

General Description

The HSU90P04 is the high cell density trench P-ch MOSFETs, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The HSU90P04 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

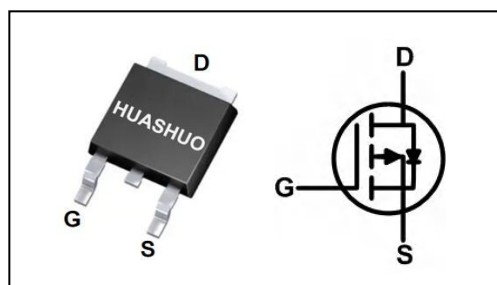
Features

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

Product Summary

V_{DS}	-40	V
$R_{DS(ON), Typ}$	5.2	m Ω
I_D	-90	A

TO252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current	-90	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current	-58	A
I_{DM}	Pulsed Drain Current ¹	-280	A
EAS	Single Pulse Avalanche Energy ²	368	mJ
$P_D @ T_C = 25^\circ C$	Total Power Dissipation	86	W
$P_D @ T_C = 100^\circ C$	Total Power Dissipation	38	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
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.3	$^\circ C/W$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-20A$	---	5.2	6.7	$m\Omega$
		$V_{GS}=-4.5V$, $I_D=-20A$	---	6.5	8.6	
$V_{GS(th)}$	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	$V_{DS}=-40V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-40V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$	---	---	-100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=-5V$, $I_D=-10A$	---	60	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	2.3	---	Ω
Q_g	Total Gate Charge	$V_{DS}=-20V$, $V_{GS}=-10V$, $I_D=-20A$	---	116	---	nC
Q_{gs}	Gate-Source Charge		---	16	---	
Q_{gd}	Gate-Drain Charge		---	24	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-20V$, $V_{GS}=-10V$, $R_G=3\Omega$, $R_L=1\Omega$	---	18	---	ns
T_r	Rise Time		---	15	---	
$T_{d(off)}$	Turn-Off Delay Time		---	73	---	
T_f	Fall Time		---	32	---	
C_{iss}	Input Capacitance	$V_{DS}=-20V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	6805	---	pF
C_{oss}	Output Capacitance		---	538	---	
C_{rss}	Reverse Transfer Capacitance		---	366	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-90	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	$I_F=20A$, $dI/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	25	---	ns
Q_{rr}	Reverse Recovery Charge		---	135	---	nC

Note :

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2.EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=-60V$, $V_G=10V$, $R_g=25\Omega$, $L=0.5\text{mH}$.

3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Characteristics

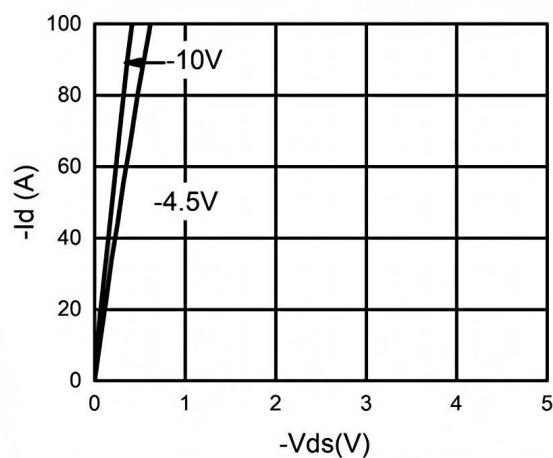


Figure 1. Output Characteristics

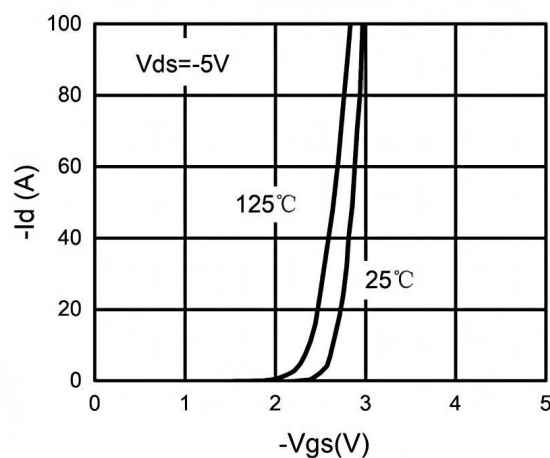


Figure 2. Transfer Characteristics

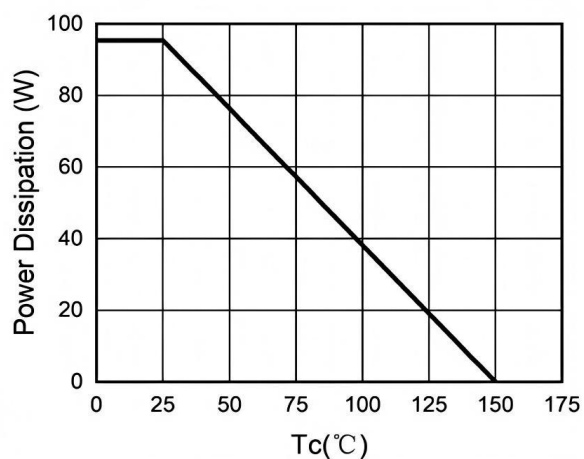


Figure 3. Power Dissipation

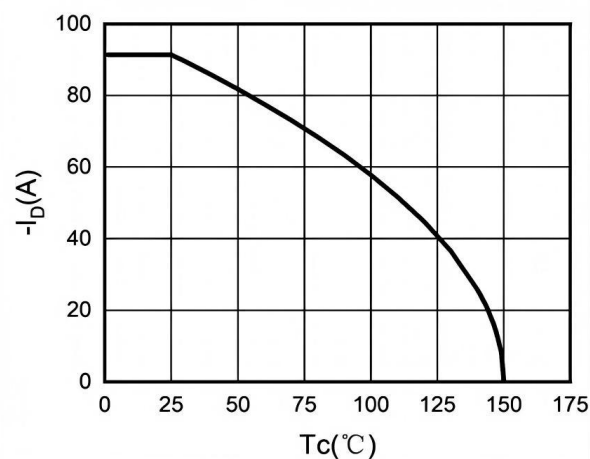


Figure 4. Drain Current

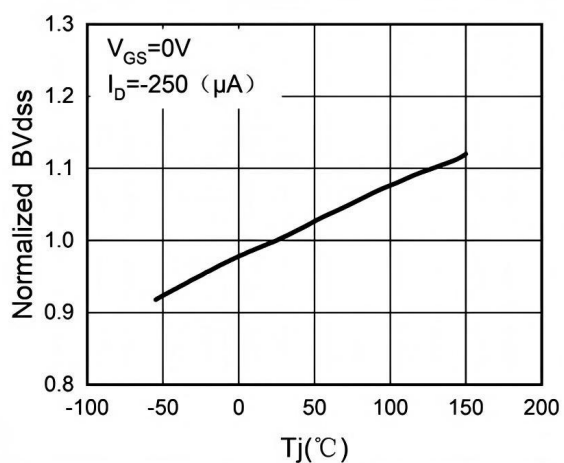


Figure 5. BVDSS vs Junction Temperature

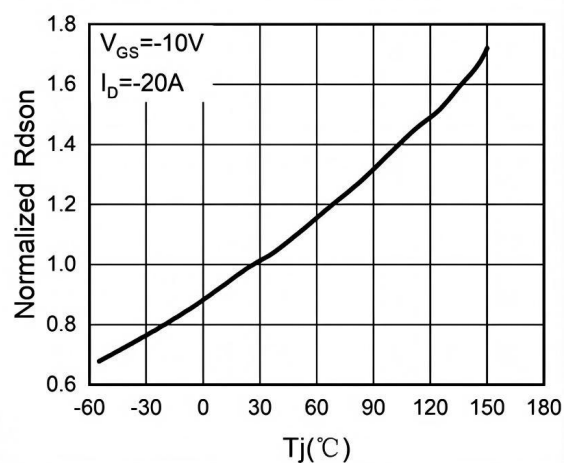


Figure 6. RDS(ON) vs Junction Temperature

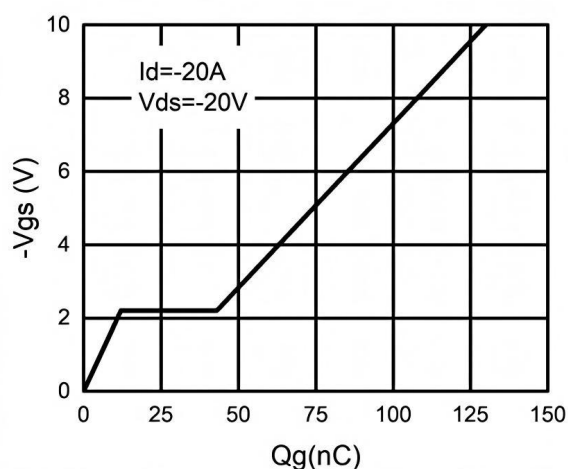


Figure 7. Gate Charge Waveforms

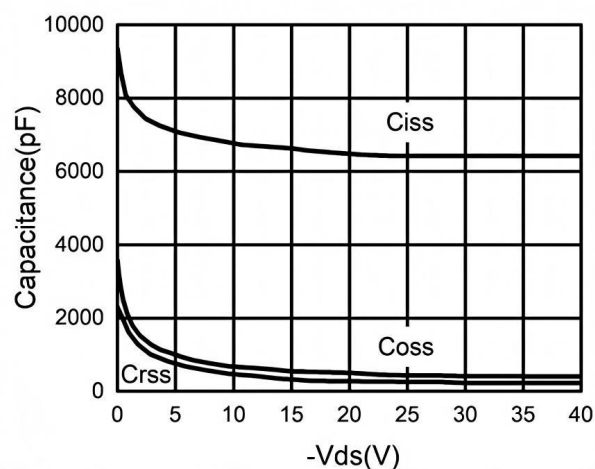


Figure 8. Capacitance

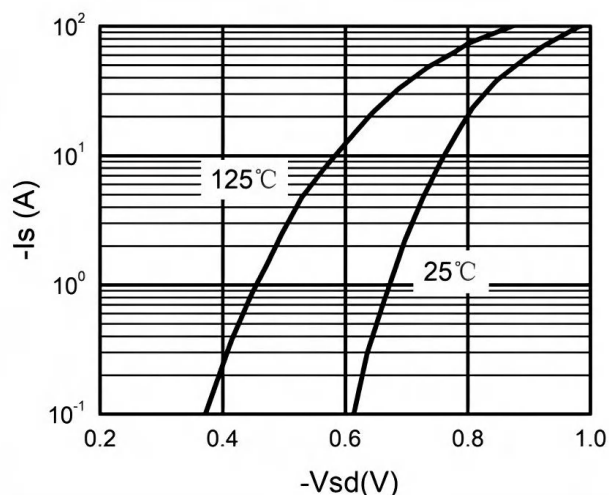


Figure 9. Body-Diode Characteristics

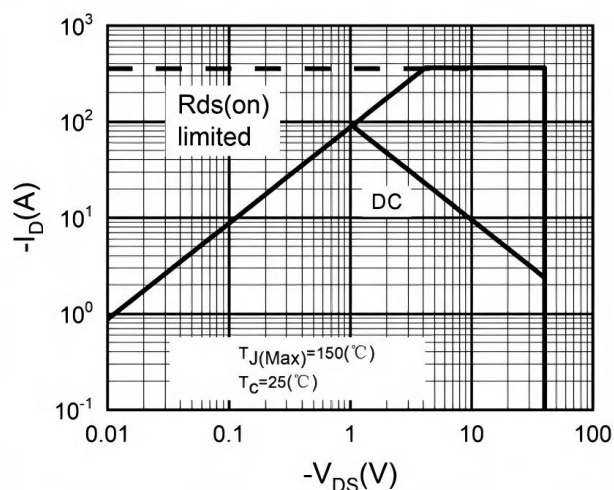
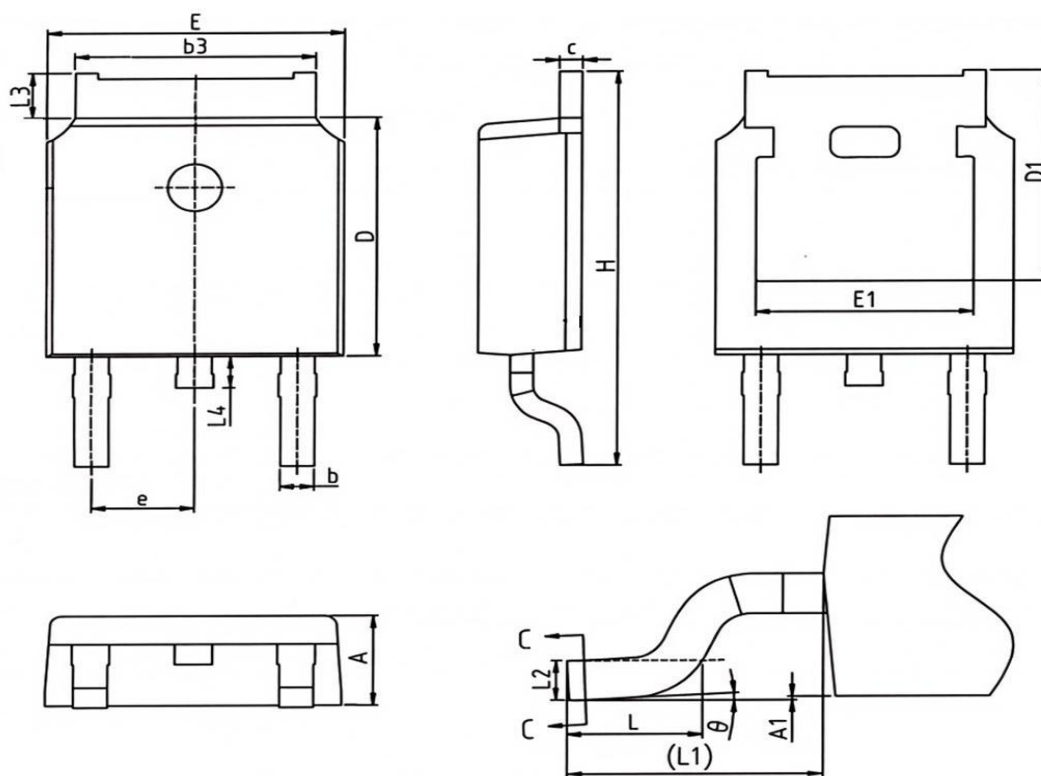


Figure 10. Maximum Safe Operating Area

Ordering Information

Part Number	Package code	Packaging
HSU90P04	TO252	2500/Tape&Reel

TO252 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°

HSU90P04 Marking:

