SamHop Microelectronics Corp.

STU/D616S

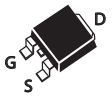
Ver1.1

N-Channel Logic Level Enhancement Mode Field Effect Transistor

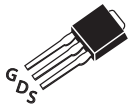
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Typ
60V	16A	64 @ VGS=10V
		81 @ VGS=4.5V

FEATURES

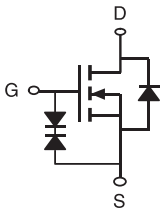
- Super high dense cell design for low $R_{DS(ON)}$.
- Rugged and reliable.
- Suface Mount Package.
- ESD Protected.



STU SERIES
TO-252AA(D-PAK)



STD SERIES
TO-251(I-PAK)



ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Symbol	Parameter		Limit	Units
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current-Continuous [a]	T_A=25°C	16	A
I_{DM}	-Pulsed [b]		46.8	A
I_{AS}	Avalanche Current [c]		9	A
E_{AS}	Avalanche Energy [c]		20.25	mJ
P_D	Maximum Power Dissipation [a]	T_A=25°C	60	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55 to 175	°C

THERMAL CHARACTERISTICS

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	50	°C/W

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ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	60			V
BV_{DSS}	Drain-Source Breakdown Voltage [e]	V_{GS}=0V , I_D=10mA	65			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=48V , V_{GS}=0V			1	A
I_{GSS}	Gate-Body leakage current	V_{GS}= ±20V , V_{DS}=0V			±10	uA
ON CHARACTERISTICS [a]						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	1	1.8	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=8A		64	77	m ohm
		V_{GS}=4.5V , I_D=6A		81	99	m ohm
g_{FS}	Forward Transconductance	V_{DS}=5V , I_D=8A		13.5		S
DYNAMIC CHARACTERISTICS [b]						
C_{ISS}	Input Capacitance	V_{DS}=20V,V_{GS}=0V f=1.0MHz		780		pF
C_{OSS}	Output Capacitance			58.5		pF
C_{RSS}	Reverse Transfer Capacitance			46.5		pF
SWITCHING CHARACTERISTICS [b]						
$t_{D(ON)}$	Turn-On DelayTime	V_{DD}=30V I_D=1A V_{GS}=10V R_{GEN}= 6 ohm		14		ns
t_r	Rise Time			13		ns
$t_{D(OFF)}$	Turn-Off DelayTime			38		ns
t_f	Fall Time			9.4		ns
Q_g	Total Gate Charge	V_{DS}=30V,I_D=8A,V_{GS}=10V		13.5		nC
		V_{DS}=30V,I_D=8A,V_{GS}=4.5V		6.7		nC
Q_{gs}	Gate-Source Charge	V_{DS}=30V,I_D=8A, V_{GS}=10V		1.88		nC
Q_{gd}	Gate-Drain Charge			3.71		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain-Source Diode Forward Current				1.5	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=1.5A		0.8	1.3	V

Notes

a.Pulse Test:Pulse Width ≤ 300us, Duty Ctcle ≤ 2%.
b.Guaranteed by design, not subject to production testing.
c.Starting T_J=25°C,L=0.5mH,R_G=25Ω,I_{AS}=9A,V_{DD} ≤ $V_{(BR)DSS}$.(See Figure13)
e.Pulse Test : Pulse Width < 1us,Duty Cycle < 1%.

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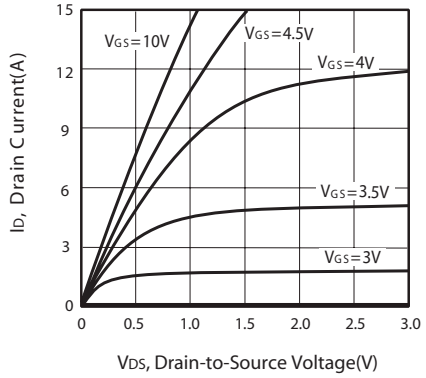

Figure 1. Output Characteristics

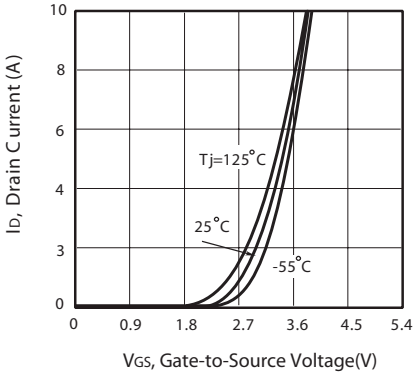

Figure 2. Transfer Characteristics

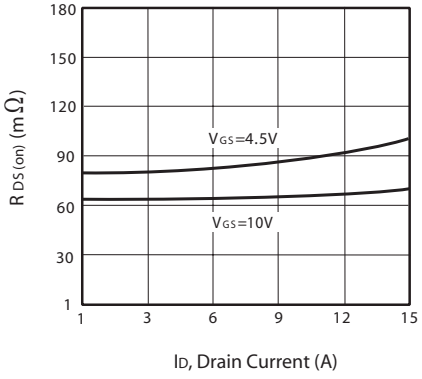

Figure 3. On-Resistance vs. Drain Current and Gate Voltage

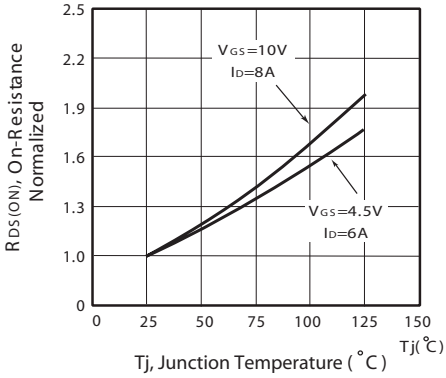

Figure 4. On-Resistance Variation with Drain Current and Temperature

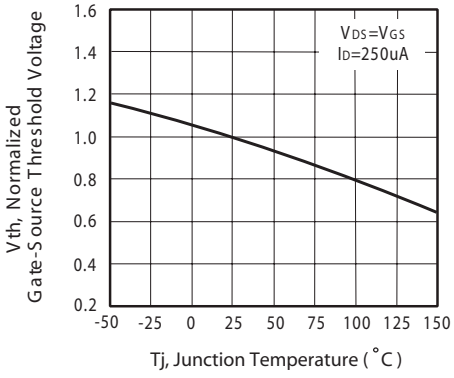

Figure 5. Gate Threshold Variation with Temperature

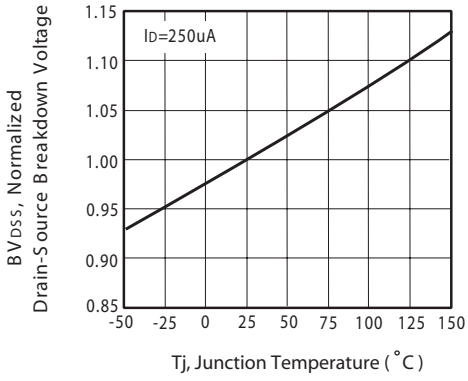

Figure 6. Breakdown Voltage Variation with Temperature

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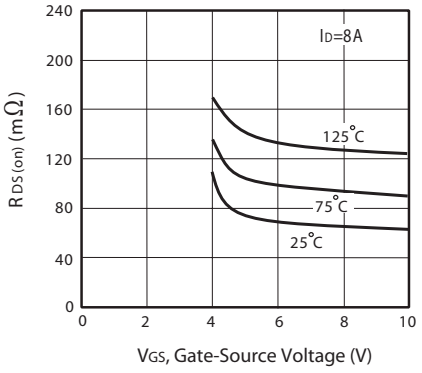

Figure 7. On-Resistance vs. Gate-Source Voltage

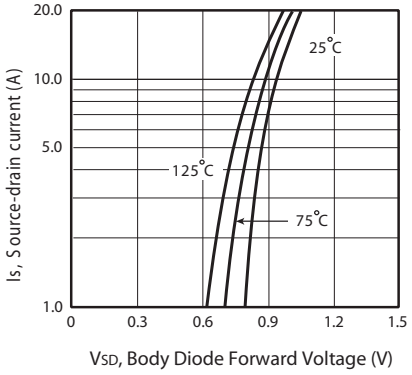

Figure 8. Body Diode Forward Voltage Variation with Source Current

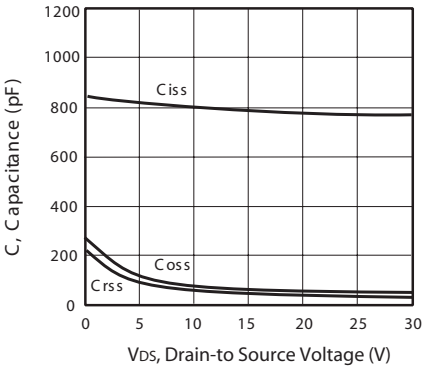

Figure 9. Capacitance

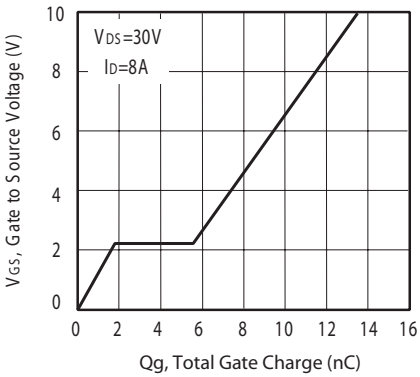

Figure 10. Gate Charge

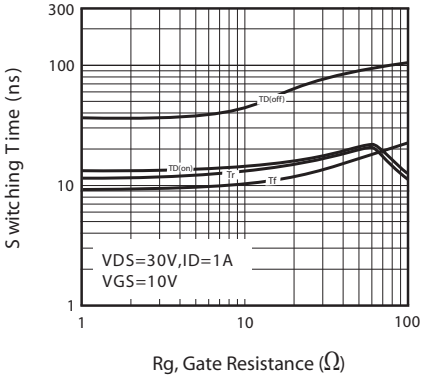

Figure 11. Switching Characteristics

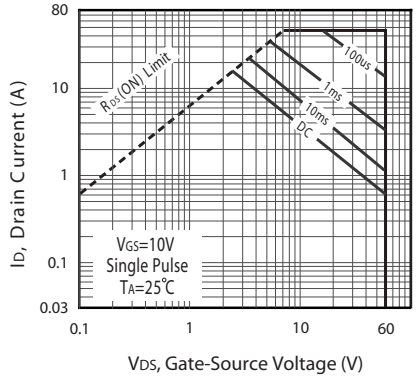

Figure 12. Maximum Safe Operating Area

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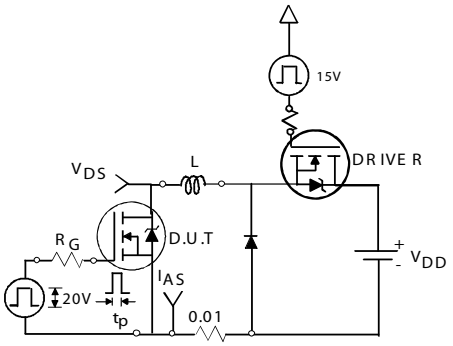
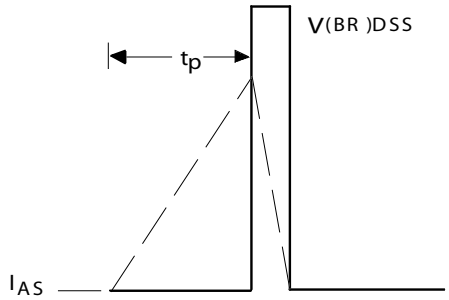


Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

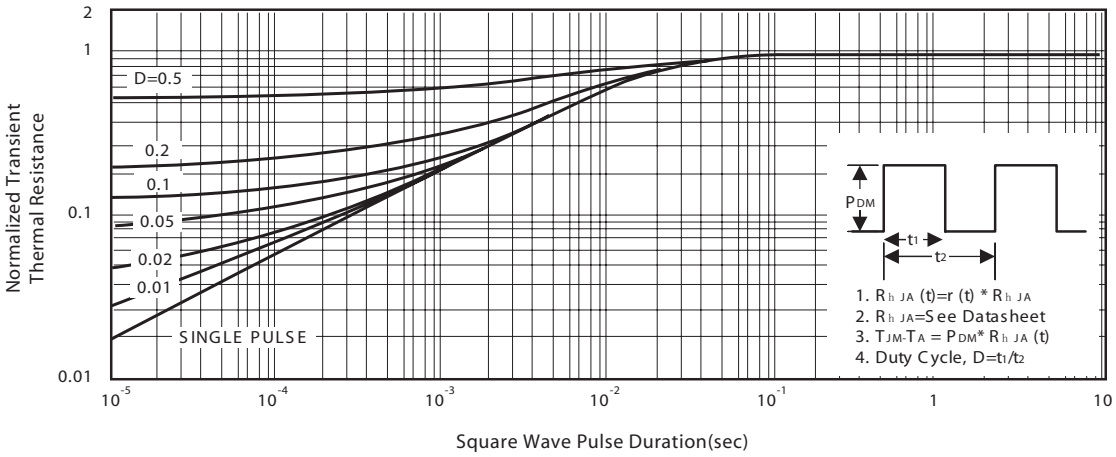


Figure 14. Normalized Thermal Transient Impedance Curve

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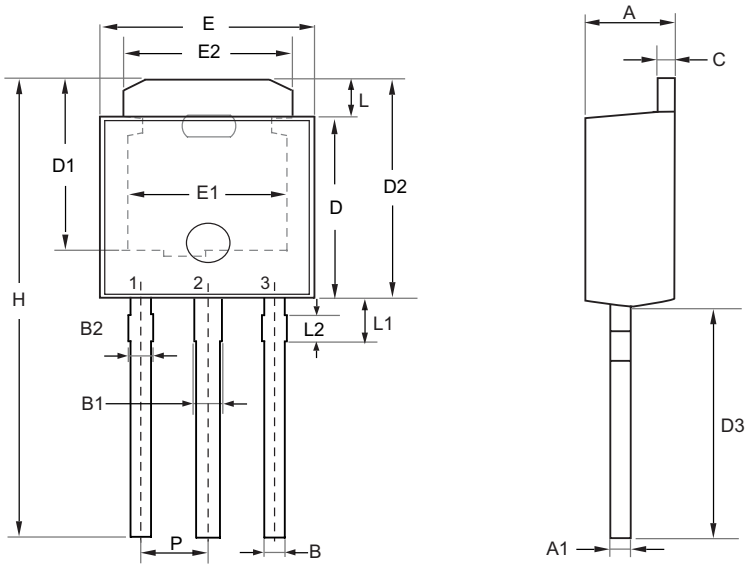
PACKAGE OUTLINE DIMENSIONS

TO-251



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.100	2.500	0.083	0.098
A1	0.350	0.650	0.014	0.026
B	0.400	0.800	0.016	0.031
B1	0.650	1.050	0.026	0.041
B2	0.500	0.900	0.020	0.035
C	0.400	0.600	0.016	0.024
D	5.300	5.700	0.209	0.224
D1	4.900	5.300	0.193	0.209
D2	6.700	7.300	0.264	0.287
D3	7.000	8.000	0.276	0.315
H	13.700	15.300	0.539	0.602
E	6.300	6.700	0.248	0.264
E1	4.600	4.900	0.181	0.193
E2	4.800	5.200	0.189	0.205
L	1.300	1.700	0.051	0.067
L1	1.400	1.800	0.055	0.071
L2	0.500	0.900	0.020	0.035
P	2.300 BSC		0.091 BSC	

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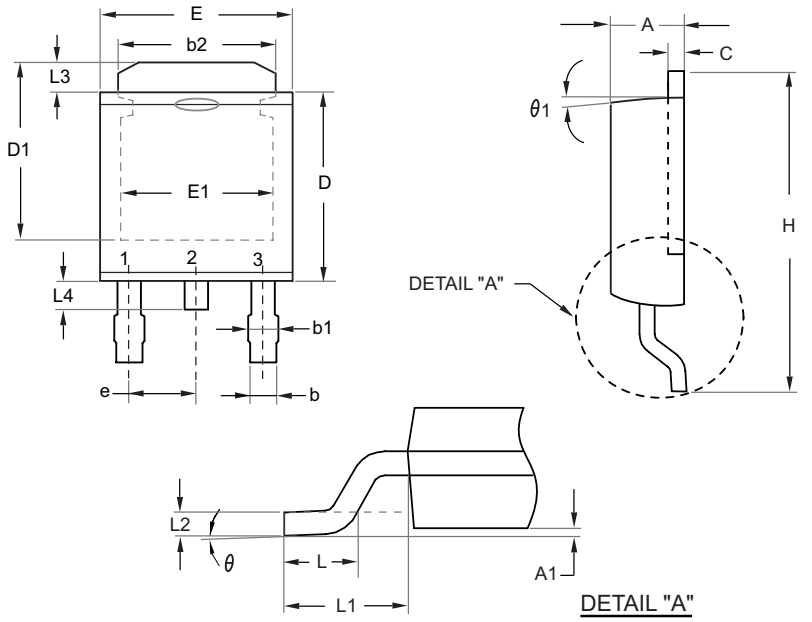

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.100	2.500	0.083	0.098
A1	0.000	0.200	0.000	0.008
b	0.400	0.889	0.016	0.035
b1	0.770	1.140	0.030	0.045
b2	4.800	5.460	0.189	0.215
C	0.400	0.600	0.016	0.024
D	5.300	6.223	0.209	0.245
D1	4.900	5.515	0.193	0.217
E	6.300	6.731	0.248	0.265
E1	4.400	5.004	0.173	0.197
e	2.290 REF		0.090 BSC	
H	8.900	10.400	0.350	0.409
L	1.397	1.770	0.055	0.070
L1	2.743 REF.		0.108 REF.	
L2	0.508 REF.		0.020 REF.	
L3	0.890	1.700	0.035	0.067
L4	0.500	1.100	0.020	0.043
θ	0°	10°	0°	10°
θ1	7° REF.		7° REF.	

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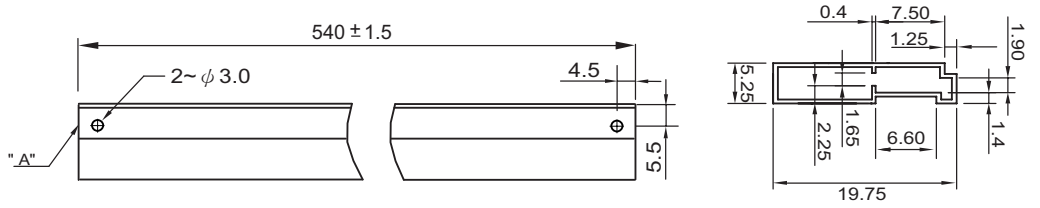
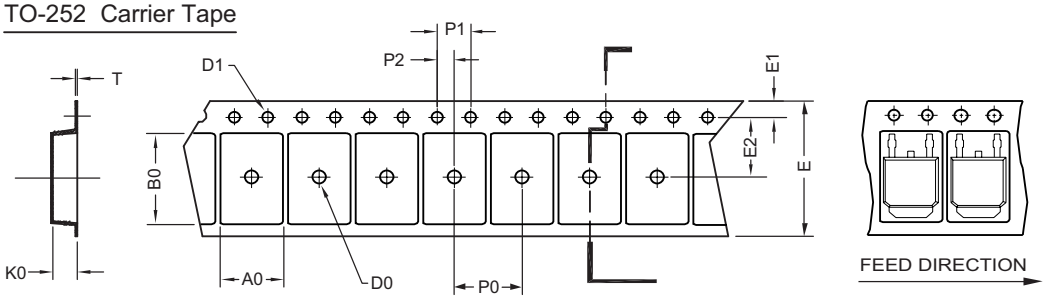
TO251 Tube/TO-252 Tape and Reel Data

TO-251 Tube



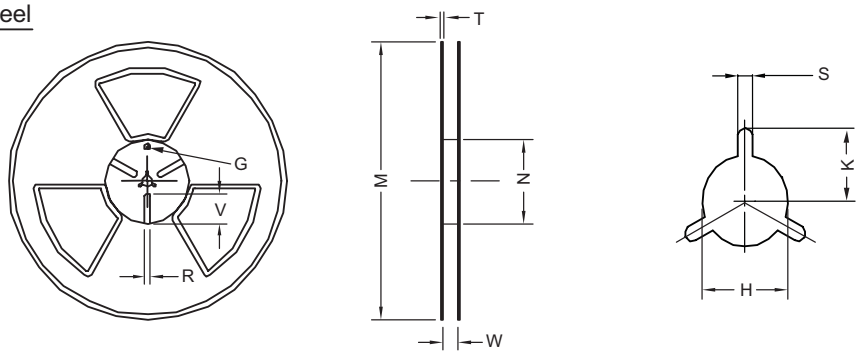
TO-252 Carrier Tape



UNIT:㎜

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
TO-252 (16 ㎜)	6.96 ±0.1	10.49 ±0.1	2.79 ±0.1	φ2	φ1.5 + 0.1 - 0	16.0 ±0.3	1.75 ±0.1	7.5 ±0.15	8.0 ±0.1	4.0 ±0.1	2.0 ±0.15	0.3 ±0.05

TO-252 Reel



UNIT:㎜

TAPE SIZE	REEL SIZE	M	N	W	T	H	K	S	G	R	V
16 ㎜	φ 330	φ330 ± 0.5	φ97 ± 1.0	17.0 + 1.5 - 0	2.2	φ13.0 + 0.5 - 0.2	10.6	2.0 ±0.5	---	---	---

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