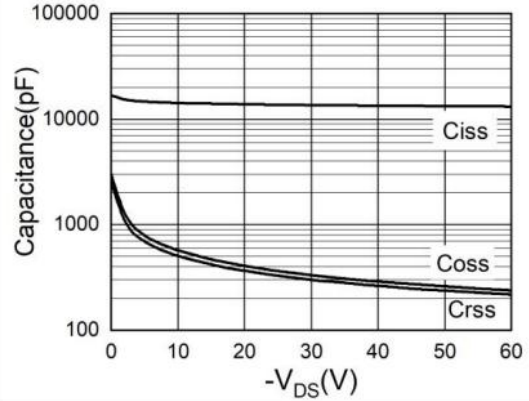


Figure 9. Body-Diode Characteristics

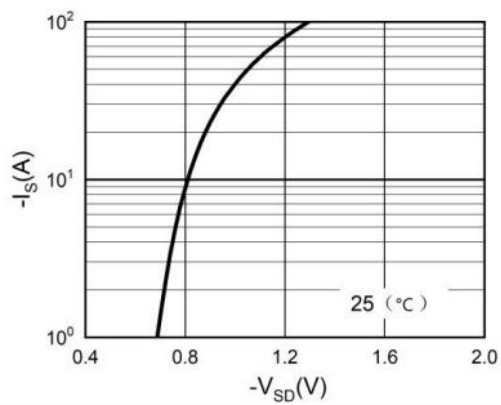
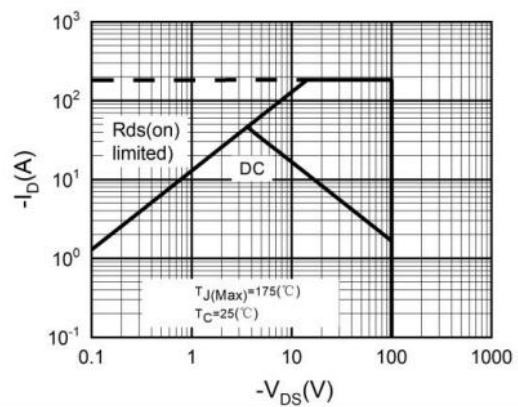
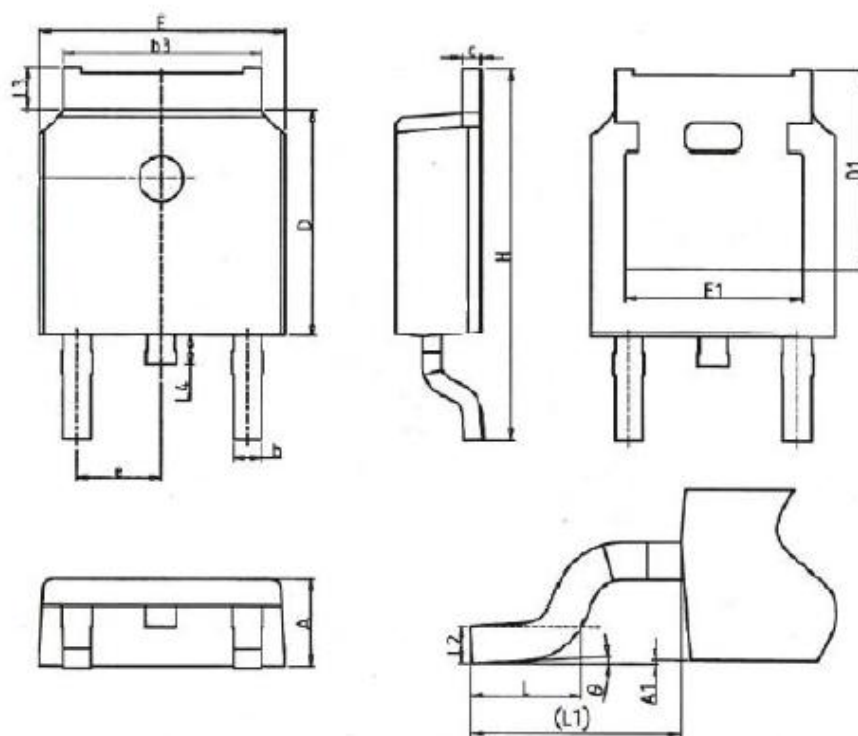


Figure 10. Maximum Safe Operating Area





TO252-2L Package Outline



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.18	2.40	0.086	0.095
A1	-	0.2	-	0.008
b	0.68	0.9	0.026	0.036
b3	4.95	5.46	0.194	0.215
c	0.43	0.89	0.017	0.035
D	5.97	6.22	0.235	0.245
D1	5.300REF		0.209REF	
E	6.35	6.73	0.250	0.265
E1	4.32	--	0.170	-
e	2.286BSC		0.09BSC	
H	9.4	10.5	0.370	0.413
L	1.38	1.78	0.054	0.070
L1	2.90REF		0.114REF	
L2	0.51BSC		0.020BSC	
L3	0.88	1.28	0.034	0.050
L4	0.5	1	0.019	0.039
Θ	0°	8°	0°	8°