

General Description

- 100% UIS Tested
- Advance SGT Technology
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

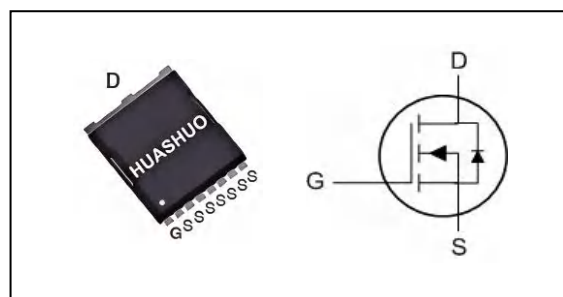
Product Summary

V_{DS}	40	V
$R_{DS(ON),TYP}$	0.85	m Ω
I_D	396	A

Applications

- SMPS Synchronous Rectification
- DC/DC Converters
- Motor Control
- ORING

TOLL Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	396	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	250	A
I_{DM}	Pulsed Drain Current	1582	A
EAS	Single Pulse Avalanche Energy	1370	mJ
I_{AS}	Avalanche Current	105	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation	272	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
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	0.46	$^\circ\text{C/W}$

Note :

1.Silicon limit.



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	$V_{GS}=0V$, $I_D=250\mu A$	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=30A$	---	0.85	1.0	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	2.0	3.0	4.0	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=40V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1.8	---	Ω
Q_g	Total Gate Charge	$V_{DS}=20V$, $V_{GS}=10V$, $I_D=20A$	---	140	---	nC
Q_{gs}	Gate-Source Charge		---	38	---	
Q_{gd}	Gate-Drain Charge		---	29	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=20V$, $V_{GS}=10V$, $R_G=1.6\Omega$,	---	30	---	ns
T_r	Rise Time		---	66	---	
$T_{d(off)}$	Turn-Off Delay Time		---	71	---	
T_f	Fall Time		---	43	---	
C_{iss}	Input Capacitance	$V_{DS}=20V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	8805	---	pF
C_{oss}	Output Capacitance		---	3406	---	
C_{rss}	Reverse Transfer Capacitance		---	110	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=20A$, $T_J=25^{\circ}\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=20A$, $dI/dt=100A/\mu s$,	---	65	---	ns
Q_{rr}	Reverse Recovery Charge	$T_J=25^{\circ}\text{C}$	---	117	---	nC

Typical Characteristics

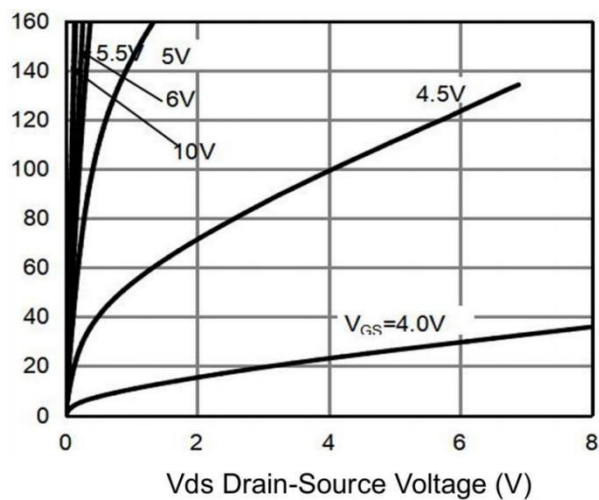


Fig.1 Typical Output Characteristics

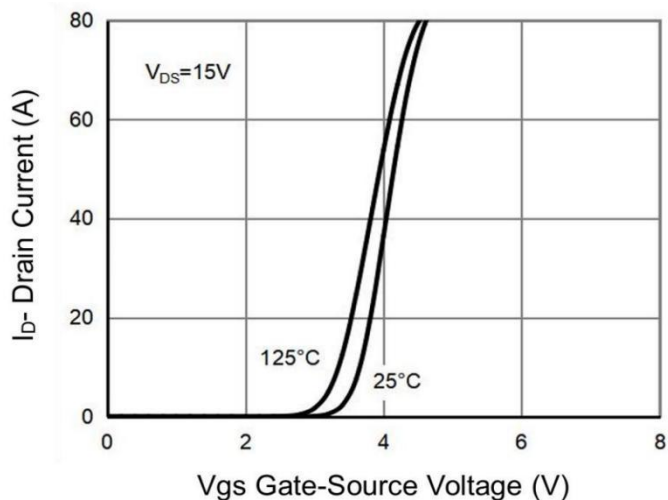


Fig.2 Transfer Characteristics

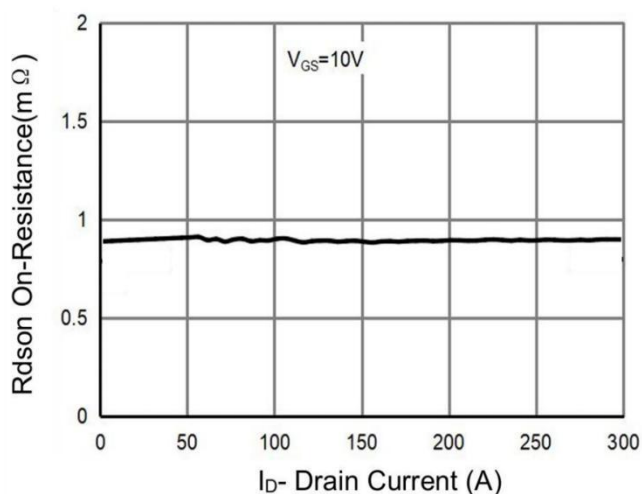


Fig.3 Rdson - Drain Current

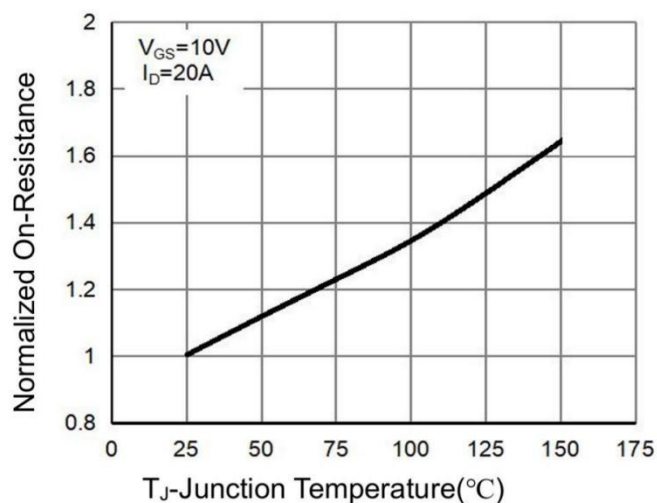


Fig.4. Rdson - Junction Temperature

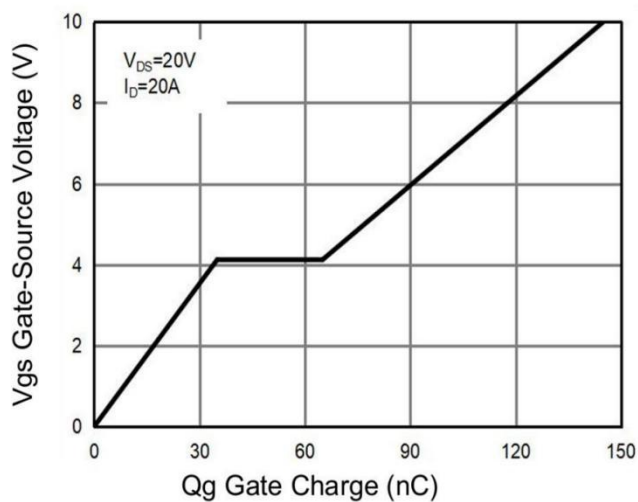


Fig.5 Gate Charge

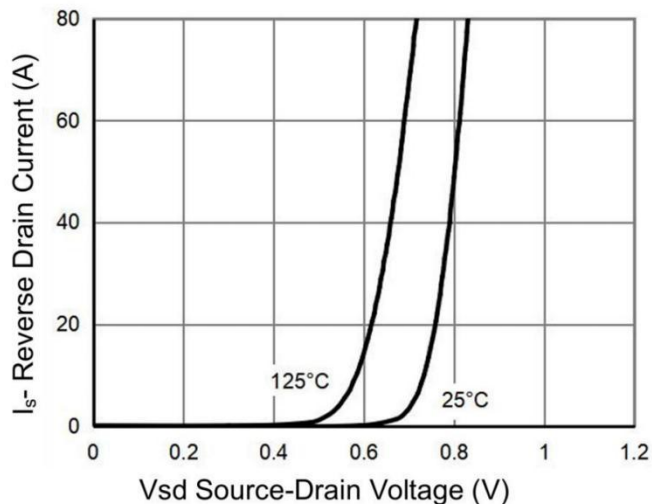


Fig.6 Source-Drain Diode Forward



N-Ch 40V Fast Switching MOSFETs

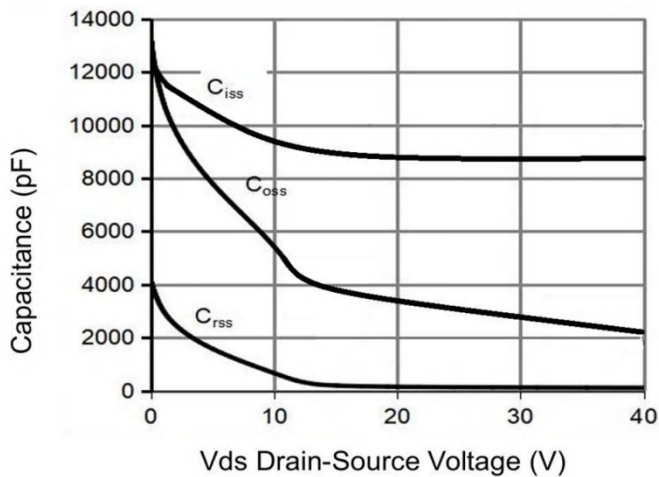


Fig.7 Capacitance vs V_{DS}

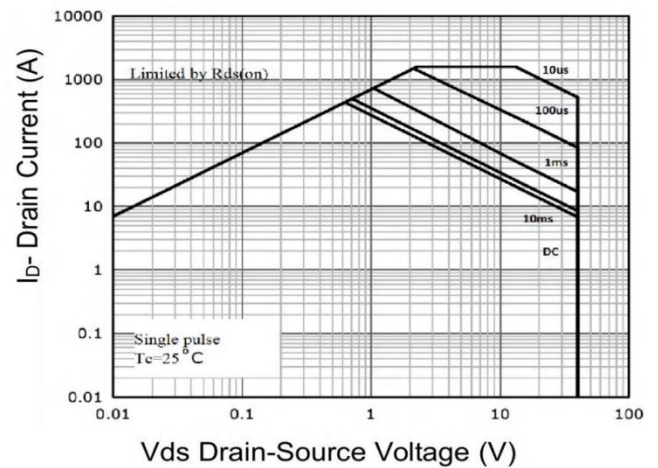


Fig.8 Safe Operating Area

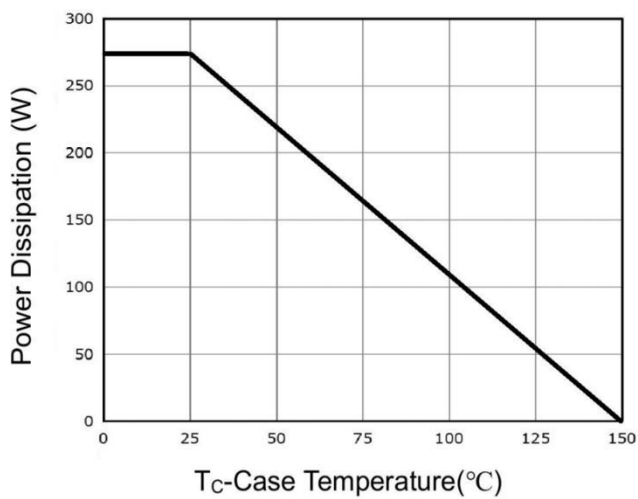


Fig.9 Power De-Rating

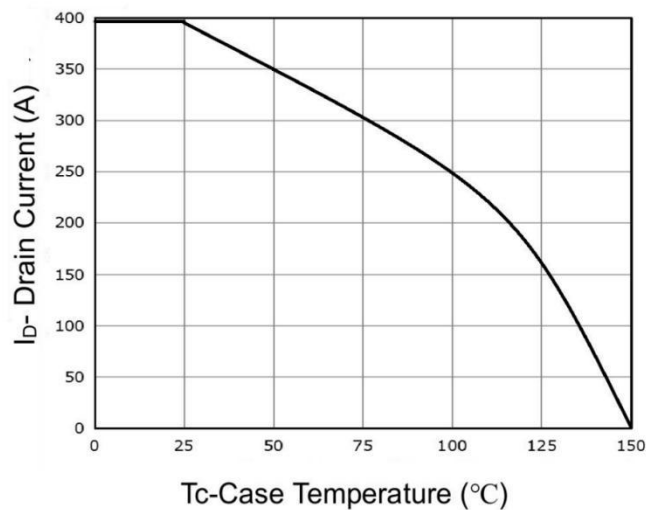


Fig.10 Current De-Rating

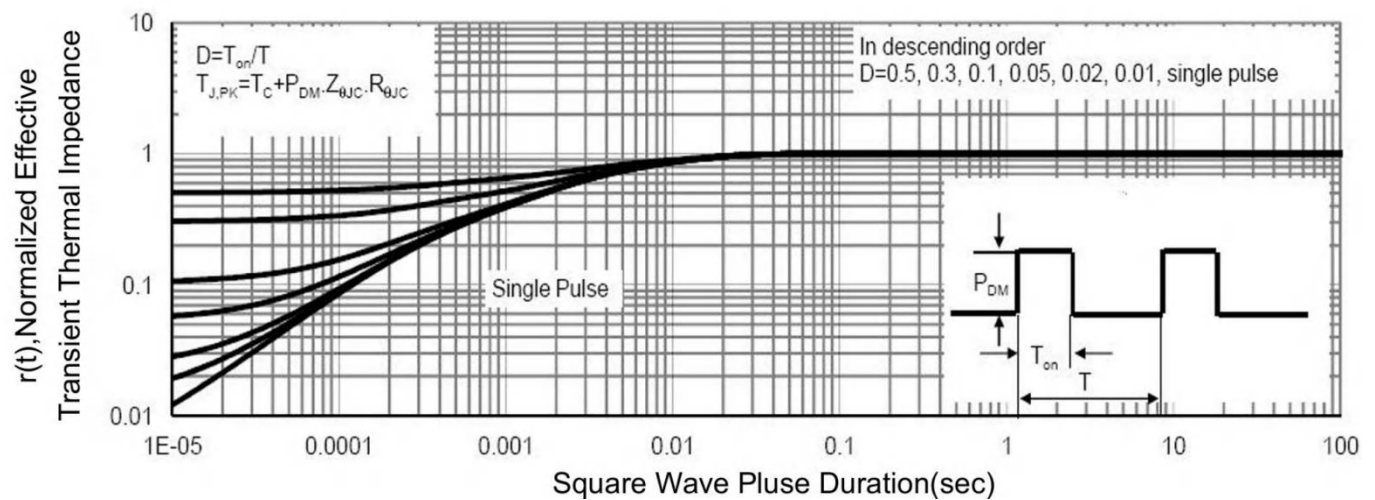


Fig.11 Normalized Maximum Transient Thermal Impedance

N-Ch 40V Fast Switching MOSFETs

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

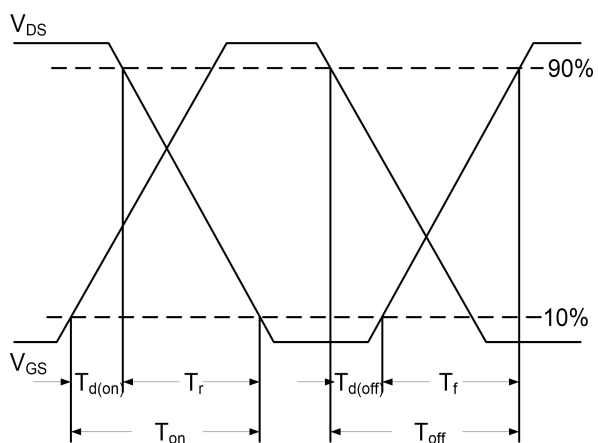


Fig.12 Switching Time Waveform

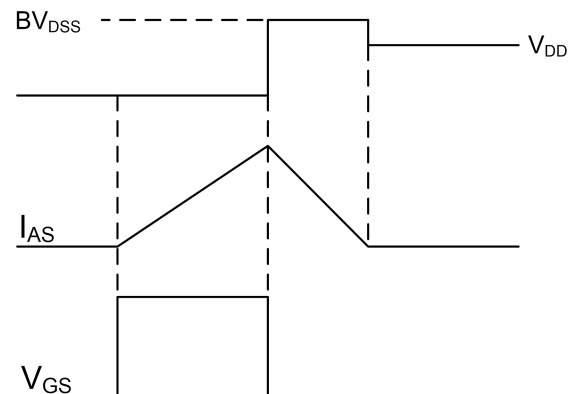


Fig.13 Unclamped Inductive Switching Waveform

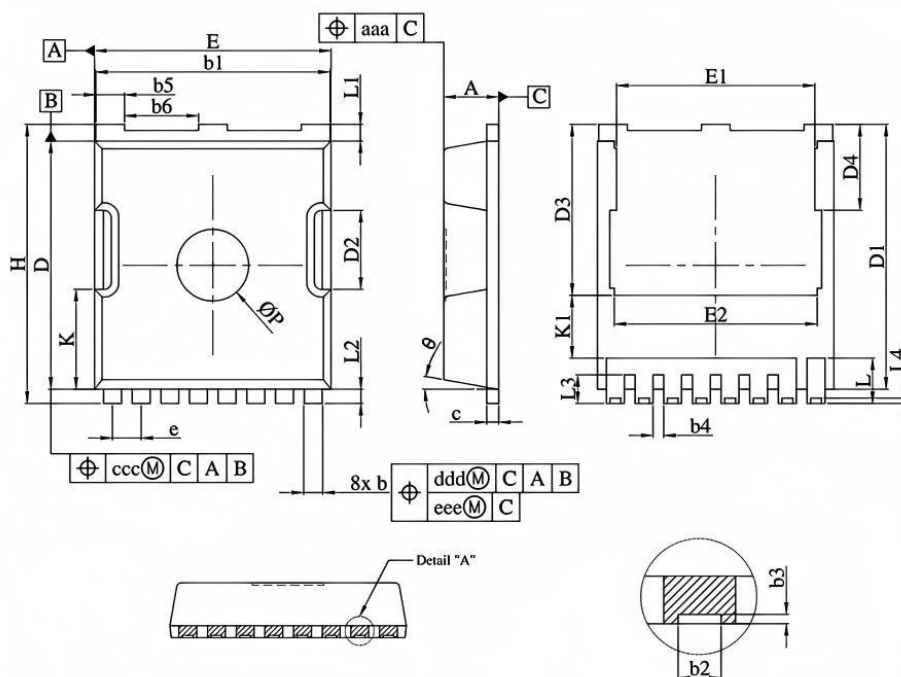
Ordering Information

Part Number
HSY010N04

Package code
TOLL

Packaging
2000/Tape&Reel

TOLL Package Outline



COMMON DIMENSIONS(MM)							
SYMBOL	MIN.	NOMINAL	MAX.	SYMBOL	MIN.	NOMINAL	MAX.
A	2.20	2.30	2.40	E1	8.20	8.30	8.40
b	0.70	0.80	0.90	E2	8.35	8.50	8.65
bI	9.70	9.80	9.90	H	11.50	11.68	11.85
b2	0.36	0.45	0.55	K	4.08	4.18	4.28
b3	0.05	0.100	0.35	K1	2.45	---	---
b4	0.30	0.40	0.50	L	1.60	1.90	2.10
b5	1.10	1.20	1.30	L1	0.50	0.70	0.90
b6	3.00	3.10	3.20	L2	0.50	0.60	0.70
C	0.40	0.50	0.60	L3	1.00	1.20	1.30
D	10.28	10.38	10.55	L4	0.13	0.23	0.33
D1	10.98	11.08	11.18	P	2.85	3.00	3.15
D2	3.20	3.30	3.40	θ	10°REF		
D3	7.00	7.15	7.30	aaa	0.20		
D4	3.44	3.59	3.74	ccC	0.20		
e	1.10	1.20	1.30	ddd	0.25		
E	9.80	9.90	10.00	eee	0.20		

HSY010N04A Marking:

