SamHop Microelectronics Corp.

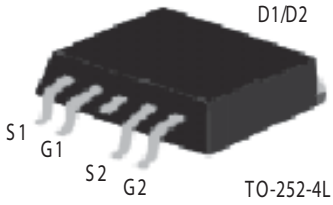
STU408D

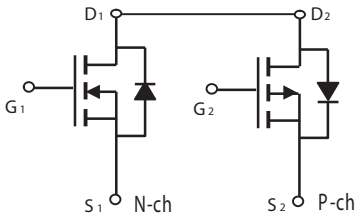
Ver 1.1

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

PRODUCT SUMMARY (N-Channel)		
VDSS	ID	RDS(ON) (mΩ) Max
40V	14A	27 @ VGS=10V
		41 @ VGS=4.5V

PRODUCT SUMMARY (P-Channel)		
VDSS	ID	RDS(ON) (mΩ) Max
-40V	-12A	37 @ VGS=-10V
		60 @ 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		40	-40	V
V_{GS}	Gate-Source Voltage		±20	±20	V
I_D	Drain Current-Continuous [a]	T_C=25°C	14	-12	A
		T_C=70°C	11.2	-9.6	A
I_{DM}	-Pulsed [b]		41	-36	A
E_{AS}	Sigle Pulse Avalanche Energy [d]		30	49	mJ
P_D	Maximum Power Dissipation [a]	T_C=25°C	10.5		W
		T_C=70°C	6.7		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 [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	40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V , V_{GS}=0V			1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}= ±20V , V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	1.5	1.8	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V , I_D=14A		22	27	m ohm
		V_{GS}=4.5V , I_D=11.4A		31	41	m ohm
g_{FS}	Forward Transconductance	V_{DS}=5V , I_D=14A		21		S
DYNAMIC CHARACTERISTICS [c]						
C_{ISS}	Input Capacitance	V_{DS}=20V,V_{GS}=0V f=1.0MHz		785		pF
C_{OSS}	Output Capacitance			80		pF
C_{RSS}	Reverse Transfer Capacitance			68		pF
SWITCHING CHARACTERISTICS [c]						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD}=20V I_D=1A V_{GS}=10V R_{GEN}=6 ohm		13.2		ns
t_r	Rise Time			13.6		ns
$t_{D(OFF)}$	Turn-Off Delay Time			16.5		ns
t_f	Fall Time			23		ns
Q_g	Total Gate Charge	V_{DS}=20V,I_D=14A,V_{GS}=10V		15		nC
		V_{DS}=20V,I_D=14A,V_{GS}=4.5V		7.2		nC
Q_{gs}	Gate-Source Charge	V_{DS}=20V,I_D=14A, V_{GS}=10V		1.7		nC
Q_{gd}	Gate-Drain Charge			4.5		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain-Source Diode Forward Current				2	A
V_{SD}	Diode Forward Voltage [b]	V_{GS}=0V,I_S=2A		0.81	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	-40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-32V , V_{GS}=0V			-1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}= ±20V , V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=-250uA	-1.0	-1.8	-3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=-10V , I_D=-12A		30	37	m ohm
		V_{GS}=-4.5V , I_D=-9.4A		45	60	m ohm
g_{FS}	Forward Transconductance	V_{DS}=-5V , I_D=-13A		18		S
DYNAMIC CHARACTERISTICS [c]						
C_{ISS}	Input Capacitance	V_{DS}=-20V,V_{GS}=0V f=1.0MHz		863		pF
C_{OSS}	Output Capacitance			142		pF
C_{RSS}	Reverse Transfer Capacitance			92		pF
SWITCHING CHARACTERISTICS [c]						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD}=-20V I_D=-1A V_{GS}=-10V R_{GEN}=6 ohm		14		ns
t_r	Rise Time			15		ns
$t_{D(OFF)}$	Turn-Off Delay Time			64		ns
t_f	Fall Time			38		ns
Q_g	Total Gate Charge	V_{DS}=-20V,I_D=-12A,V_{GS}=-10V		16.8		nC
		V_{DS}=-20V,I_D=-12A,V_{GS}=-4.5V		8.1		nC
Q_{gs}	Gate-Source Charge	V_{DS}=-20V,I_D=-12A, V_{GS}=-10V		1.8		nC
Q_{gd}	Gate-Drain Charge			4.8		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain-Source Diode Forward Current				-3	A
V_{SD}	Diode Forward Voltage [b]	V_{GS}=0V,I_S=-3A		-0.8	-1.2	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,V_{GS}=10V.(See Figure13)

N-Channel

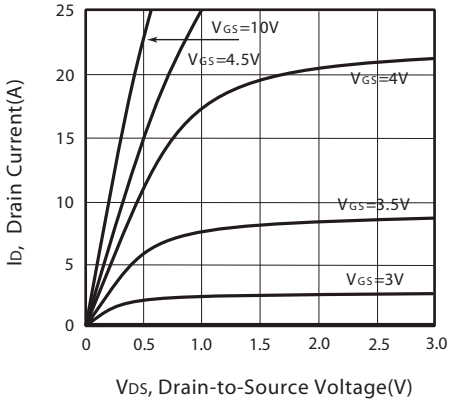


Figure 1. Output Characteristics

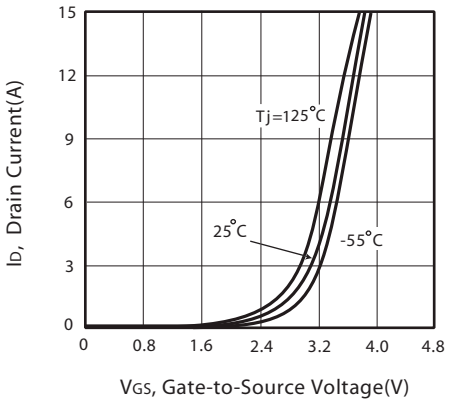


Figure 2. Transfer Characteristics

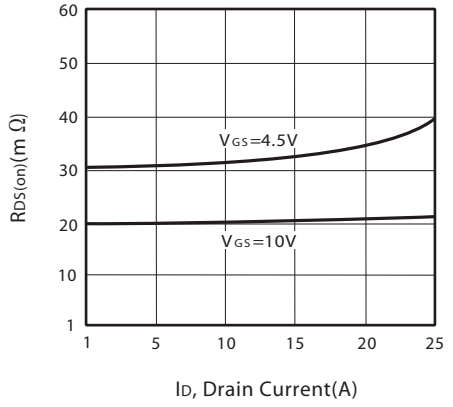


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

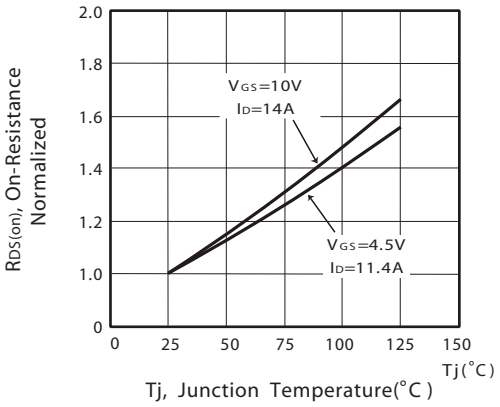


Figure 4. On-Resistance Variation with Drain Current and Temperature

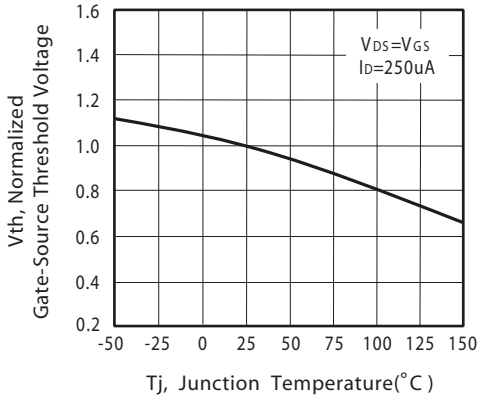


Figure 5. Gate Threshold Variation with Temperature

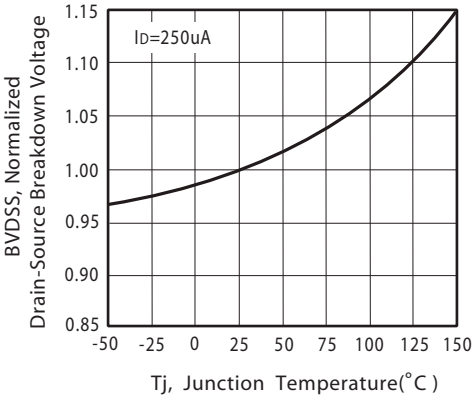


Figure 6. Breakdown Voltage Variation with Temperature

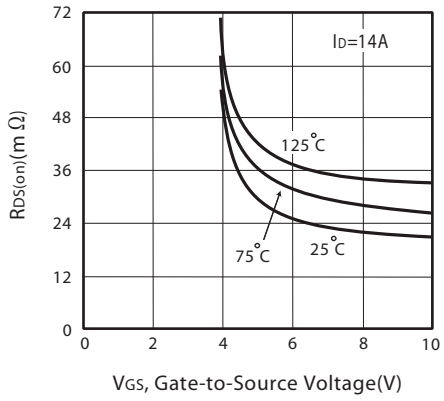


Figure 7. On-Resistance vs. Gate-Source Voltage

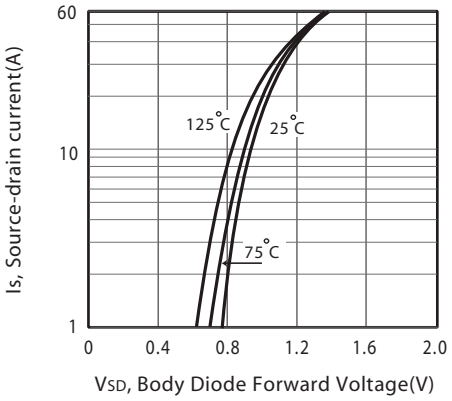


Figure 8. Body Diode Forward Voltage Variation with Source Current

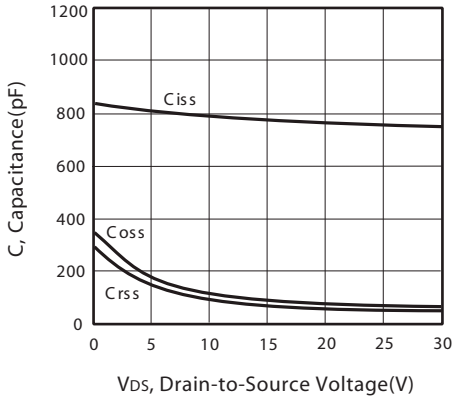


Figure 9. Capacitance

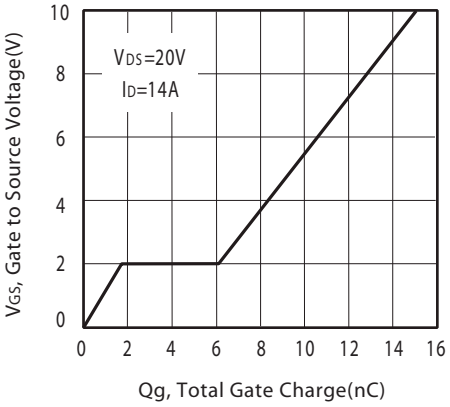


Figure 10. Gate Charge

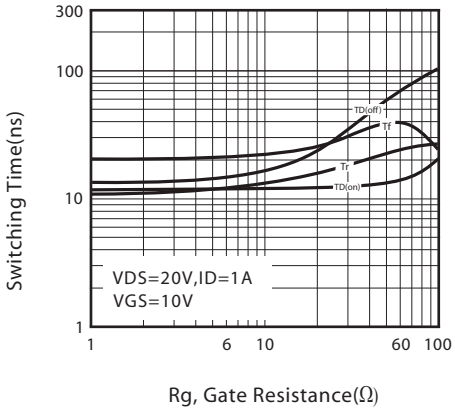


Figure 11. switching characteristics

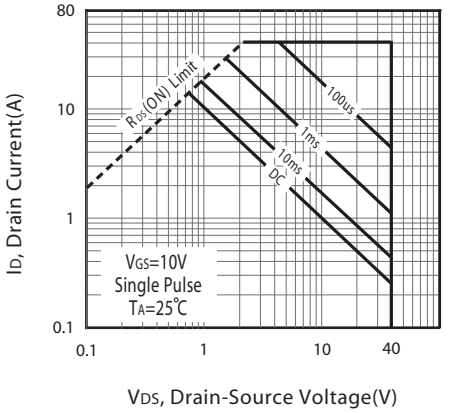
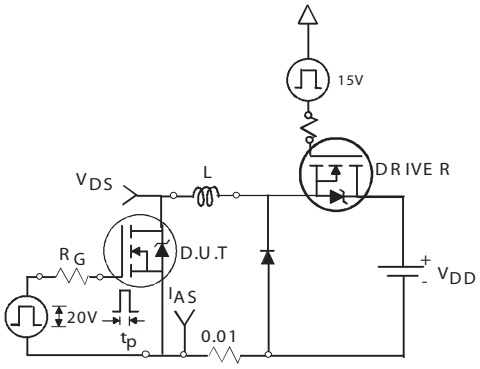
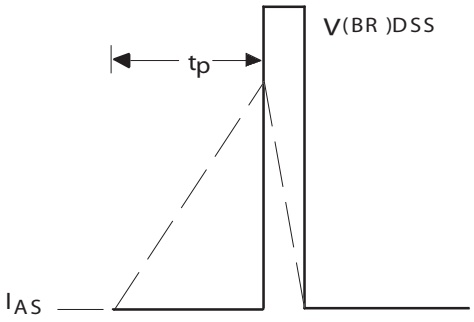


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

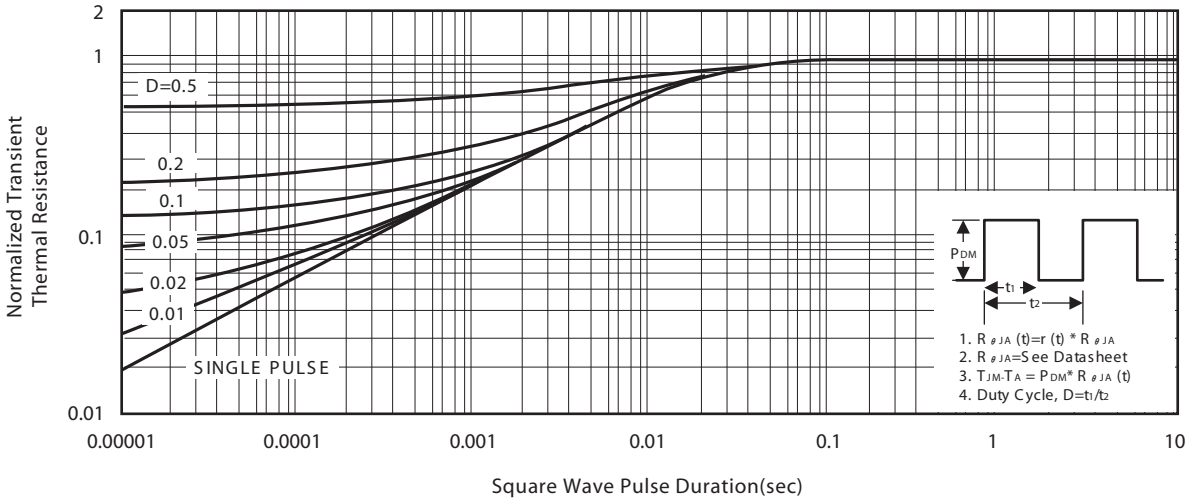


Figure 14. Normalized Thermal Transient Impedance Curve

P-Channel

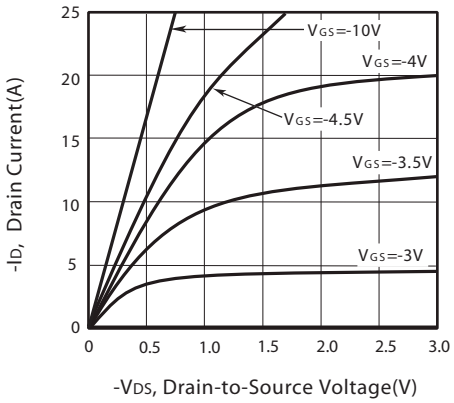


Figure 1. Output Characteristics

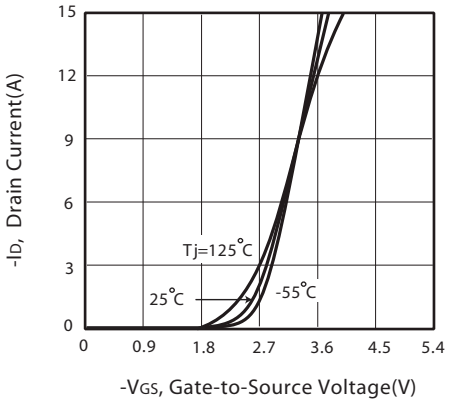


Figure 2. Transfer Characteristics

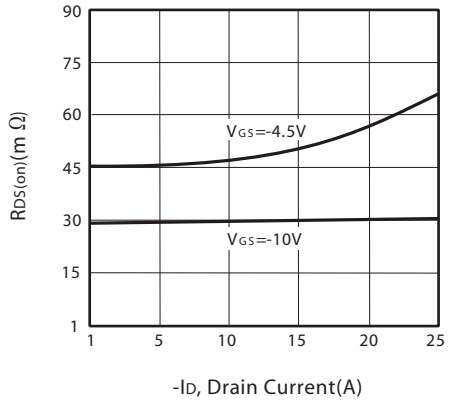


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

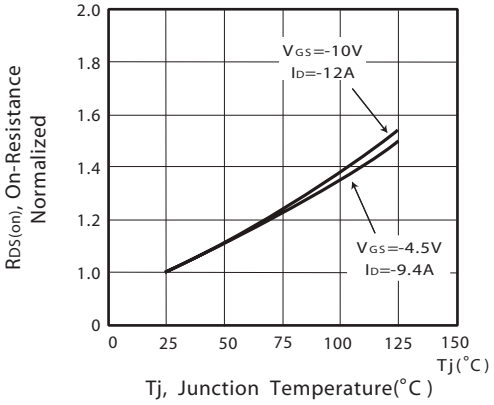


Figure 4. On-Resistance Variation with Drain Current and Temperature

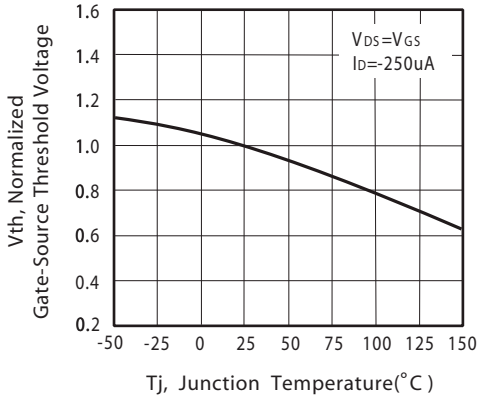


Figure 5. Gate Threshold Variation with Temperature

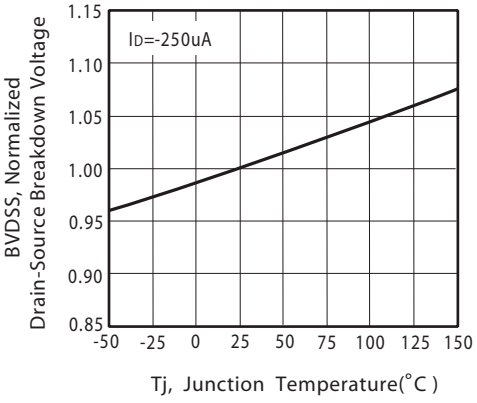


Figure 6. Breakdown Voltage Variation with Temperature

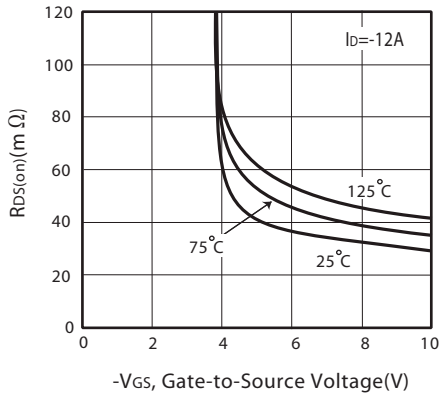


Figure 7. On-Resistance vs. Gate-Source Voltage

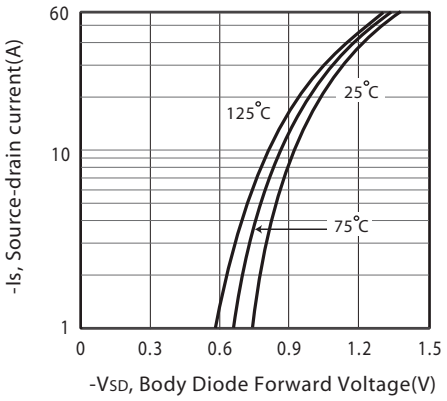


Figure 8. Body Diode Forward Voltage Variation with Source Current

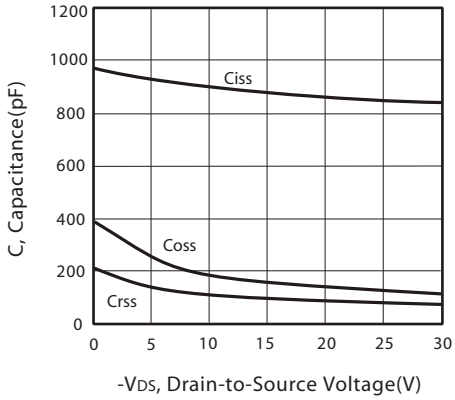


Figure 9. Capacitance

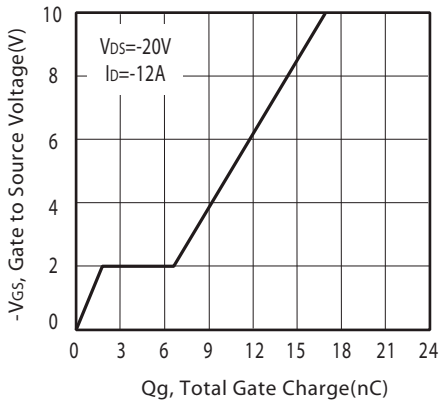


Figure 10. Gate Charge

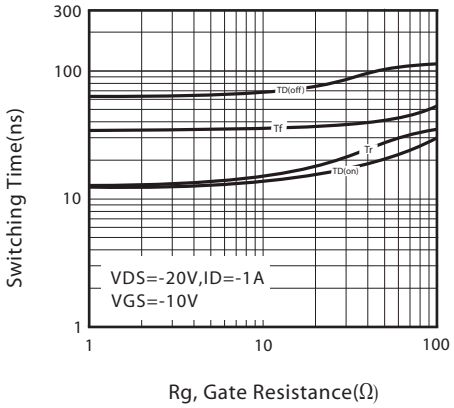


Figure 11. switching characteristics

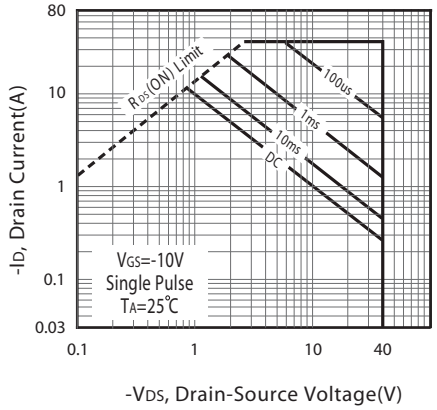
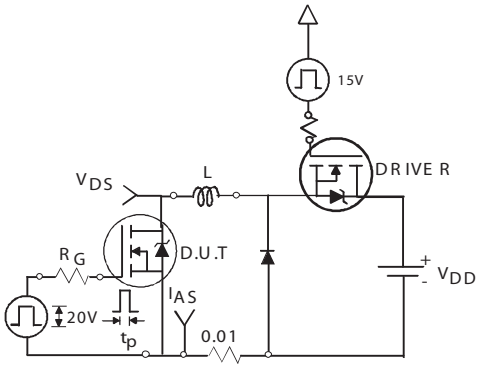
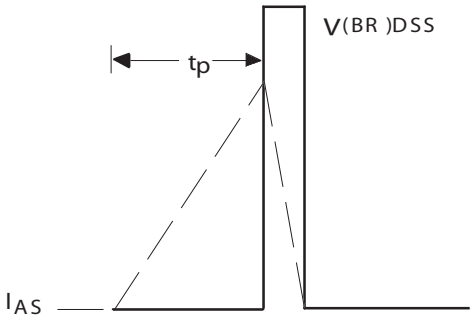


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 15a.



Unclamped Inductive Waveforms

Figure 15b.

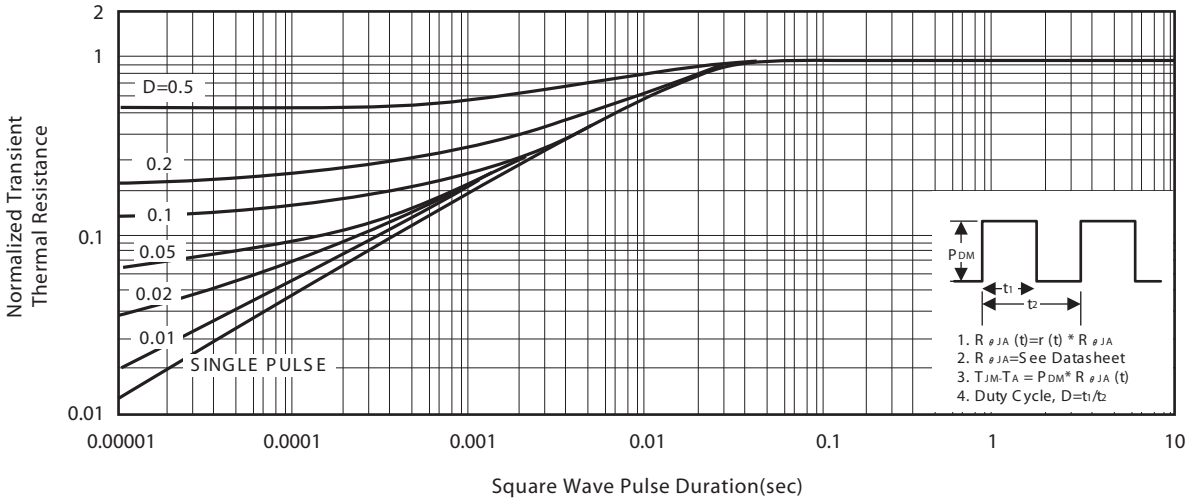
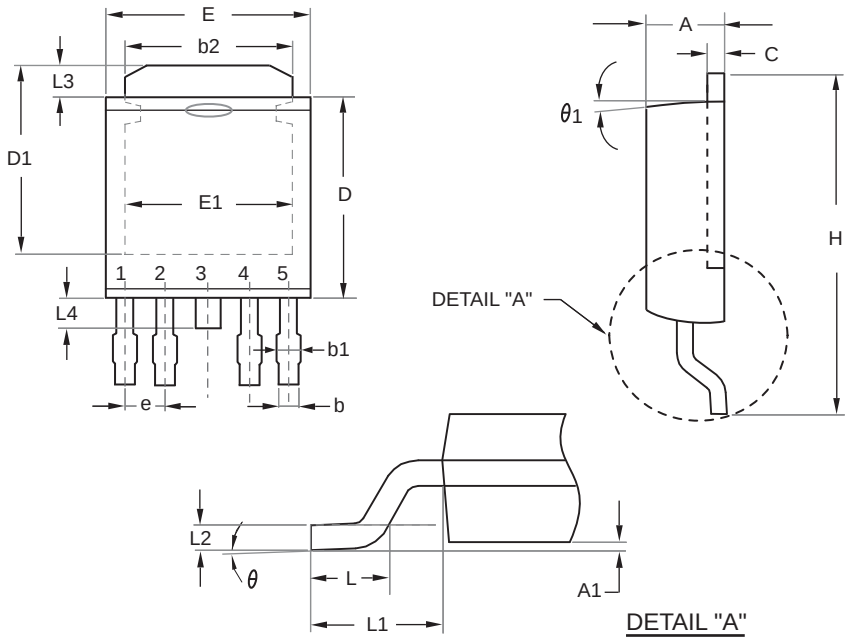


Figure 16. Normalized Thermal Transient Impedance Curve

PACKAGE OUTLINE DIMENSIONS

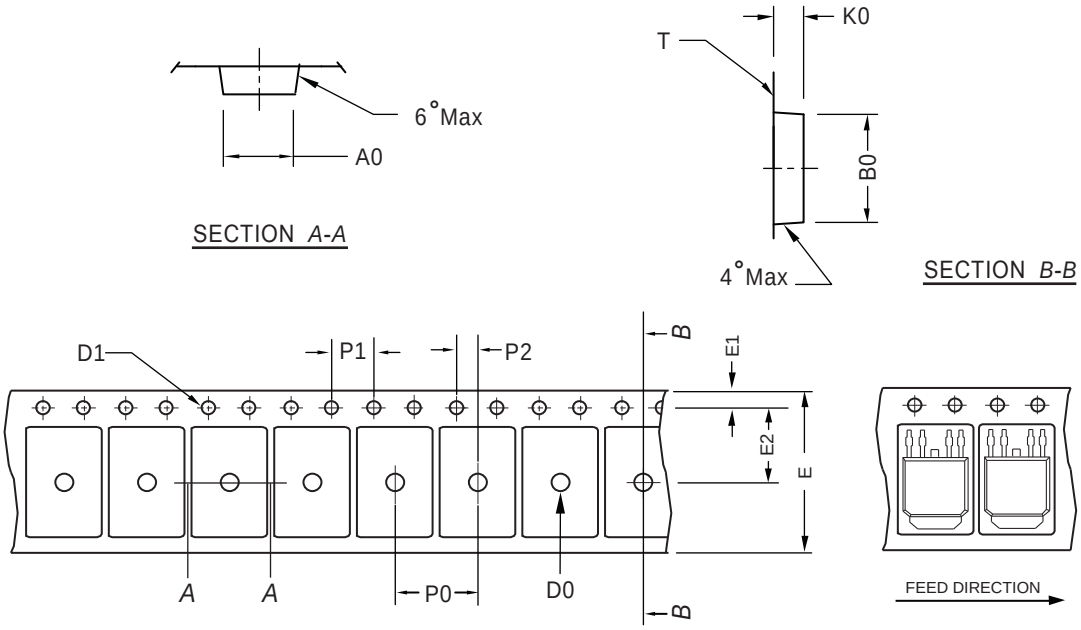
TO-252-4L



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

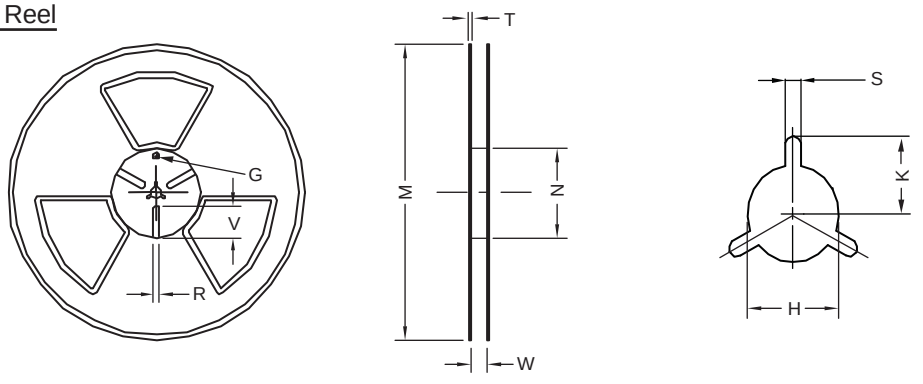
TO-252-4L Carrier Tape



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	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-252-4L 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	---	---	---