SamHop Microelectronics Corp.

STU/D1955NL

Arp,12 2005 ver1.2

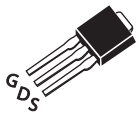
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
55V	10A	55 @ V_{GS} = 10V
		80 @ V_{GS} = 4.5V

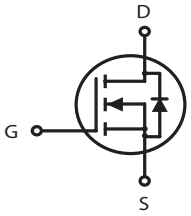
FEATURES

- Super high dense cell design for low $R_{DS(ON)}$.
- Rugged and reliable.
- TO-252 and TO-251 Package.

STU SERIES
TO-252AA(D-PAK)



STD SERIES
TO-251(I-PAK)



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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage Rating		Vspike (d)	60	V
Drain-Source Voltage		V_{DS}	55	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous [a] @ Ta	25°C	I_D	10	A
	70°C		8	A
-Pulsed [b]		I_{DM}	23	A
Drain-Source Diode Forward Current [a]		I_S	15	A
Maximum Power Dissipation [a]	Ta= 25°C	P_D	50	W
	Ta=70°C		35	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	°C/W

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N-Channel ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ [c]	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	55			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=44V, V_{GS}=0V			1	uA
Gate-Body Leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS [b]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1.0	1.9	3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=8A		42	55	m ohm
		V_{GS}=4.5V, I_D=4A		65	80	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS}=5V, V_{GS}=10V	15			A
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=8A		10		S
DYNAMIC CHARACTERISTICS [c]						
Input Capacitance	C_{ISS}	V_{DS}=30V, V_{GS}=0V f=1.0MHz		635	718	pF
Output Capacitance	C_{OSS}			75	87	pF
Reverse Transfer Capacitance	C_{RSS}			50	57	pF
Gate resistance	Rg	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		2.6		ohm
SWITCHING CHARACTERISTICS [c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD}=30V I_D=8 A V_{GS}=10V R_{GEN}=6 ohm		10.6	13	ns
Rise Time	t_r			5.3	6	ns
Turn-Off Delay Time	$t_{D(OFF)}$			14.5	17	ns
Fall Time	t_f			9.8	11	ns
Total Gate Charge	Q_g	V_{DS}=15V, I_D=8A, V_{GS}=10V		12.8	14	nC
		V_{DS}=15V, I_D=8A, V_{GS}=5V		7.1	8	nC
Gate-Source Charge	Q_{gs}	V_{DS}=15V, I_D=8A V_{GS}=10V		2.6	3	nC
Gate-Drain Charge	Q_{gd}			3.8	5	nC

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS [a]						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, Is = 15A		1	1.3	V

Notes
a.Surface Mounted on FR4 Board, t≤10sec.
b.Pulse Test:Pulse Width≤300us, Duty Cycle≤2%.
c.Guaranteed by design, not subject to production testing.
d.Guaranteed when external Rg=6 ohm and tf < tf max

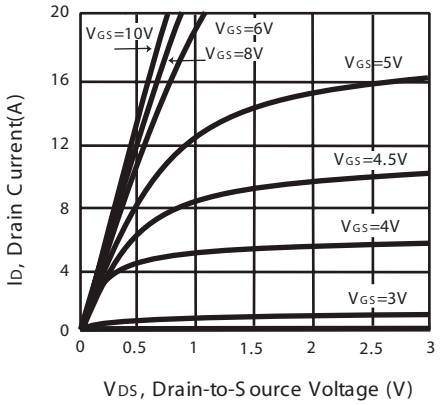

Figure 1. Output Characteristics

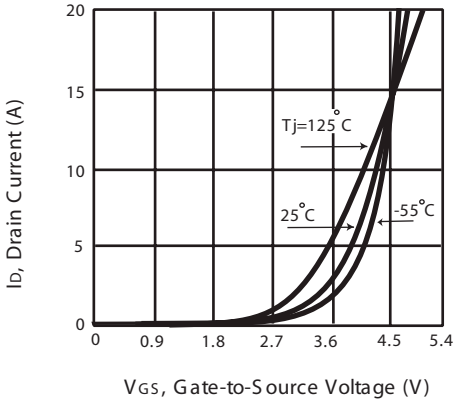

Figure 2. Transfer Characteristics

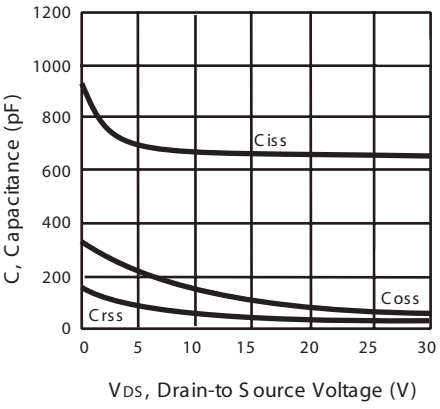

Figure 3. Capacitance

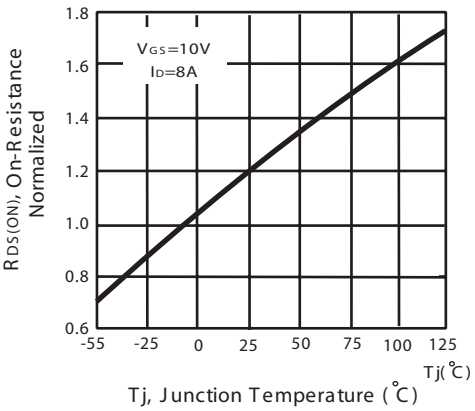

Figure 4. On-Resistance Variation with Drain Current and Temperature

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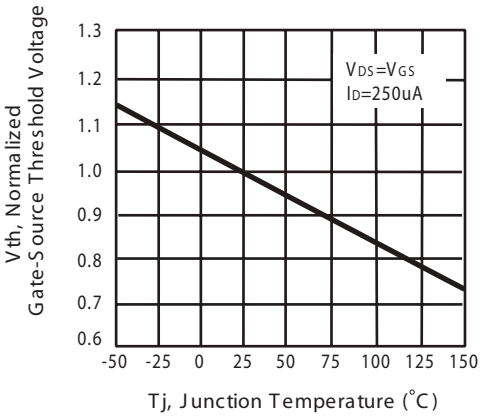


Figure 5. Gate Threshold Variation with Temperature

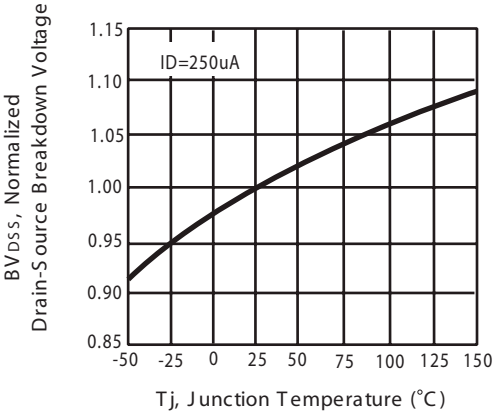


Figure 6. Breakdown Voltage Variation with Temperature

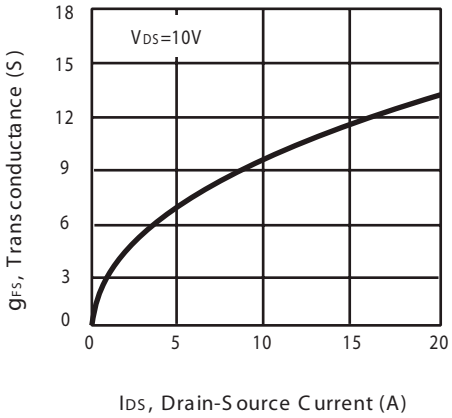


Figure 7. Transconductance Variation with Drain Current

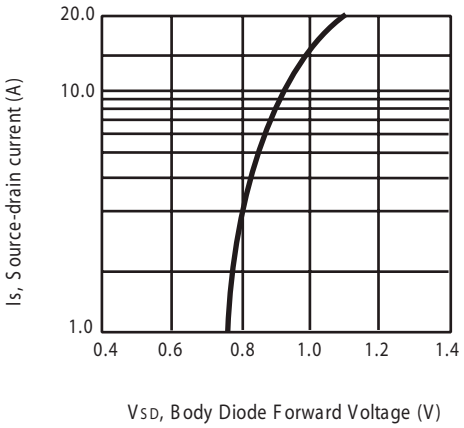


Figure 8. Body Diode Forward Voltage Variation with Source Current

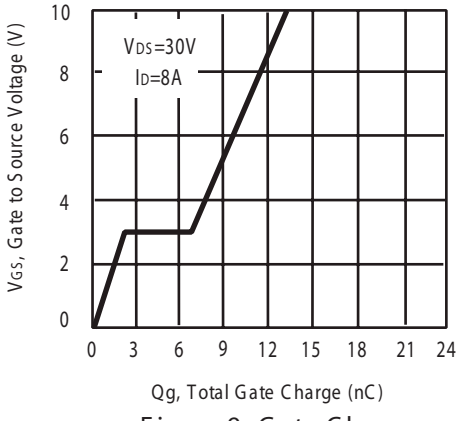


Figure 9. Gate Charge

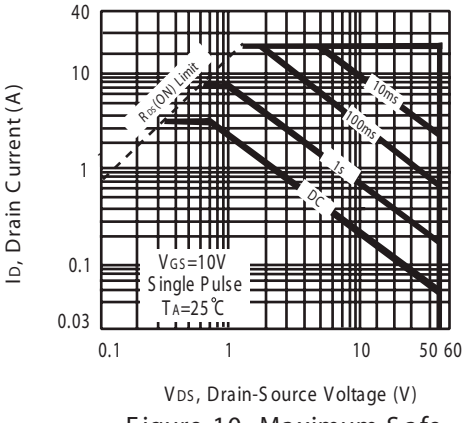


Figure 10. Maximum Safe Operating Area

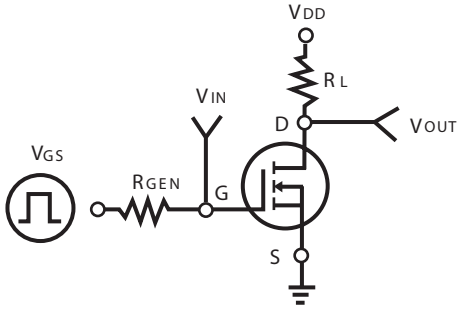


Figure 11. Switching Test Circuit

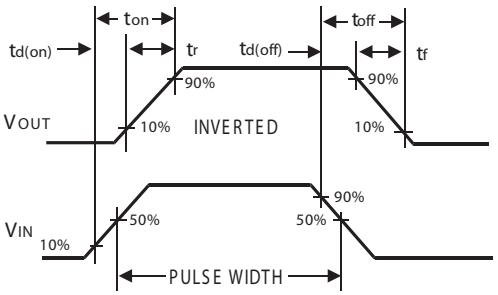
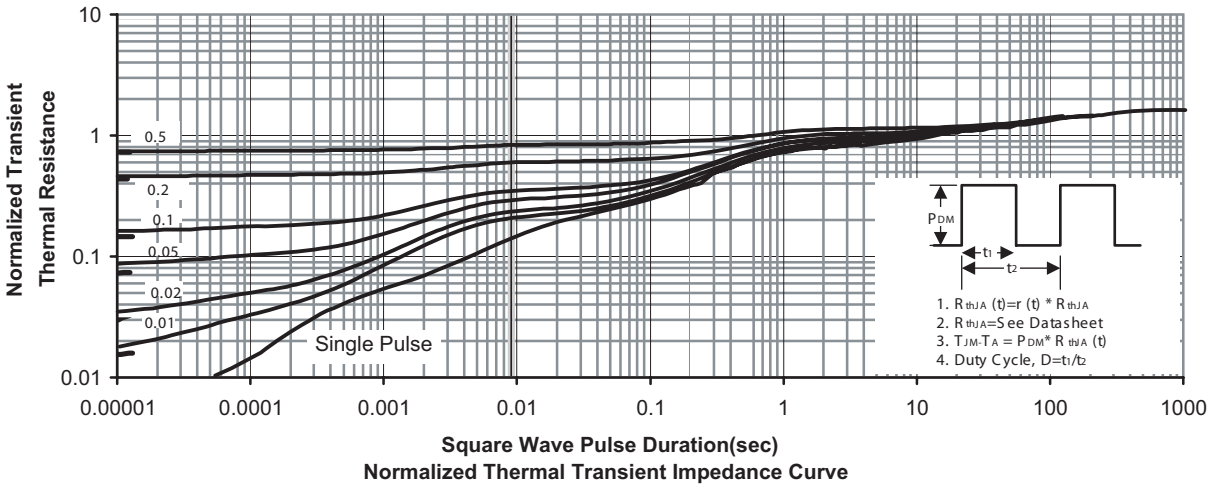
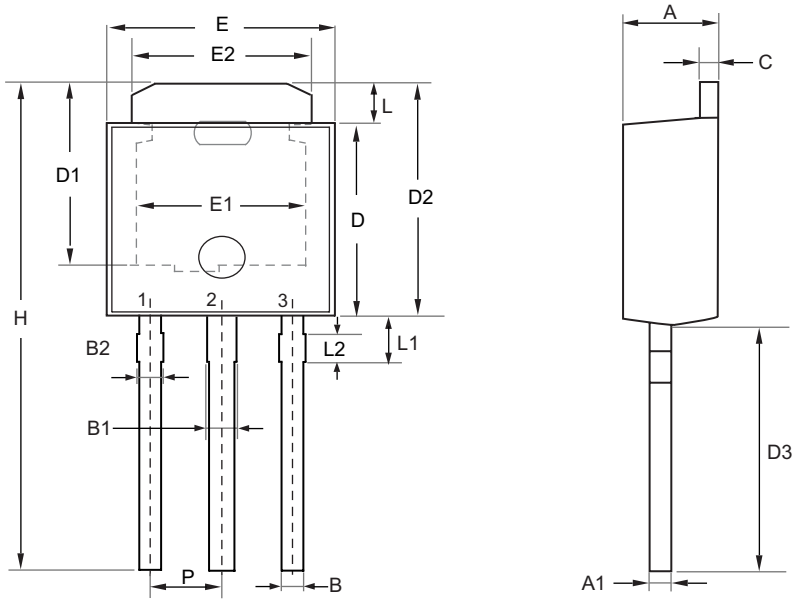


Figure 12. Switching Waveforms



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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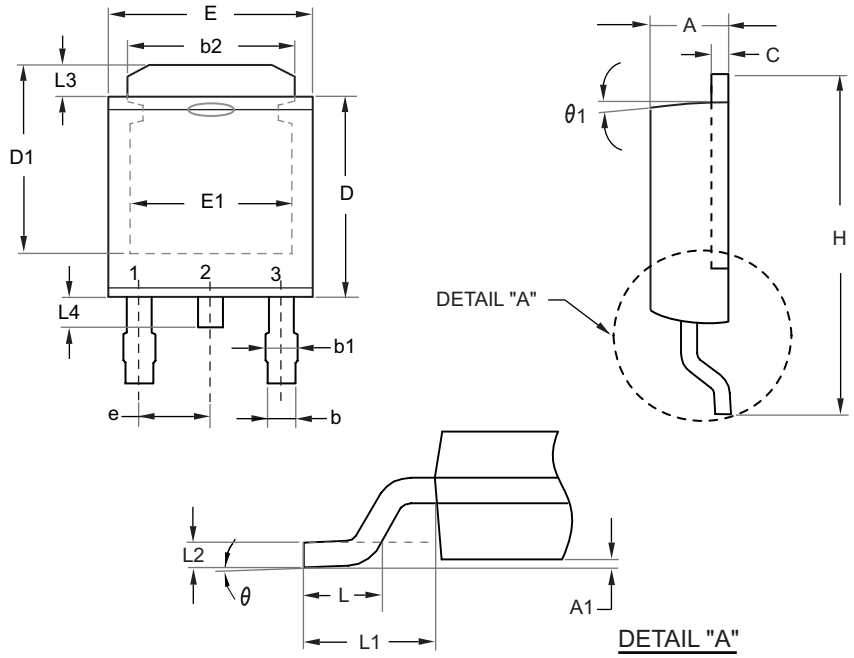
TO-252



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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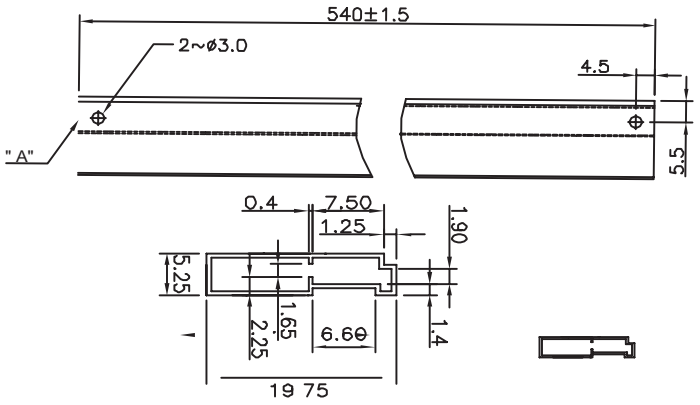
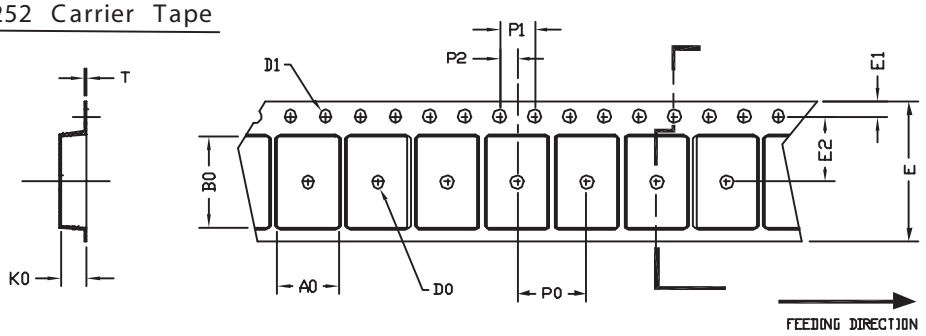
TO251 Tube/TO-252 Tape and Reel data

TO-251 Tube



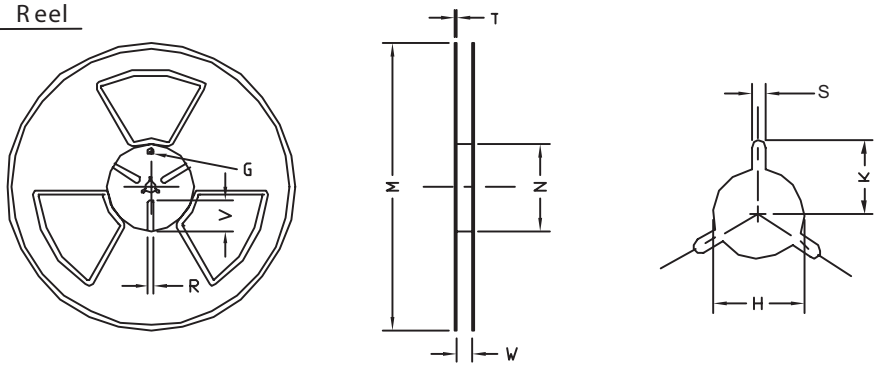
TO-252 Carrier Tape



UNIT:㎜

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
TO-252 (16 ㎜)	6.80 ±0.1	10.3 ±0.1	2.50 ±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	---	---	---