STU310DH

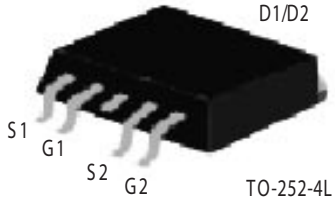
SamHop Microelectronics Corp.

May,28,2007

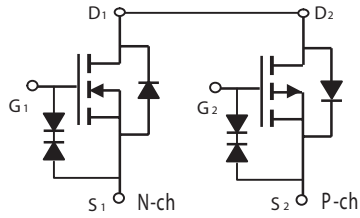
Dual Enhancement Mode Field Effect Transistor (N and P Channel)

PRODUCT SUMMARY (N-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
30V	19A	20 @ V_{GS} = 10V
		28 @ V_{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
-30V	-15A	30 @ V_{GS} = -10V
		44 @ V_{GS} = -4.5V



TO-252-4L



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

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Drain Current-Continuous @ Tc	25°C	I_D	19	-15	A
	70°C		17	-13	A
-Pulsed [a]		I_{DM}	50	-50	A
Drain-Source Diode Forward Current		I_S	10	-6	A
Maximum Power Dissipation	Tc= 25°C	P_D	11		W
	Tc= 70°C		7.7		
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175		°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	13.6	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	120	°C/W

STU310DH

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	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =24V, V_{GS} =0V			1	uA
Gate-Body Leakage	I_{GSS}	V_{GS} =±20V, V_{DS}= 0V			±10	uA
ON CHARACTERISTICS [a]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D = 250uA	1	1.8	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} =10V, I_D =10A		14	20	m ohm
		V_{GS} =4.5V, I_D= 8A		20	28	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 4.5V	20			A
Forward Transconductance	g_{FS}	V_{DS} = 10V, I_D= 10A		16.5		S
DYNAMIC CHARACTERISTICS [b]						
Input Capacitance	C_{ISS}	V_{DS} =15V, V_{GS} = 0V f =1.0MHz		635		pF
Output Capacitance	C_{OSS}			170		pF
Reverse Transfer Capacitance	C_{RSS}			97		pF
SWITCHING CHARACTERISTICS [b]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = 15V I_D = 1 A V_{GS} = 10V R_{GEN} = 6 ohm		12.5		ns
Rise Time	t_r			12		ns
Turn-Off Delay Time	$t_{D(OFF)}$			45		ns
Fall Time	t_f			10		ns
Total Gate Charge	Q_g	V_{DS} =15V, I_D =20A,V_{GS} =10V		12		nC
		V_{DS} =15V, I_D =20A,V_{GS} =4.5V		6		nC
Gate-Source Charge	Q_{gs}	V_{DS} =15V, I_D = 20 A V_{GS} =10V		1.8		nC
Gate-Drain Charge	Q_{gd}			3.5		nC

STU310DH

P-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	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =-24V, V_{GS} =0V			-1	uA
Gate-Body Leakage	I_{GSS}	V_{GS} =±20V, V_{DS}= 0V			±10	uA
ON CHARACTERISTICS [a]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D = -250uA	-1	-1.8	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} =-10V, I_D= -6A		24	30	m ohm
		V_{GS} =-4.5V, I_D= -4A		35	44	m ohm
On-State Drain Current	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -10V	-20			A
Forward Transconductance	g_{FS}	V_{DS} = -10V, I_D=-6A		12.5		S
DYNAMIC CHARACTERISTICS [b]						
Input Capacitance	C_{ISS}	V_{DS} =-15V, V_{GS} = 0V f =1.0MHz		1120		pF
Output Capacitance	C_{OSS}			280		pF
Reverse Transfer Capacitance	C_{RSS}			190		pF
SWITCHING CHARACTERISTICS [b]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = -15V I_D = -1A V_{GS} = -10V R_{GEN} = 6 ohm		15		ns
Rise Time	t_r			28		ns
Turn-Off Delay Time	$t_{D(OFF)}$			110		ns
Fall Time	t_f			30		ns
Total Gate Charge	Q_g	V_{DS} =-15V,I_D =-20A,V_{GS} =-10V		22		nC
		V_{DS}=-15V,I_D =-20A,V_{GS} =-4.5V		10.5		nC
Gate-Source Charge	Q_{gs}	V_{DS} =-15V, I_D = -20 A V_{GS} =-10V		2.5		nC
Gate-Drain Charge	Q_{gd}			6.5		nC

STU310DH

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

Parameter	Symbol	Condition		Min	Typ [c]	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS [b]							
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, Is =10A	N-Ch		0.9	1.3	V
		V_{GS} = 0V, Is =-6A	P-Ch		-0.9	-1.3	

Notes

a.Pulse Test:Pulse Width≤300μs, Duty Cycle≤2%.

b.Guaranteed by design, not subject to production testing.

N-Channel

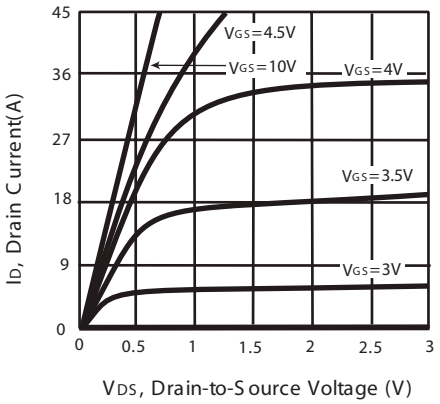


Figure 1. Output Characteristics

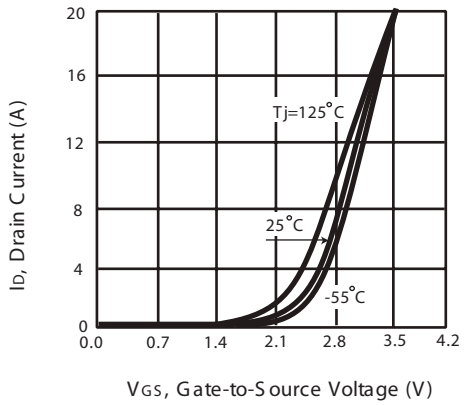


Figure 2. Transfer Characteristics

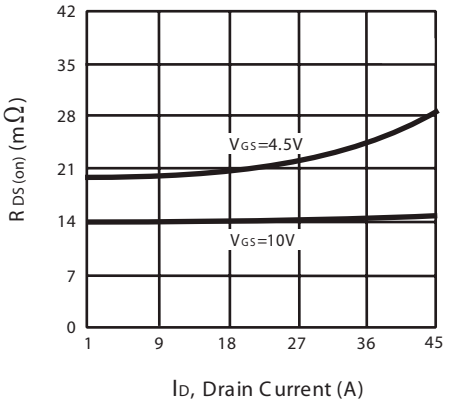


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

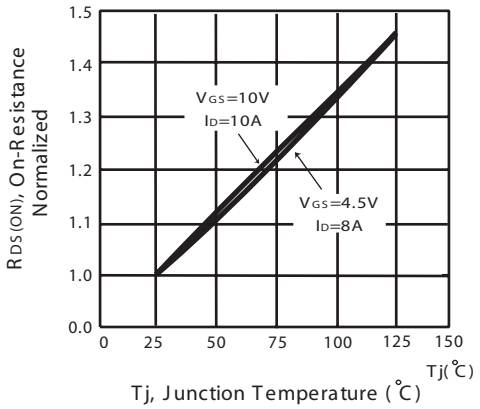


Figure 4. On-Resistance Variation with Drain Current and Temperature

STU310DH

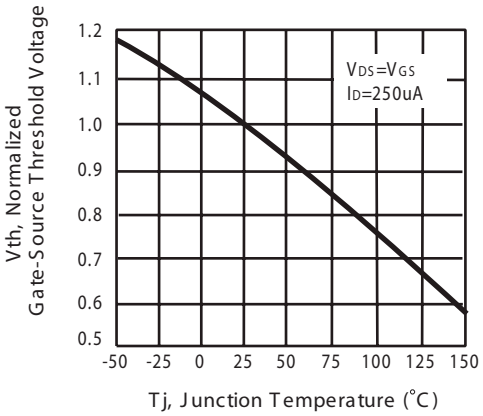


Figure 5. Gate Threshold Variation with Temperature

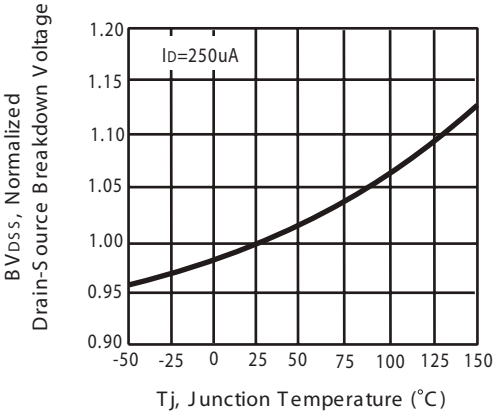


Figure 6. Breakdown Voltage Variation with Temperature

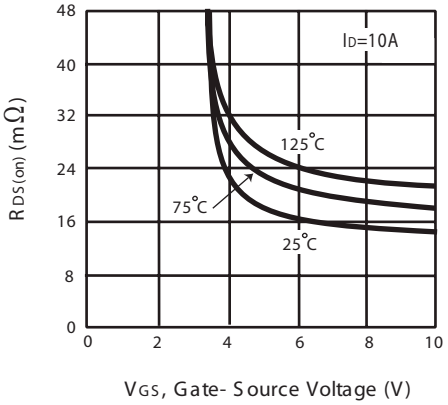


Figure 7. On-Resistance vs. Gate-Source Voltage

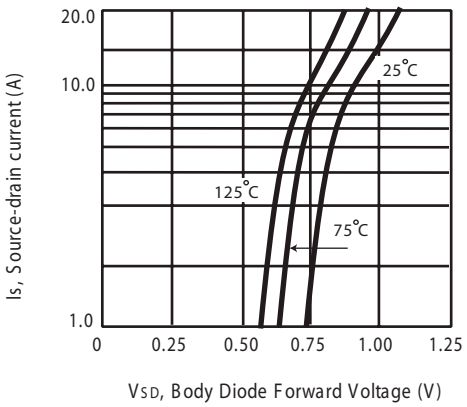


Figure 8. Body Diode Forward Voltage Variation with Source Current

STU310DH

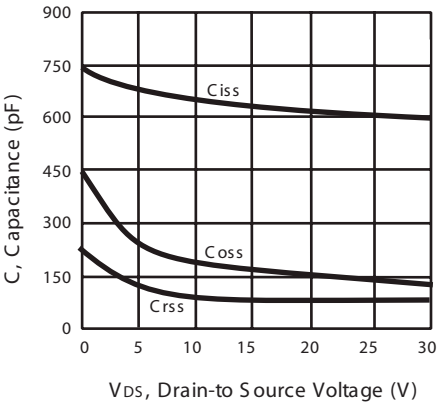


Figure 10. Capacitance

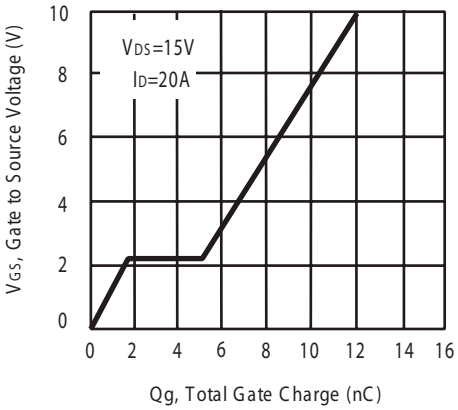


Figure 11. Gate Charge

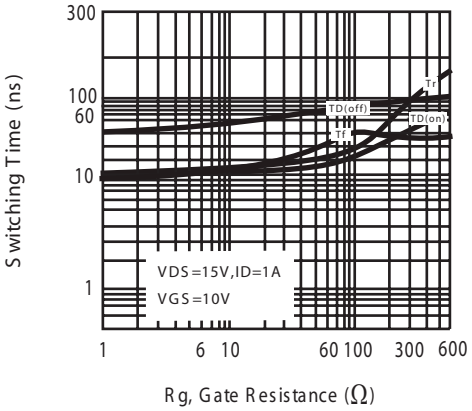


Figure 12.switching characteristics

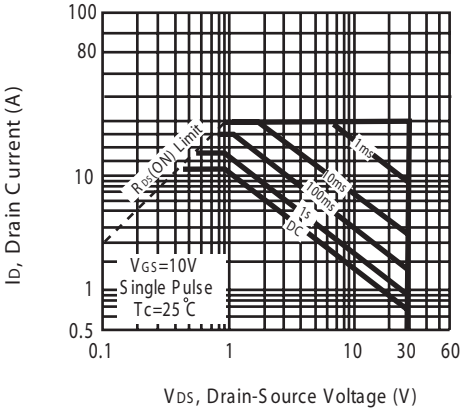


Figure 13. Maximum Safe Operating Area

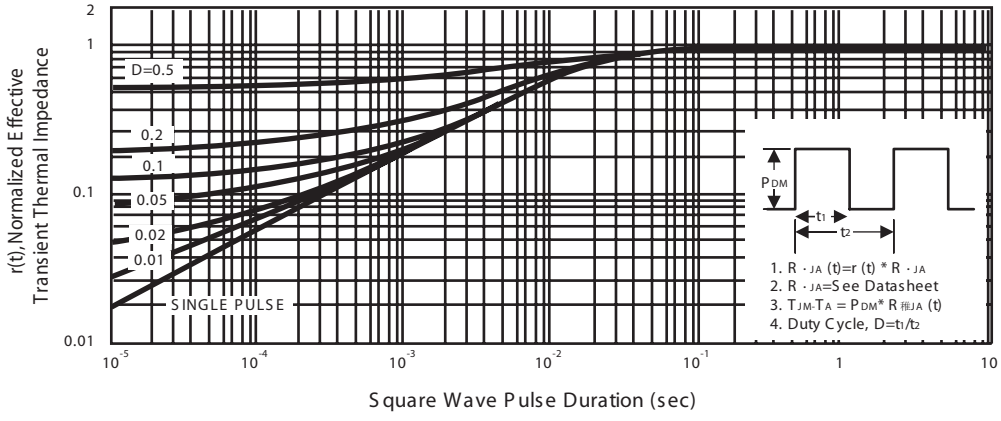


Figure 14. Normalized Thermal Transient Impedance Curve

STU310DH

P-Channel

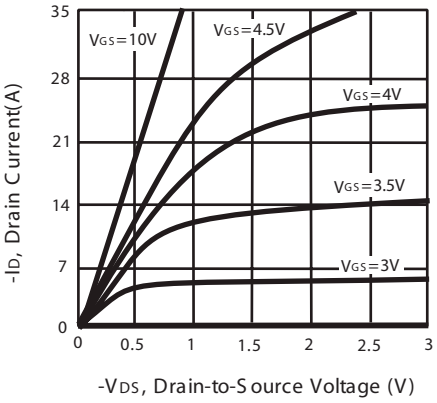
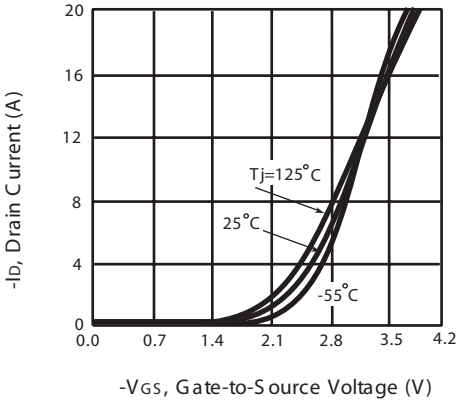


Figure 1. Output Characteristics



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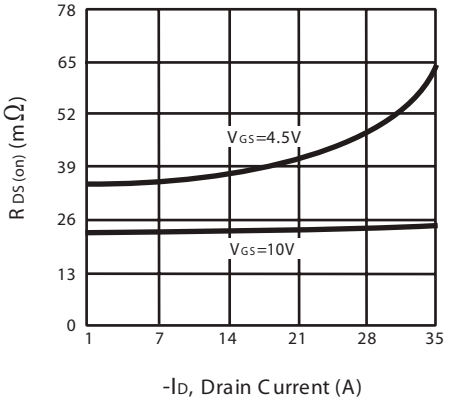


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

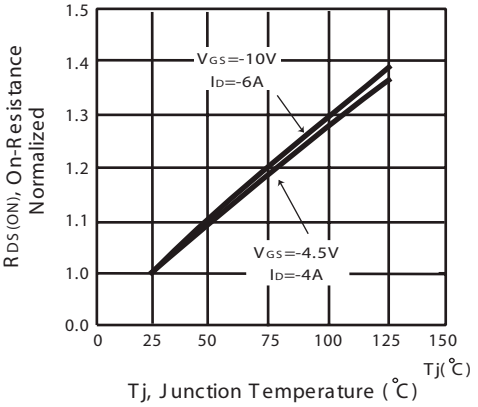


Figure 4. On-Resistance Variation with Drain Current and Temperature

STU310DH

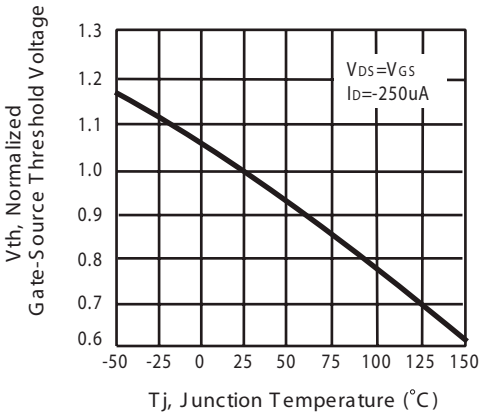


Figure 5. Gate Threshold Variation with Temperature

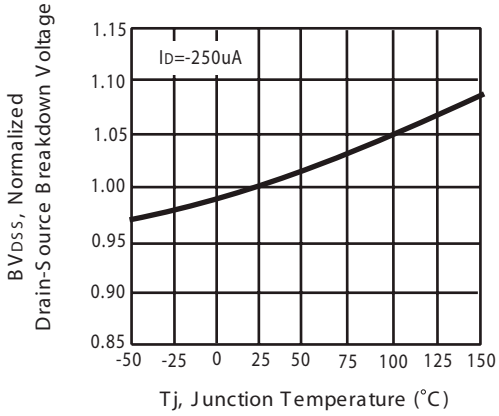


Figure 6. Breakdown Voltage Variation with Temperature

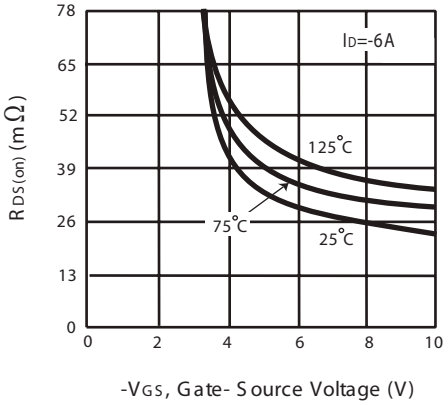


Figure 7. On-Resistance vs. Gate-Source Voltage

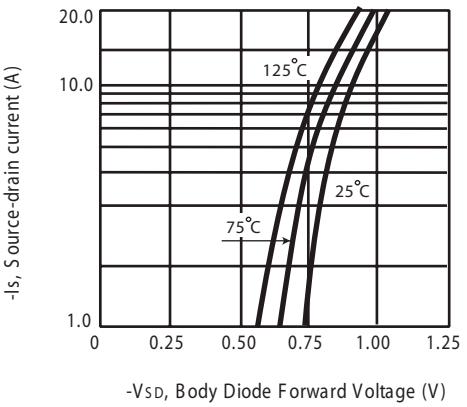


Figure 8. Body Diode Forward Voltage Variation with Source Current

STU310DH

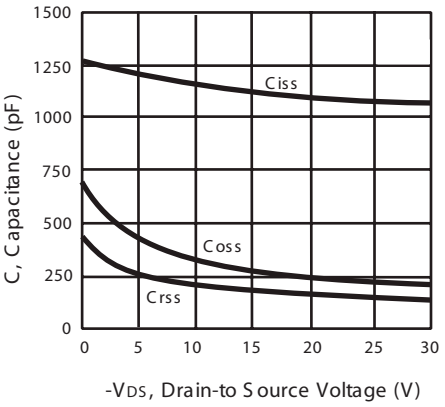
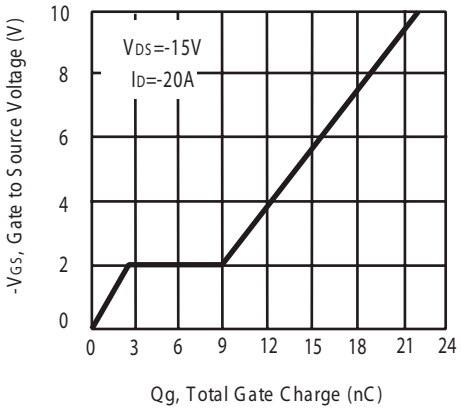


Figure 10. Capacitance



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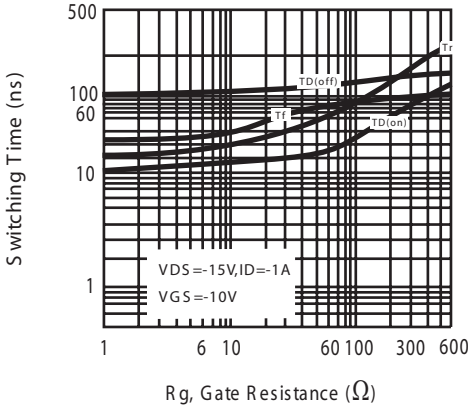


Figure 12.switching characteristics

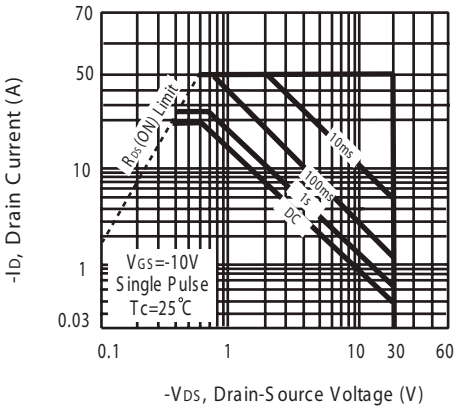


Figure 13. Maximum Safe Operating Area

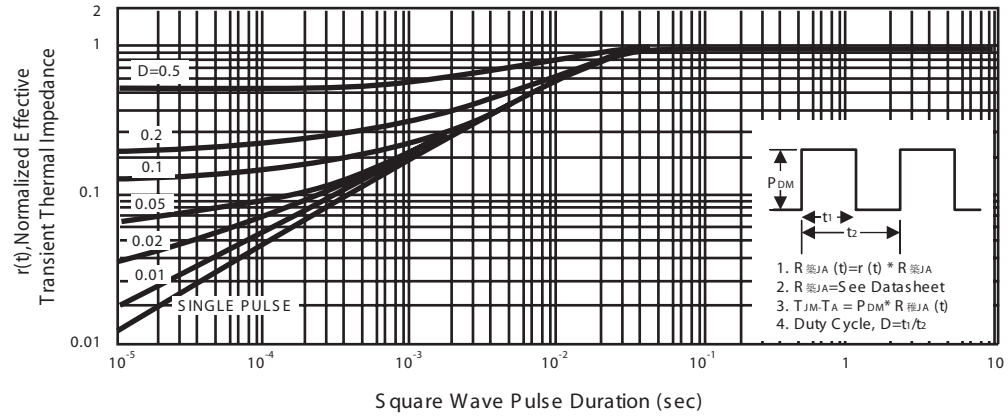
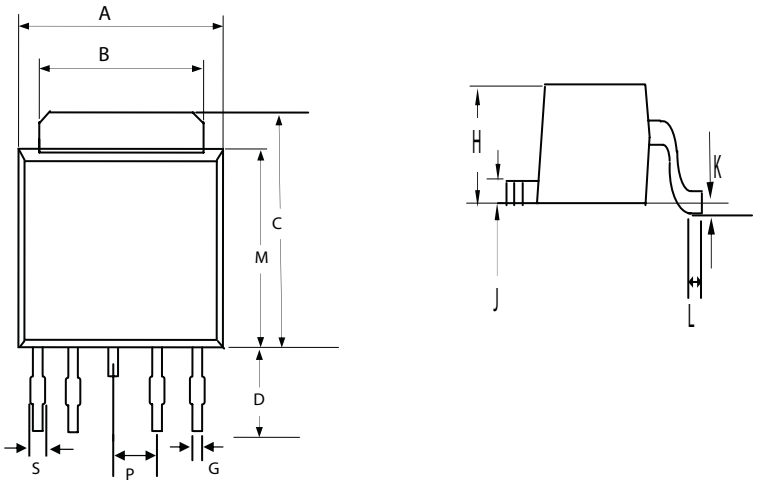


Figure 14. Normalized Thermal Transient Impedance Curve

STU310DH

PACKAGE OUTLINE DIMENSIONS

TO-252-4L

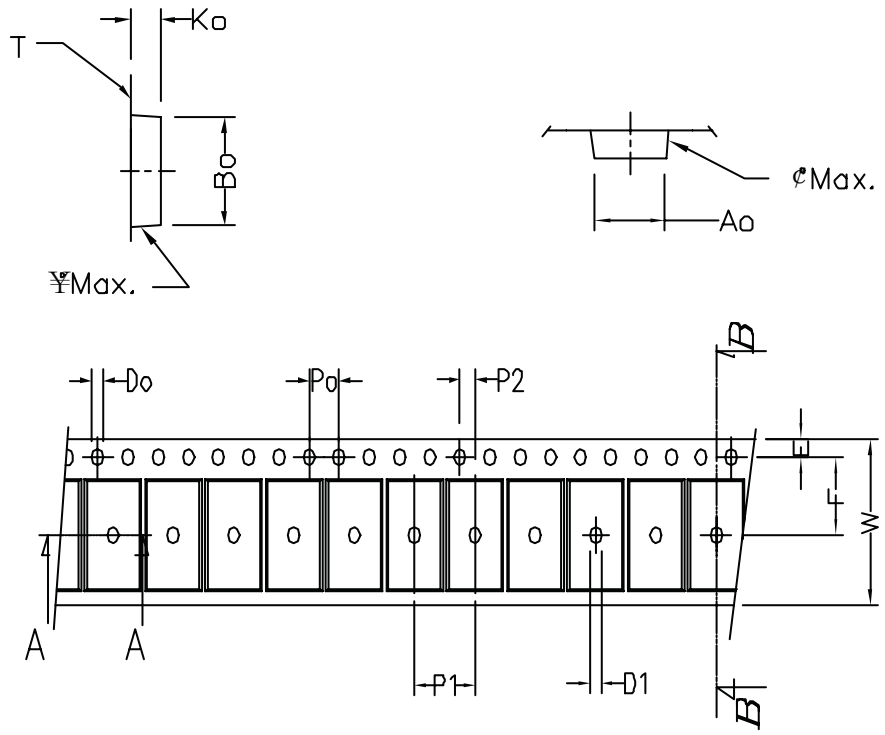


REF .	Millimeters	
	MIN	MAX
A	6.40	6.80
B	5.2	5.50
C	6.80	10.20
D	2.20	3.00
P	1.27 REF .	
S	0.50	0.80
G	0.40	0.60
H	2.20	2.40
J	0.45	0.60
K	0	0.15
L	0.90	1.50
M	5.40	5.80

STU310DH

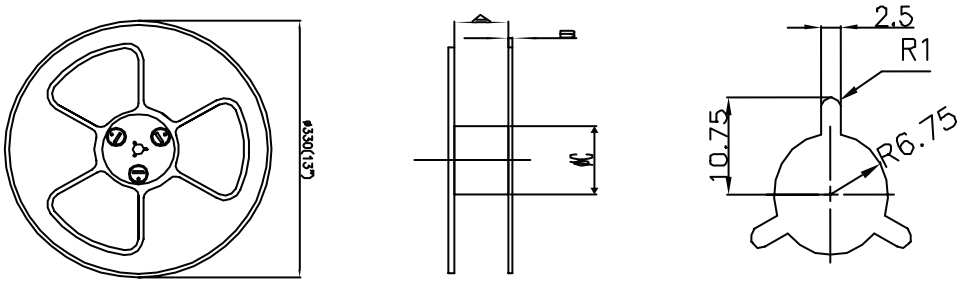
TO-252-4L Tape and Reel Data

TO-252-4L Carrier Tape



symbol	Ao	Bo	Ko	Po	P1	P2	T
Spec	6.96±0.1	10.49±0.1	2.79±0.1	4.0±0.1	8.0±0.10	2.0±0.05	0.33±0.013
symbol	E	F	Do	D1	W	10Po	
Spec	1.75±0.1	7.5±0.05	1.55±0.05	1.5±0.25	$16.0^{+0.3}_{-0.1}$	40.0±0.2	

TO-252-4L Reel



UNIT: b

Width of carrier tape	8	12	16	24	32	44	56
A±0.1	9.4	13.4	17.4	25.4	33.4	45.4	57.4
B	2.3	2.3	2.3	2.3	2.3	2.3	2.3
øC	100	100	100	100	100	100	100