SamHop Microelectronics Corp.

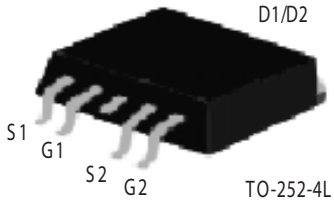
STU314D

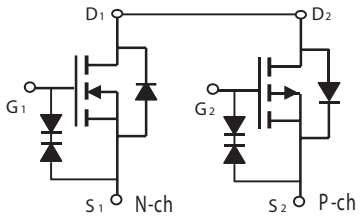
Ver 1.0

Dual Enhancement Mode Field Effect Transistor (N and P Channel)

PRODUCT SUMMARY (N-Channel)		
VDSS	ID	RDS(ON) (mΩ) Max
30V	16A	28 @ VGS=10V
		40 @ VGS=4.5V

PRODUCT SUMMARY (P-Channel)		
VDSS	ID	RDS(ON) (mΩ) Max
-30V	-14A	34 @ VGS=-10V
		55 @ VGS=-4.5V





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

Symbol	Parameter		N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage		30	-30	V
V_{GS}	Gate-Source Voltage		±20	±20	V
I_D	Drain Current-Continuous [a]	T_C=25°C	16	-14	A
		T_C=70°C	13	-11	A
I_{DM}	-Pulsed [b]		47	-42	A
E_{AS}	Sigle Pulse Avalanche Energy [d]		16	64	mJ
P_D	Maximum Power Dissipation [a]	T_C=25°C	10.4		W
		T_C=70°C	6.7		W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55 to 150		°C

THERMAL CHARACTERISTICS

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case [a]	12	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient [a]	60	°C/W

N-Channel 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	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V , V_{GS}=0V			1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}= ±20V , V_{DS}=0V			±10	uA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	1	1.9	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=16A		22	28	m ohm
		V_{GS}=4.5V , I_D=13.7A		31	40	m ohm
g_{FS}	Forward Transconductance	V_{DS}=5V , I_D=16A		25		S
DYNAMIC CHARACTERISTICS [c]						
C_{ISS}	Input Capacitance	V_{DS}=15V,V_{GS}=0V f=1.0MHz		505		pF
C_{OSS}	Output Capacitance			105		pF
C_{RSS}	Reverse Transfer Capacitance			65		pF
SWITCHING CHARACTERISTICS [c]						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD}=15V I_D=1A V_{GS}=10V R_{GEN}=6 ohm		12		ns
t_r	Rise Time			11		ns
$t_{D(OFF)}$	Turn-Off Delay Time			16.6		ns
t_f	Fall Time			14		ns
Q_g	Total Gate Charge	V_{DS}=15V,I_D=16A,V_{GS}=10V		8.8		nC
		V_{DS}=15V,I_D=16A,V_{GS}=4.5V		4.3		nC
Q_{gs}	Gate-Source Charge	V_{DS}=15V,I_D=16A, V_{GS}=10V		1.5		nC
Q_{gd}	Gate-Drain Charge			2.3		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain-Source Diode Forward Current				1.7	A
V_{SD}	Diode Forward Voltage [b]	V_{GS}=0V,I_S=1.7A		0.8	1.2	V

P-Channel 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	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V , V_{GS}=0V			-1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}= ±20V , V_{DS}=0V			±10	uA
ON CHARACTERISTICS						
$V_{GS(th)}$	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=-14A		26	34	m ohm
		V_{GS}=-4.5V , I_D=-11A		41	55	m ohm
g_{FS}	Forward Transconductance	V_{DS}=-5V , I_D=-14A		17		S
DYNAMIC CHARACTERISTICS [c]						
C_{ISS}	Input Capacitance	V_{DS}=-15V,V_{GS}=0V f=1.0MHz		815		pF
C_{OSS}	Output Capacitance			215		pF
C_{RSS}	Reverse Transfer Capacitance			125		pF
SWITCHING CHARACTERISTICS [c]						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD}=-15V I_D=-1A V_{GS}=-10V R_{GEN}=6 ohm		13		ns
t_r	Rise Time			15		ns
$t_{D(OFF)}$	Turn-Off Delay Time			62		ns
t_f	Fall Time			13		ns
Q_g	Total Gate Charge	V_{DS}=-15V,I_D=-14A,V_{GS}=-10V		15.5		nC
		V_{DS}=-15V,I_D=-14A,V_{GS}=-4.5V		7.3		nC
Q_{gs}	Gate-Source Charge	V_{DS}=-15V,I_D=-14A, V_{GS}=-10V		1.7		nC
Q_{gd}	Gate-Drain Charge			4.7		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain-Source Diode Forward Current				-1.7	A
V_{SD}	Diode Forward Voltage [b]	V_{GS}=0V,I_S=-1.7A		-0.77	-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.Starting T_J=25°C,L=0.5mH,V_{DD} = 20V,VGS=10V.(See Figure13)

N-Channel

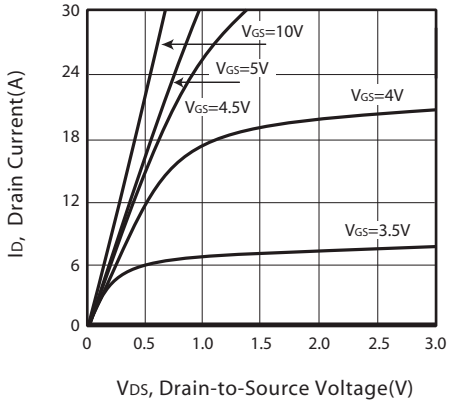


Figure 1. Output Characteristics

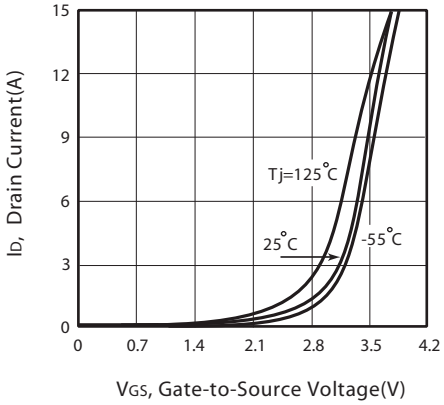


Figure 2. Transfer Characteristics

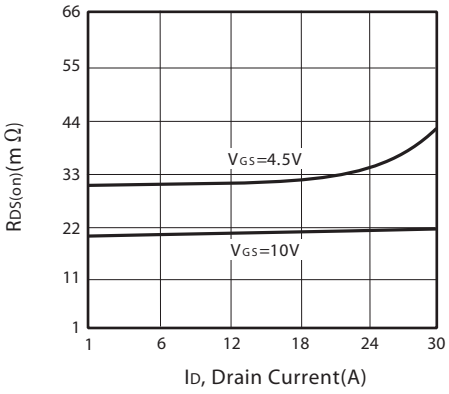


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

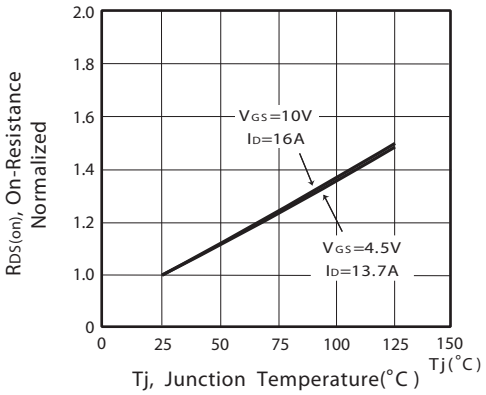


Figure 4. On-Resistance Variation with Drain Current and Temperature

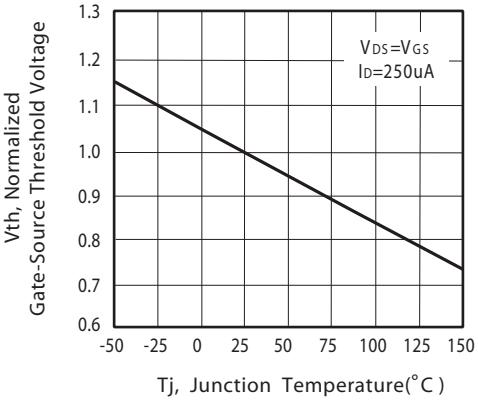


Figure 5. Gate Threshold Variation with Temperature

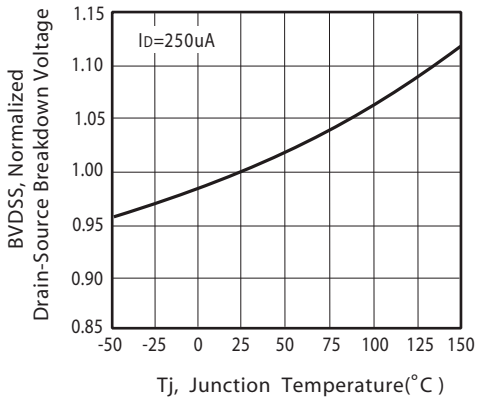


Figure 6. Breakdown Voltage Variation with Temperature

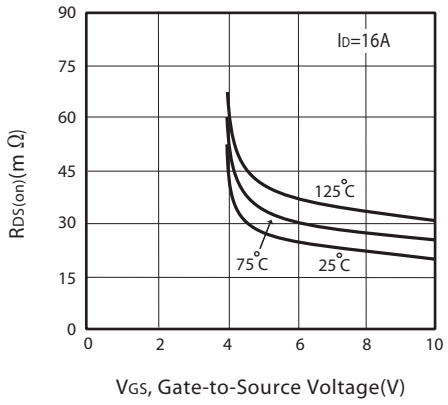


Figure 7. On-Resistance vs. Gate-Source Voltage

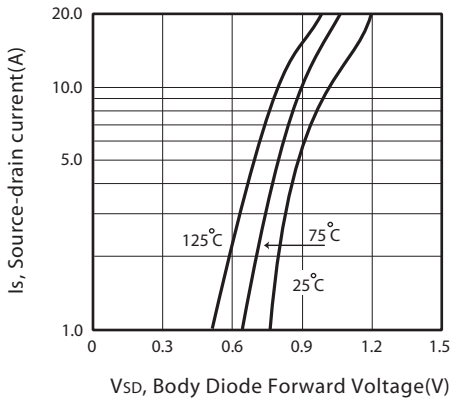


Figure 8. Body Diode Forward Voltage Variation with Source Current

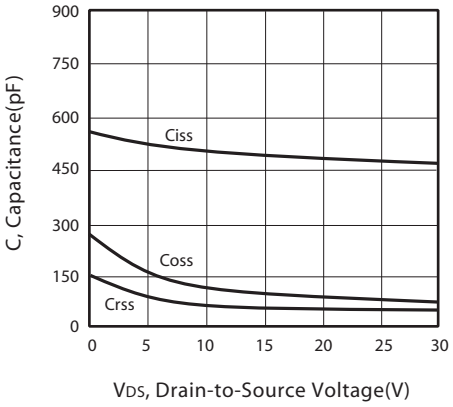


Figure 9. Capacitance

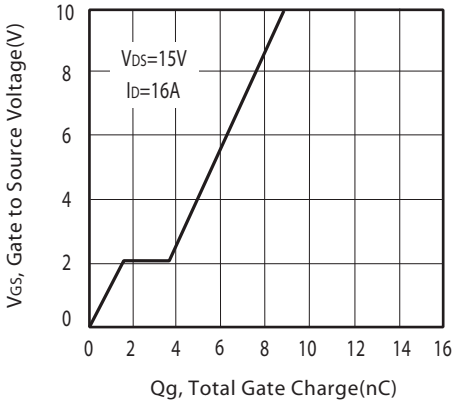


Figure 10. Gate Charge

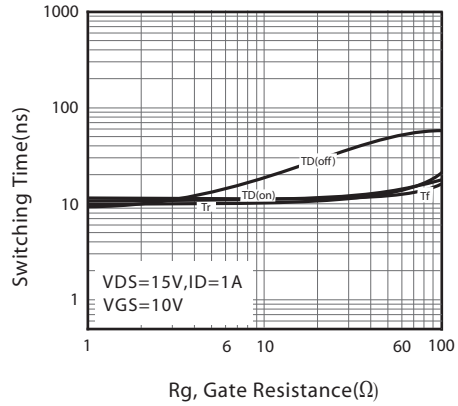


Figure 11. switching characteristics

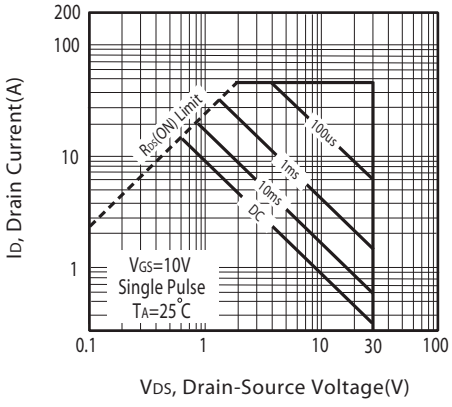
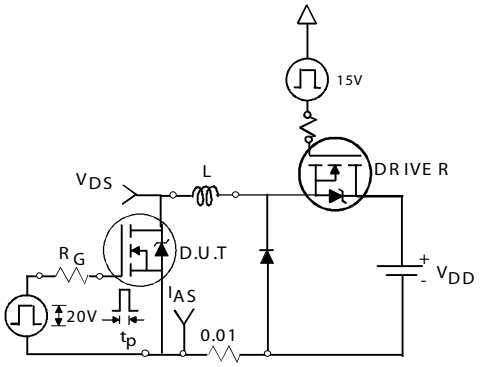
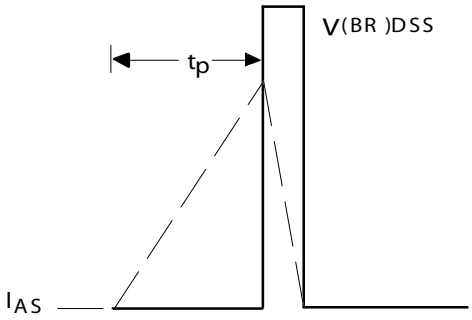


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

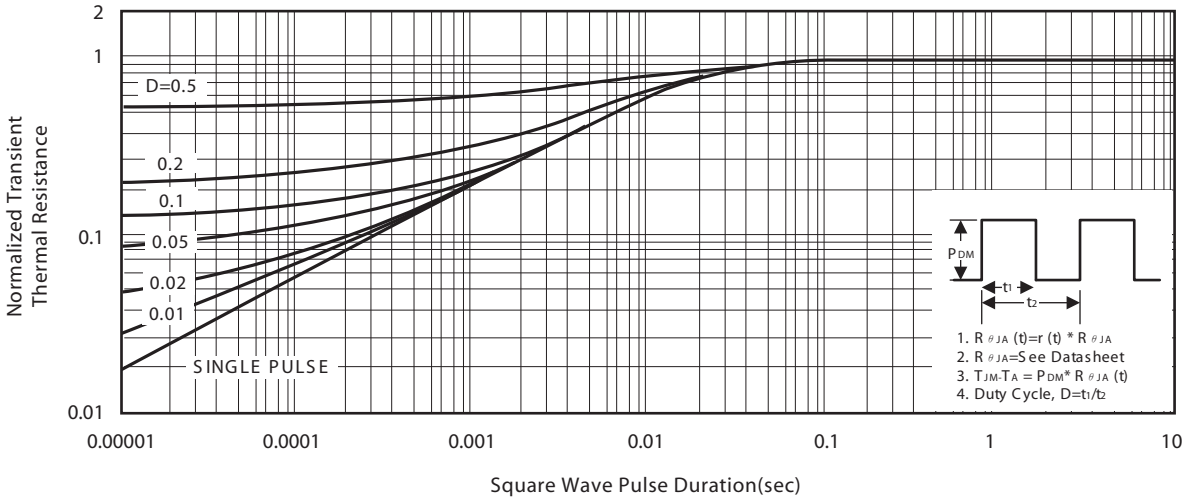


Figure 14. Normalized Thermal Transient Impedance Curve

P-Channel

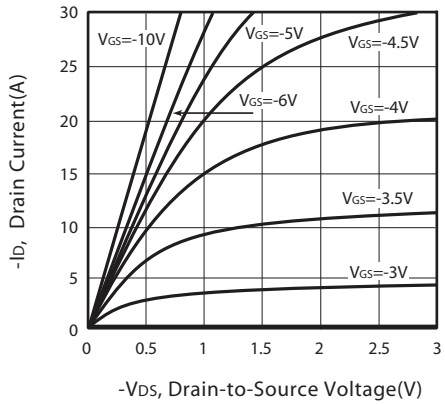


Figure 1. Output Characteristics

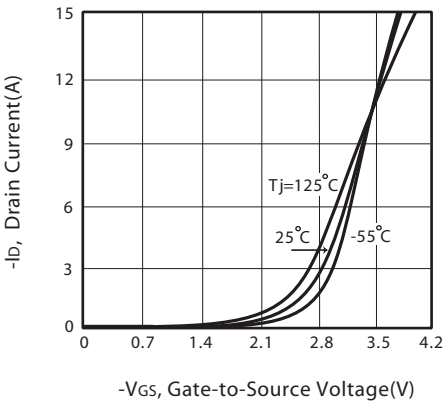


Figure 2. Transfer Characteristics

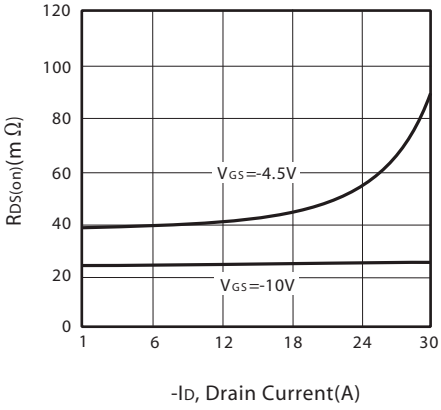


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

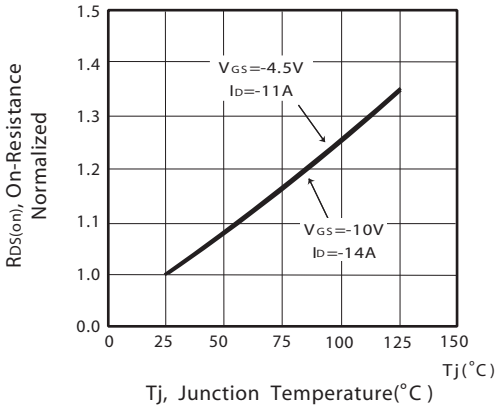


Figure 4. On-Resistance Variation with Drain Current and Temperature

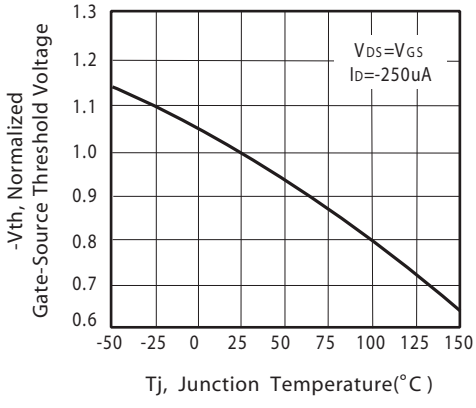


Figure 5. Gate Threshold Variation with Temperature

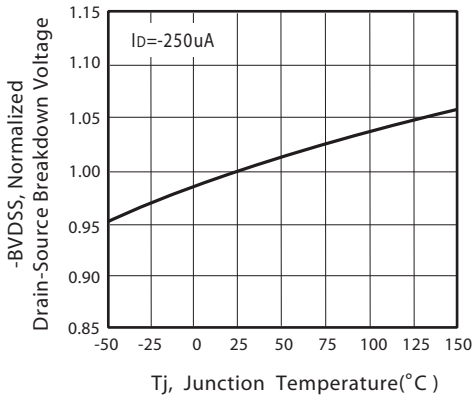


Figure 6. Breakdown Voltage Variation with Temperature

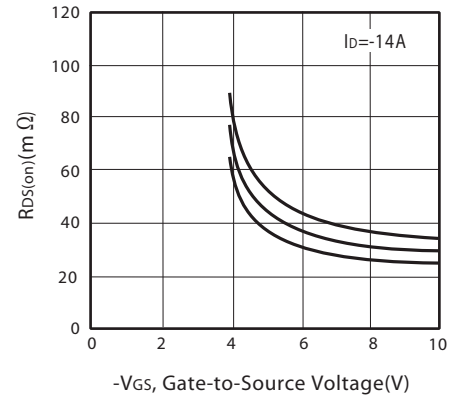


Figure 7. On-Resistance vs. Gate-Source Voltage

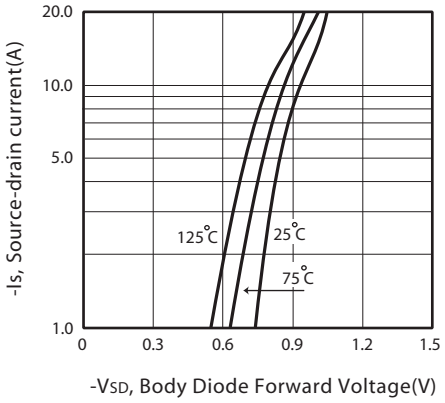


Figure 8. Body Diode Forward Voltage Variation with Source Current

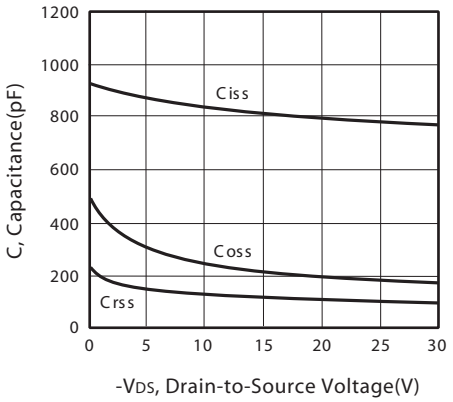


Figure 9. Capacitance

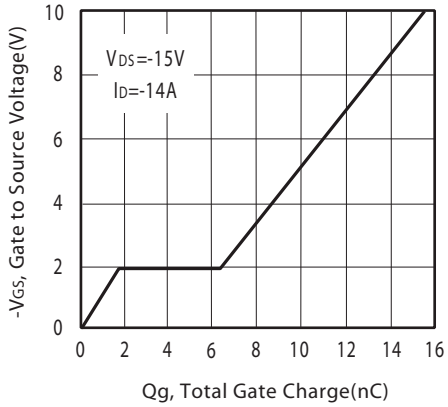


Figure 10. Gate Charge

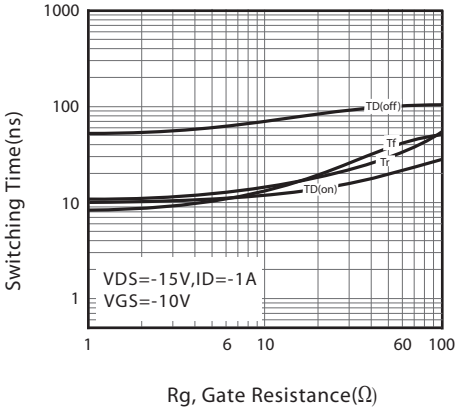


Figure 11. switching characteristics

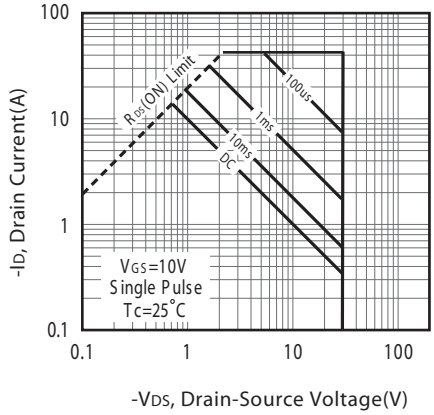
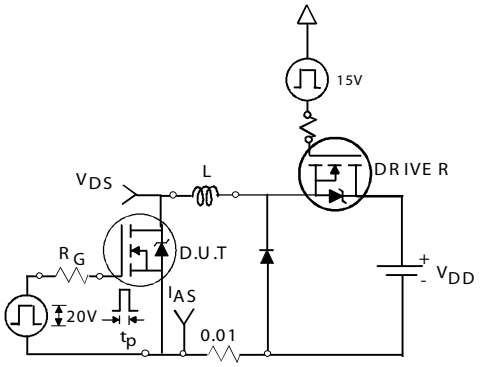
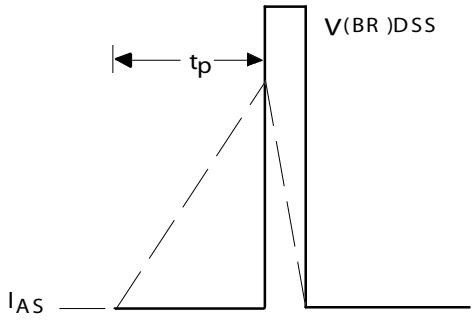


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

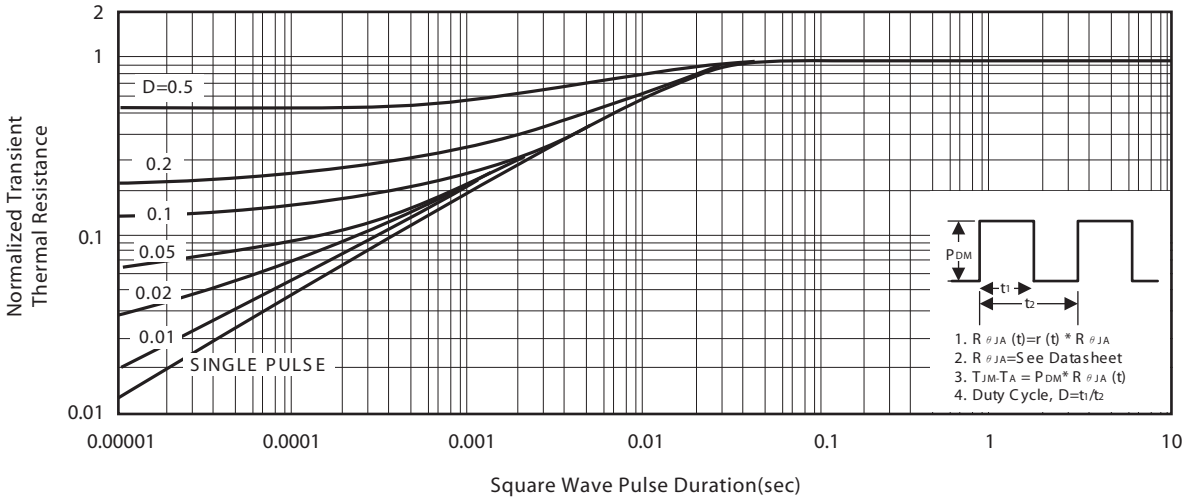
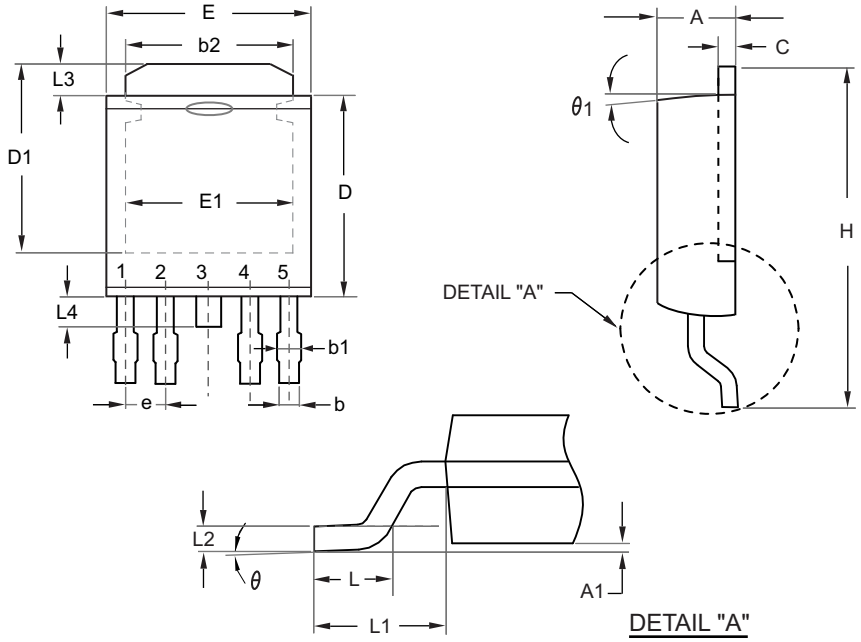


Figure 14. Normalized Thermal Transient Impedance Curve

PACKAGE OUTLINE DIMENSIONS

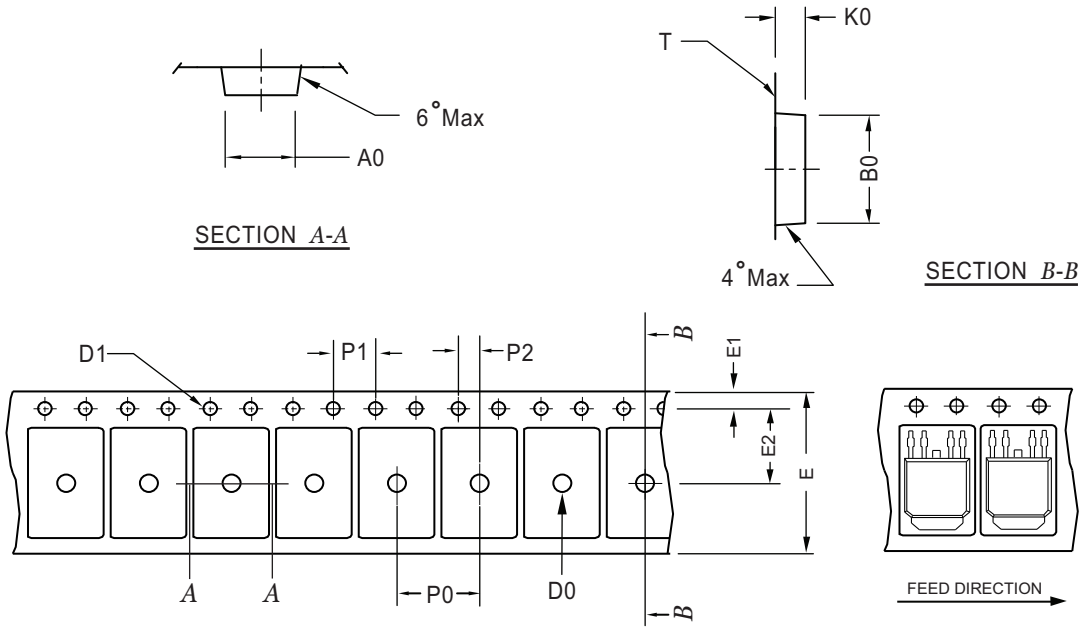
TO-252-4L



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.200	2.387	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.440	0.680	0.017	0.027
b1	0.635	0.787	0.025	0.031
b2	5.210	5.460	0.205	0.215
C	0.450	0.584	0.018	0.023
D	6.000	6.223	0.236	0.245
D1	5.200	5.515	0.205	0.217
E	6.400	6.731	0.252	0.265
E1	4.400	5.004	0.173	0.197
e	1.270	BSC	0.050	BSC
H	9.400	10.400	0.370	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	1.270	0.035	0.050
L4	0.640	1.010	0.025	0.040
θ	0°	10°	0°	10°
θ1	7°	REF.	7°	REF.

TO-252-4L Tape and Reel Data

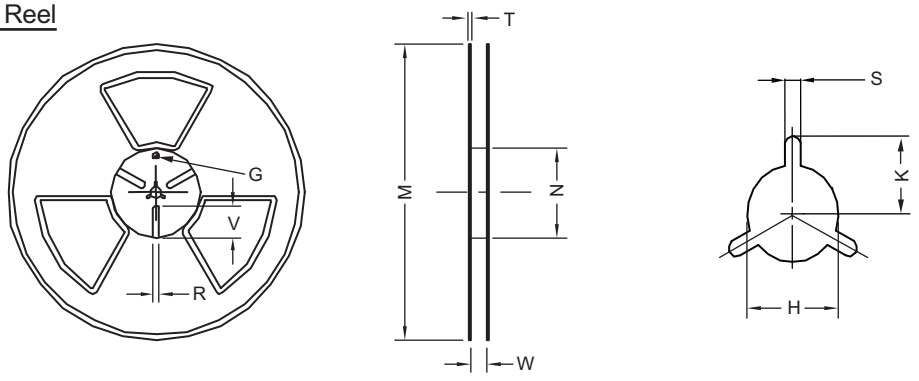
TO-252-4L Carrier Tape



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	ϕ 2	ϕ 1.5 + 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-252-4L Reel



UNIT:㎜

TAPE SIZE	REEL SIZE	M	N	W	T	H	K	S	G	R	V
16 ㎜	ϕ 330	ϕ 330 ± 0.5	ϕ 97 ± 1.0	17.0 + 1.5 - 0	2.2	ϕ 13.0 + 0.5 - 0.2	10.6	2.0 ±0.5	---	---	---