



STU407DH

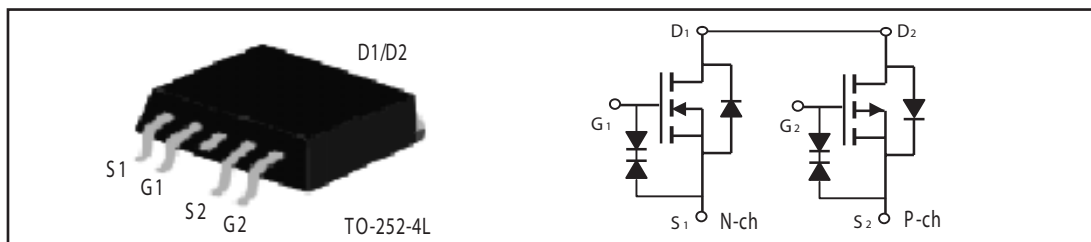
Dual Enhancement Mode Field Effect Transistor (N and P Channel)

PRODUCT SUMMARY (N-Channel)

V _{DSS}	I _D	R _{DS(ON)} (m Ω) Max
40V	16A	29 @ V _{GS} = 10V
		39 @ V _{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)

V _{DSS}	I _D	R _{DS(ON)} (m Ω) Max
-40V	-12A	47 @ V _{GS} = -10V
		64 @ V _{GS} = -4.5V



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

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V _{DS}	40	-40	V
Gate-Source Voltage		V _{GS}	±20	±20	V
Drain Current-Continuous @ T _c	25°C	I _D	16	-12	A
	70°C		13.8	-10	A
-Pulsed ^a		I _{DM}	50	-50	A
Drain-Source Diode Forward Current		I _S	8	-6	A
Maximum Power Dissipation	T _c = 25°C	P _D	11		W
	T _c = 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 θ JC	13.6	°C/W
Thermal Resistance, Junction-to-Ambient	R θ JA	120	°C/W

STU407DH

N-Channel ELECTRICAL CHARACTERISTICS (TA = 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	40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 32V, 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 = 8A		21	29	m ohm
		V _{GS} = 4.5V, I _D = 6A		29	39	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 = 8A		15		S
DYNAMIC CHARACTERISTICS ^b						
Input Capacitance	C _{ISS}	V _{DS} = 20V, V _{GS} = 0V f = 1.0MHz		735		pF
Output Capacitance	C _{OSS}			120		pF
Reverse Transfer Capacitance	C _{RSS}			70		pF
Gate resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f = 1.0MHz		0.36		ohm
SWITCHING CHARACTERISTICS ^b						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 20V I _D = 3 A V _{GS} = 10V R _{GEN} = 3 ohm		13		ns
Rise Time	t _r			15		ns
Turn-Off Delay Time	t _{D(OFF)}			26		ns
Fall Time	t _f			10		ns
Total Gate Charge	Q _g	V _{DS} = 20V, I _D = 8A, V _{GS} = 10V		15		nC
		V _{DS} = 20V, I _D = 8A, V _{GS} = 4.5V		7.2		nC
Gate-Source Charge	Q _{gs}	V _{DS} = 20V, I _D = 8 A V _{GS} = 10V		2.0		nC
Gate-Drain Charge	Q _{gd}			3.8		nC

STU407DH

P-Channel ELECTRICAL CHARACTERISTICS (TA = 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	-40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -32V, 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	-1.6	-3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = -10V, I _D = -6A		39	47	m ohm
		V _{GS} = -4.5V, I _D = -4A		49	64	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		9		S
DYNAMIC CHARACTERISTICS ^b						
Input Capacitance	C _{ISS}	V _{DS} = -20V, V _{GS} = 0V f = 1.0MHz		920		pF
Output Capacitance	C _{OSS}			135		pF
Reverse Transfer Capacitance	C _{RSS}			75		pF
Gate resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f = 1.0MHz		3.5		ohm
SWITCHING CHARACTERISTICS ^b						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = -20V I _D = -3A V _{GS} = -10V R _{GEN} = 3 ohm		12		ns
Rise Time	t _r			13		ns
Turn-Off Delay Time	t _{D(OFF)}			60		ns
Fall Time	t _f			25		ns
Total Gate Charge	Q _g	V _{DS} = -20V, I _D = -6A, V _{GS} = -10V		15		nC
		V _{DS} = -20V, I _D = -6A, V _{GS} = -4.5V		7.2		nC
Gate-Source Charge	Q _{gs}	V _{DS} = -20V, I _D = -6 A V _{GS} = -10V		2		nC
Gate-Drain Charge	Q _{gd}			4.0		nC

STU407DH

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, I _S = 8A V _{GS} = 0V, I _S = -6A	N-Ch P-Ch	0.94 -0.87	1.2 -1.2	V

Notes

- a. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

N-Channel

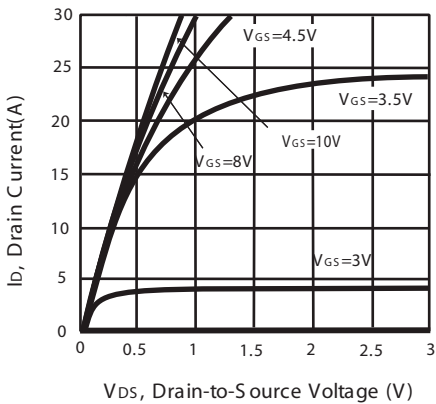


Figure 1. Output Characteristics

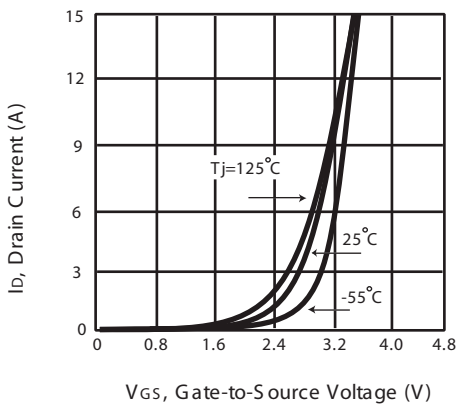


Figure 2. Transfer Characteristics

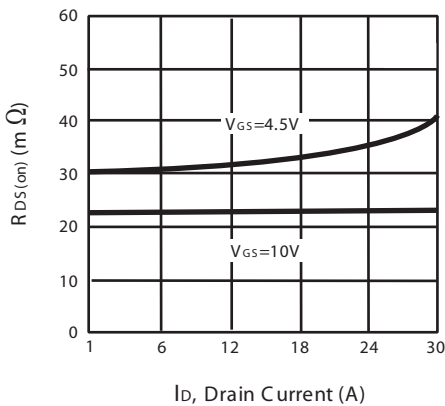


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

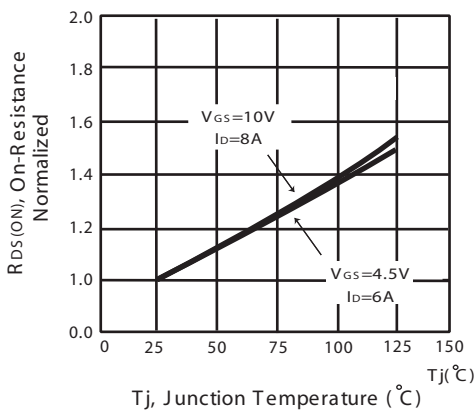


Figure 4. On-Resistance Variation with Drain Current and Temperature

STU407DH

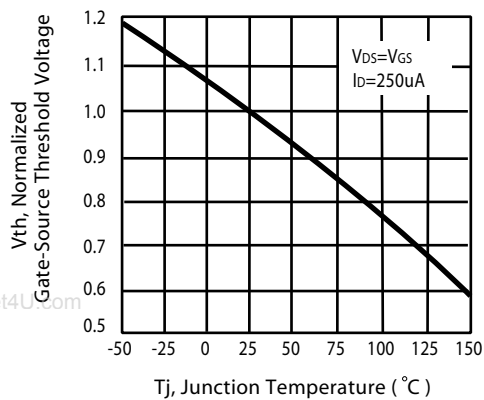


Figure 5. Gate Threshold Variation with Temperature

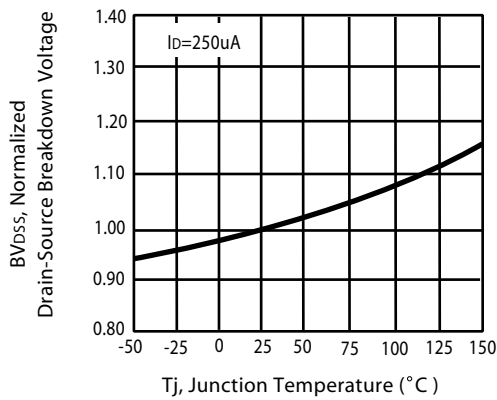


Figure 6. Breakdown Voltage Variation with Temperature

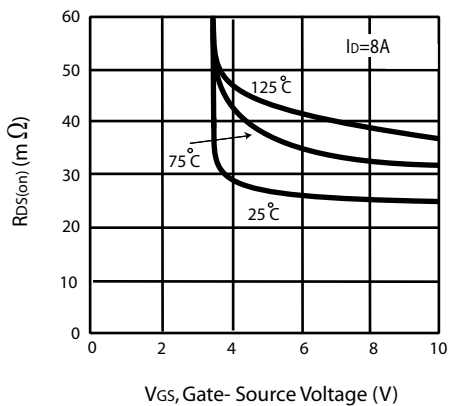


Figure 7. On-Resistance vs. Gate-Source Voltage

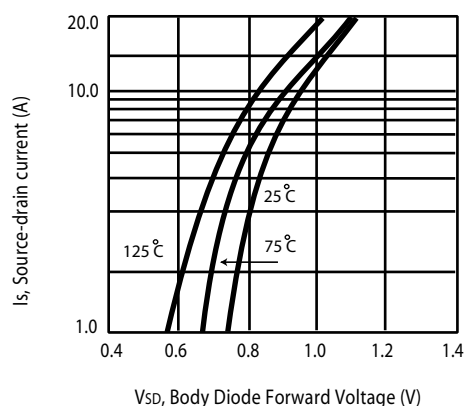


Figure 8. Body Diode Forward Voltage Variation with Source Current

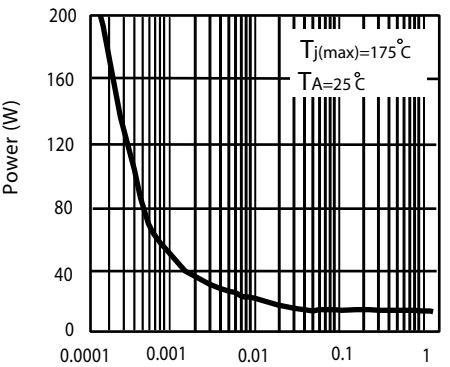


Figure 9. Single Pulse Power Rating Junction-to-Case

STU407DH

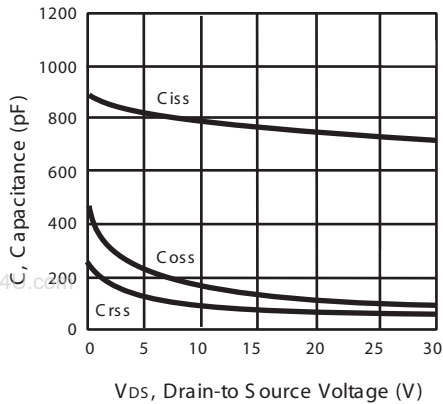


Figure 10. Capacitance

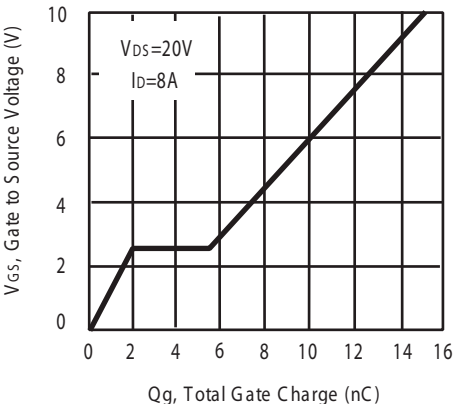


Figure 11. Gate Charge

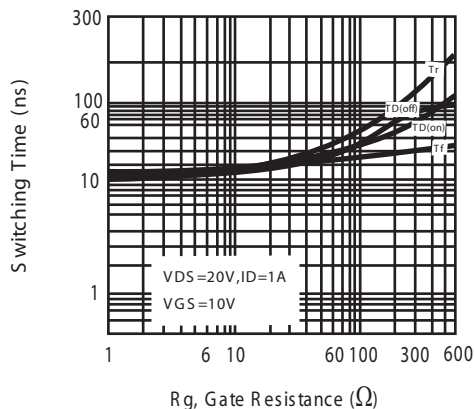


Figure 12. switching characteristics

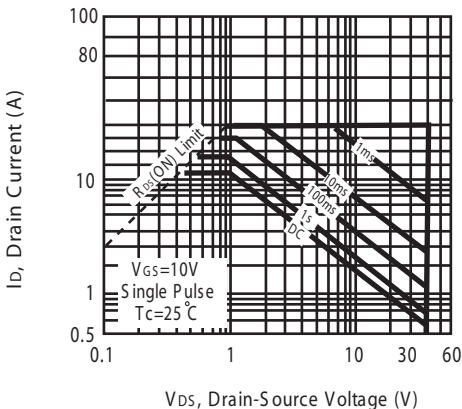


Figure 13. Maximum Safe Operating Area

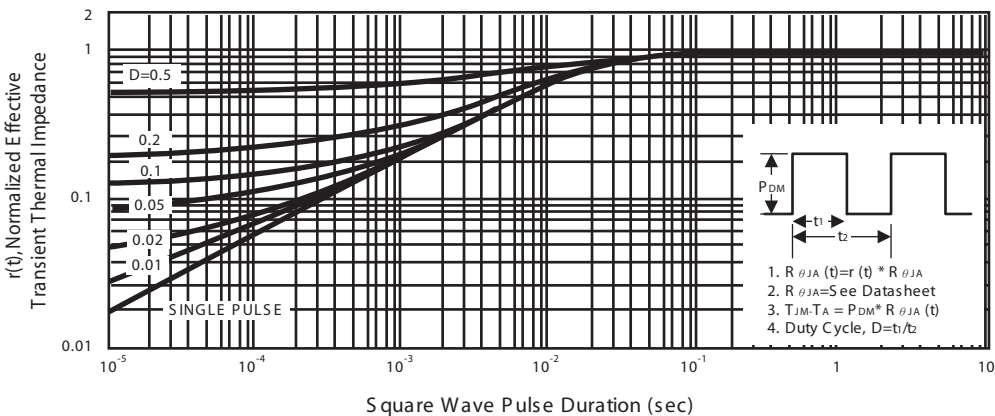


Figure 14. Normalized Thermal Transient Impedance

STU407DH

P-Channel

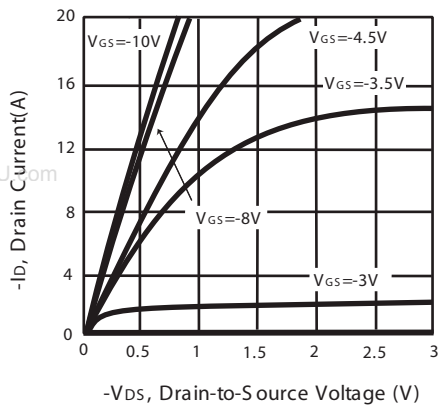


Figure 1. Output Characteristics

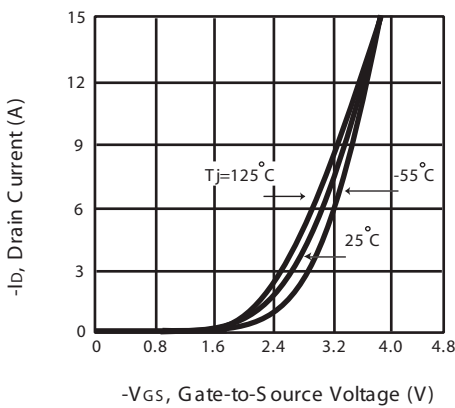


Figure 2. Transfer Characteristics

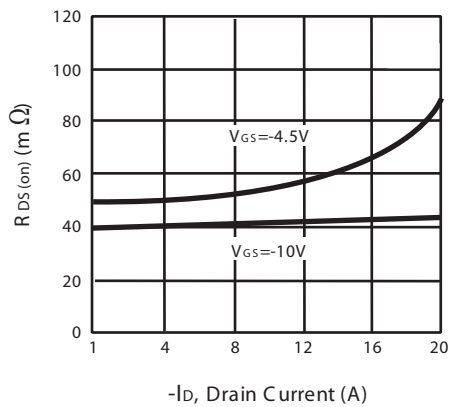


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

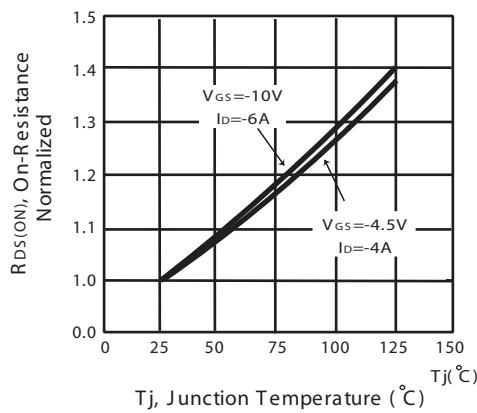


Figure 4. On-Resistance Variation with Drain Current and Temperature

STU407DH

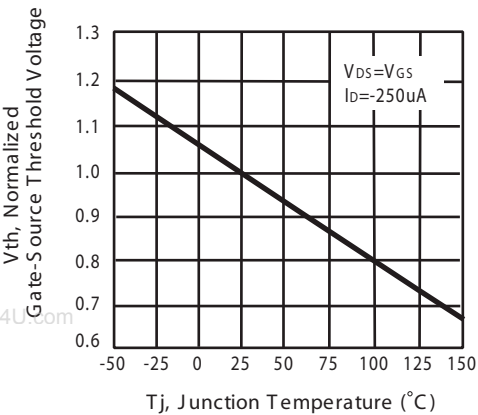


Figure 5. Gate Threshold Variation with Temperature

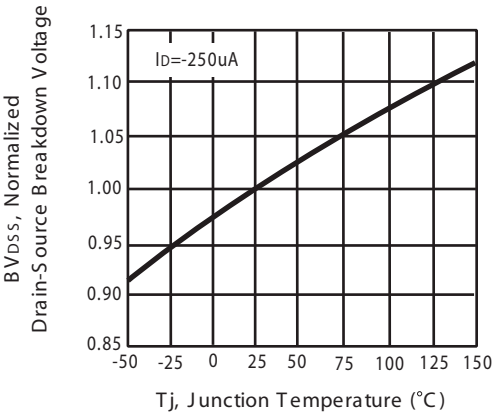


Figure 6. Breakdown Voltage Variation with Temperature

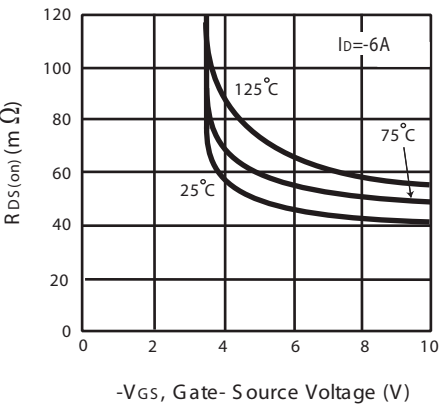


Figure 7. On-Resistance vs. Gate-Source Voltage

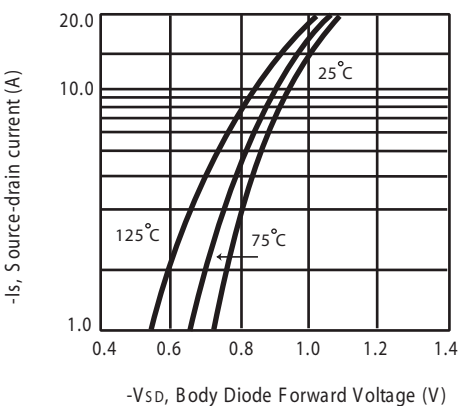


Figure 8. Body Diode Forward Voltage Variation with Source Current

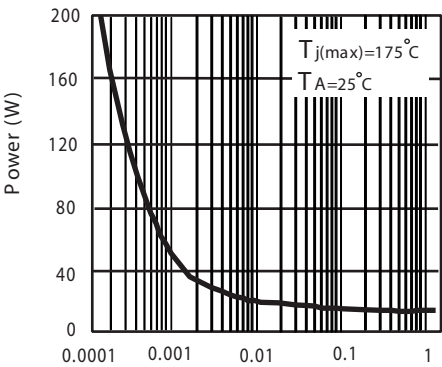
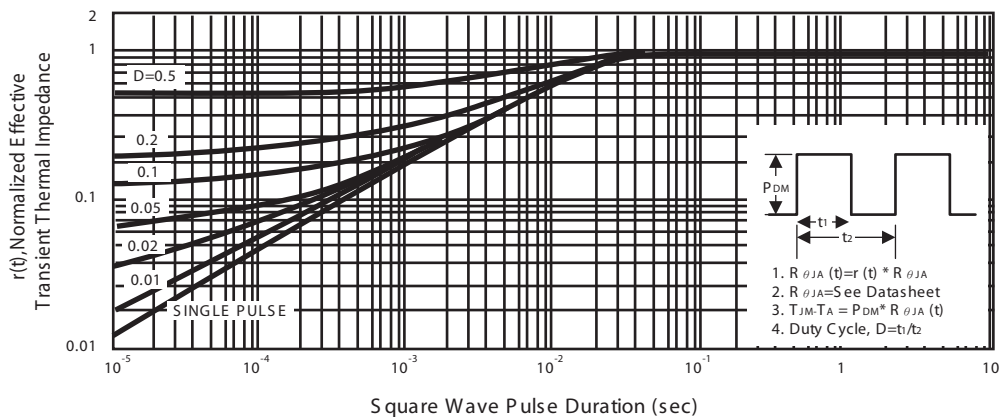
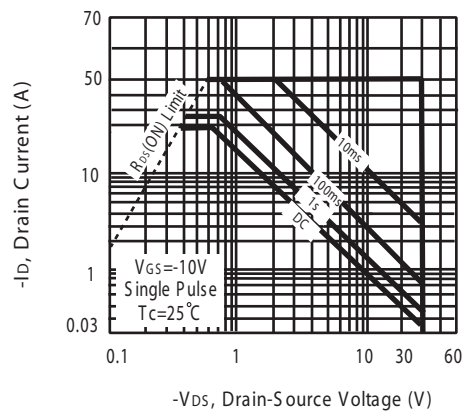
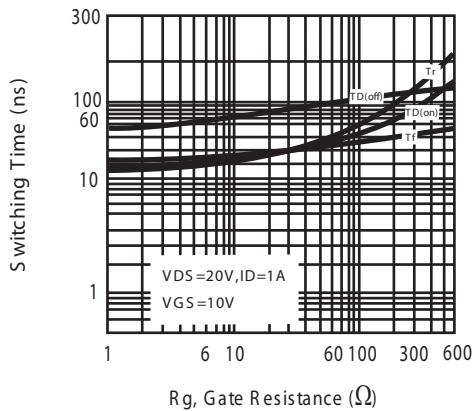
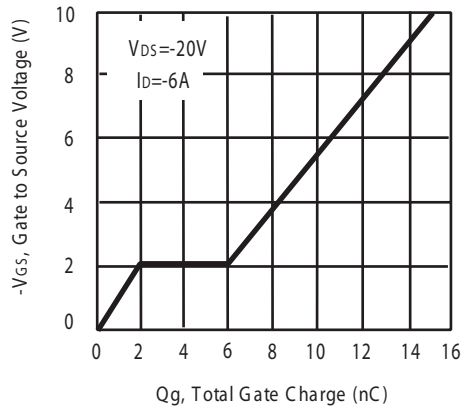
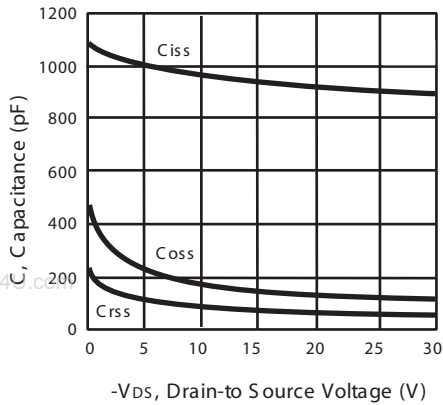


Figure 9. Single Pulse Power Rating Junction-to-Case

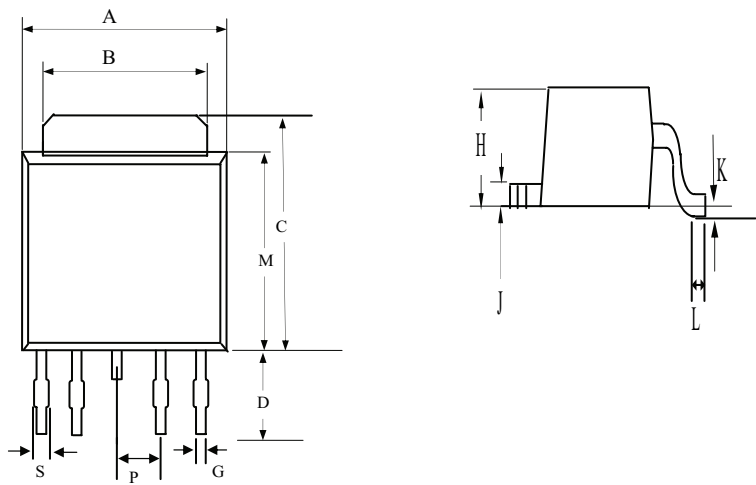
STU407DH



STU407DH

PACKAGE OUTLINE DIMENSIONS

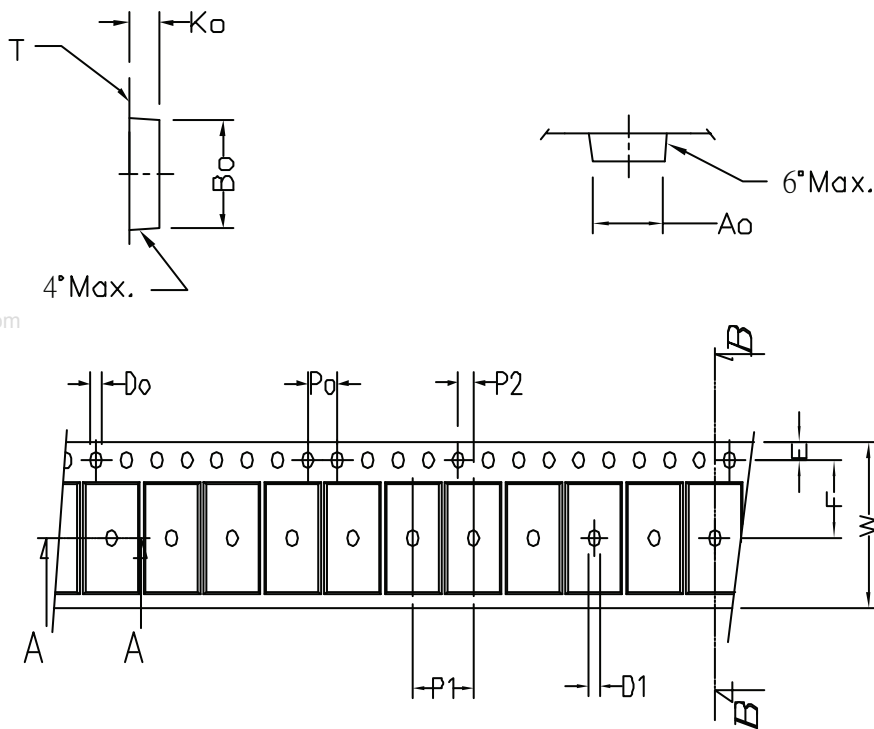
TO-252-4L



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

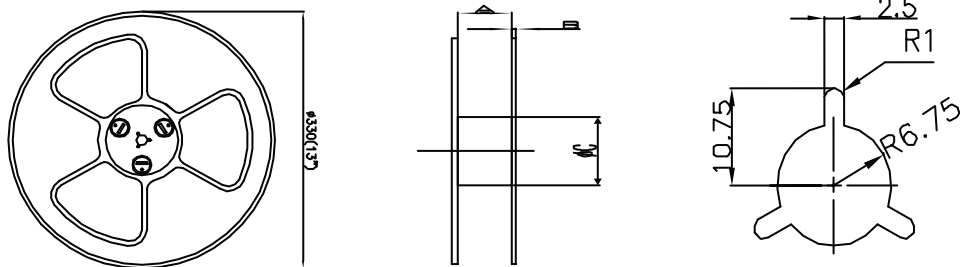
TO-252-4L Tape and Reel Data

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:mm

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