SamHop Microelectronics Corp.

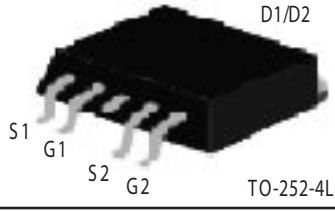
STU409DH

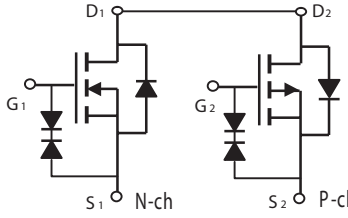
May 29 2007

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

PRODUCT SUMMARY (N-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
40V	18A	24 @ V_{GS} = 10V
		30 @ V_{GS} = 4.5V

PRODUCT SUMMARY (P-Channel)		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
-40V	-14A	35 @ V_{GS} = -10V
		50 @ 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 @ Tc	25°C	I_D	18	-14	A
	70°C		15	-11	A
-Pulsed [a]		I_{DM}	50	-50	A
Drain-Source Diode Forward Current		I_S	8	-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

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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	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		18	24	m ohm
		V_{GS}=4.5V, I_D= 6A		23	30	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		17		S
DYNAMIC CHARACTERISTICS [b]						
Input Capacitance	C_{ISS}	V_{DS} =20V, V_{GS} = 0V f =1.0MHz		700		pF
Output Capacitance	C_{OSS}			120		pF
Reverse Transfer Capacitance	C_{RSS}			75		pF
SWITCHING CHARACTERISTICS [b]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = 20V I_D = 3 A V_{GS} = 10V R_{GEN} = 3 ohm		11		ns
Rise Time	t_r			12		ns
Turn-Off Delay Time	$t_{D(OFF)}$			45		ns
Fall Time	t_f			11		ns
Total Gate Charge	Q_g	V_{DS} =20V, I_D =8A, V_{GS} =10V		14		nC
		V_{DS} =20V, I_D =8A, V_{GS} =4.5V		7		nC
Gate-Source Charge	Q_{gs}	V_{DS} =20V, I_D = 8 A V_{GS} =10V		1.6		nC
Gate-Drain Charge	Q_{gd}			3.4		nC

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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	-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= -6A		28	35	m ohm
		V_{GS}=-4.5V, I_D= -4A		42	50	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		11		S
DYNAMIC CHARACTERISTICS [b]						
Input Capacitance	C_{ISS}	V_{DS}=-20V, V_{GS}= 0V f=1.0MHz		1000		pF
Output Capacitance	C_{OSS}			175		pF
Reverse Transfer Capacitance	C_{RSS}			95		pF
SWITCHING CHARACTERISTICS [b]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = -20V I_D = -3A V_{GS} = -10V R_{GEN} = 3 ohm		11		ns
Rise Time	t_r			15		ns
Turn-Off Delay Time	$t_{D(OFF)}$			72		ns
Fall Time	t_f			30		ns
Total Gate Charge	Q_g	V_{DS}=-20V, I_D=-6A,V_{GS}=-10V		17.5		nC
		V_{DS}=-20V, I_D=-6A,V_{GS}=-4.5V		8.5		nC
Gate-Source Charge	Q_{gs}	V_{DS}=-20V, I_D= -6 A V_{GS}=-10V		2.3		nC
Gate-Drain Charge	Q_{gd}			4.5		nC

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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 =8A V_{GS} = 0V, Is =-6A	N-Ch P-Ch		0.94 -0.87	1.3 -1.3	V

Notes

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

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

N-Channel

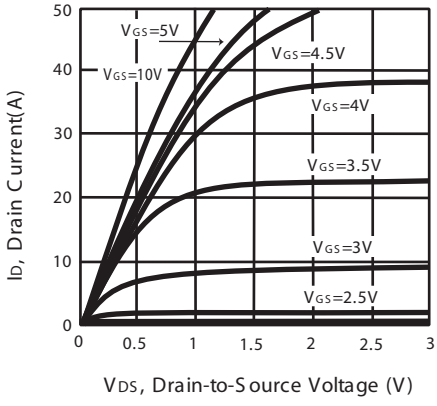

Figure 1. Output Characteristics

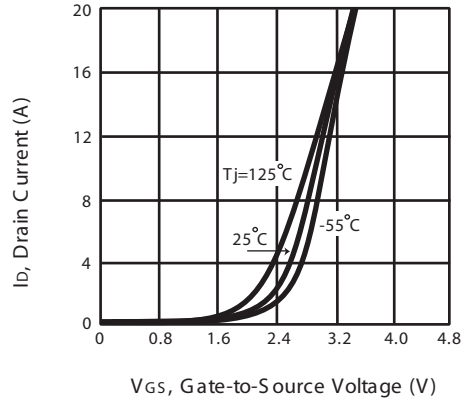

Figure 2. Transfer Characteristics

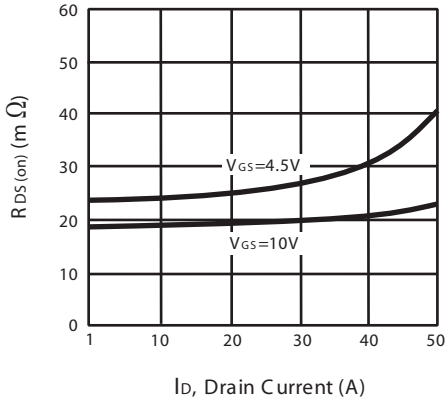

Figure 3. On-Resistance vs. Drain Current and Gate Voltage

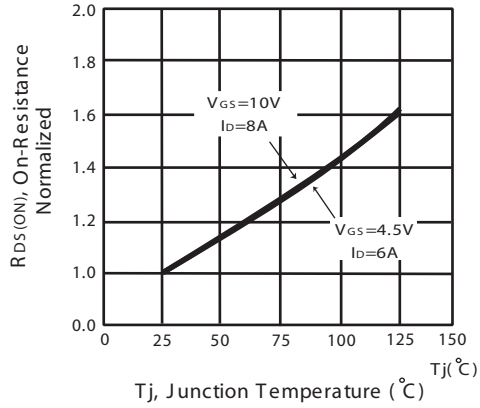

Figure 4. On-Resistance Variation with Drain Current and Temperature

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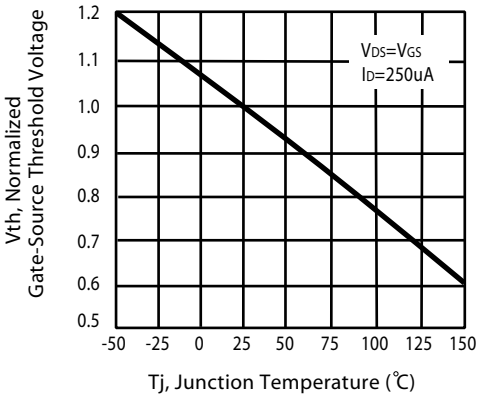

Figure 5. Gate Threshold Variation with Temperature

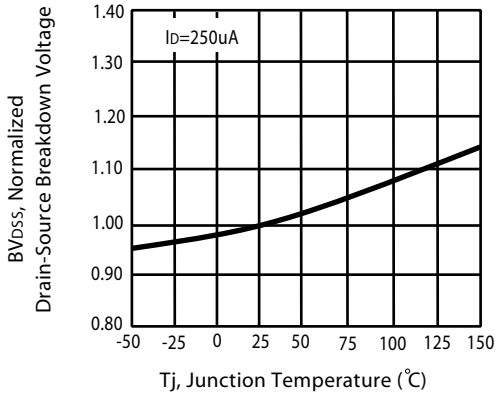

Figure 6. Breakdown Voltage Variation with Temperature

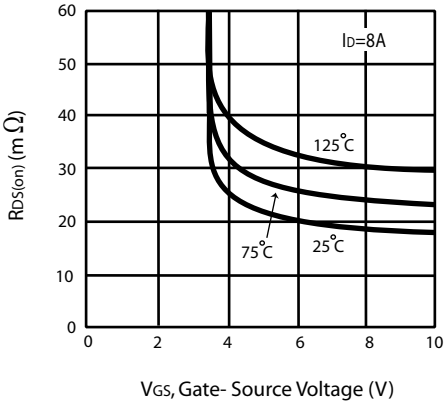

Figure 7. On-Resistance vs. Gate-Source Voltage

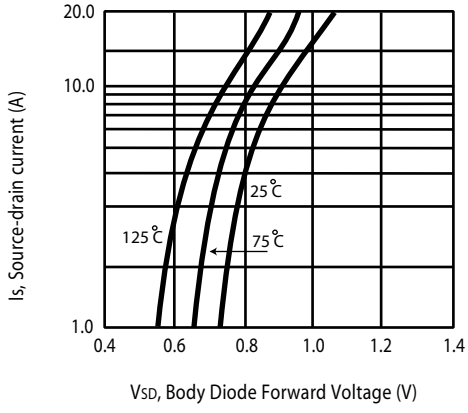

Figure 8. Body Diode Forward Voltage Variation with Source Current

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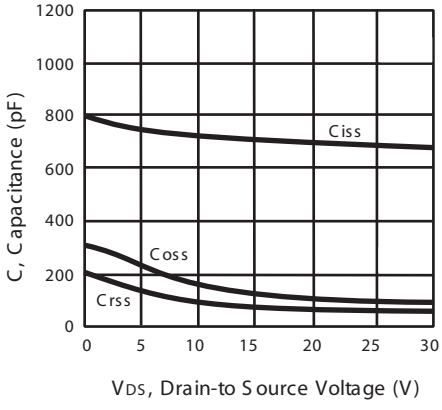

Figure 9. Capacitance

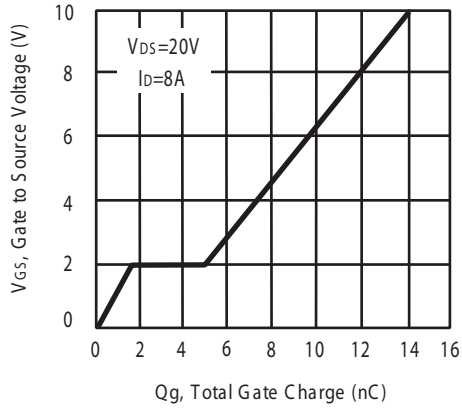

Figure 10. Gate Charge

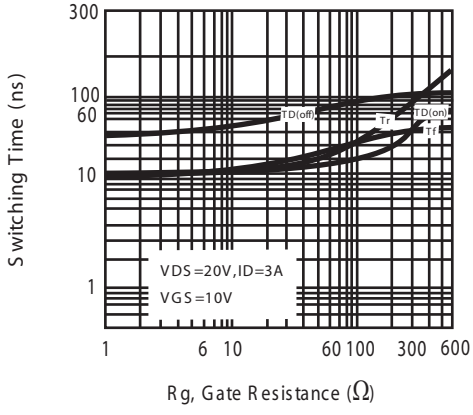

Figure 11.switching characteristics

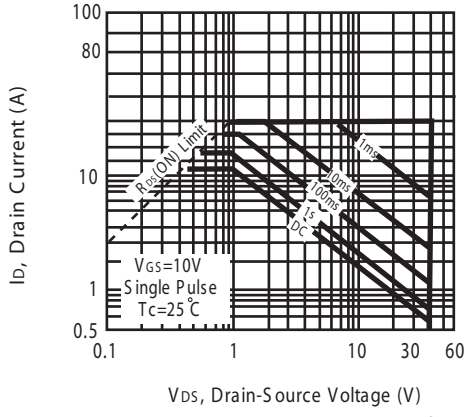

Figure 12. Maximum Safe Operating Area

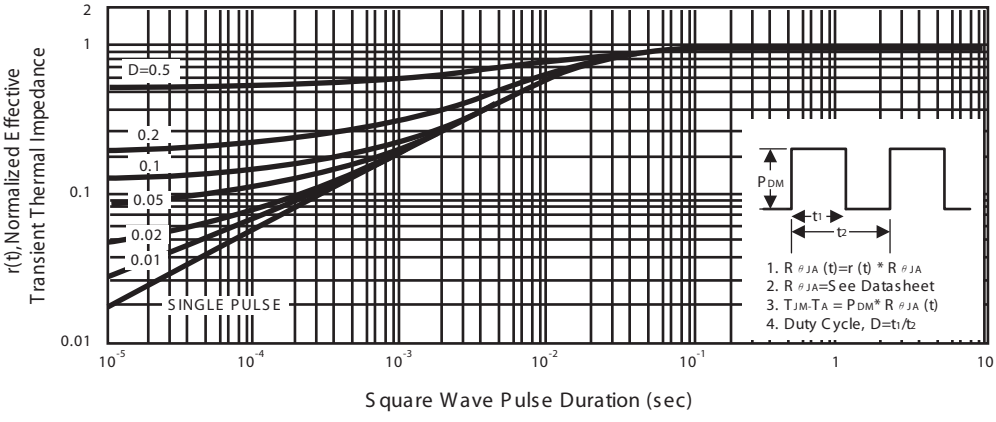

Figure 13. Normalized Thermal Transient Impedance Curve

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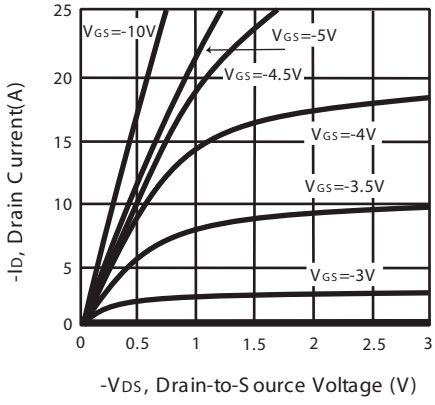
P-Channel



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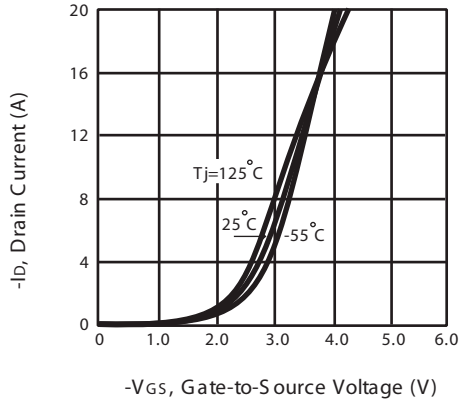
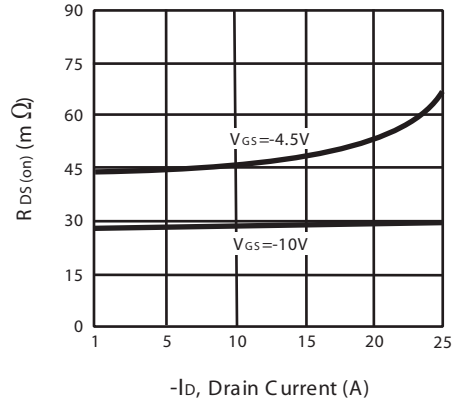


Figure 2. Transfer Characteristics



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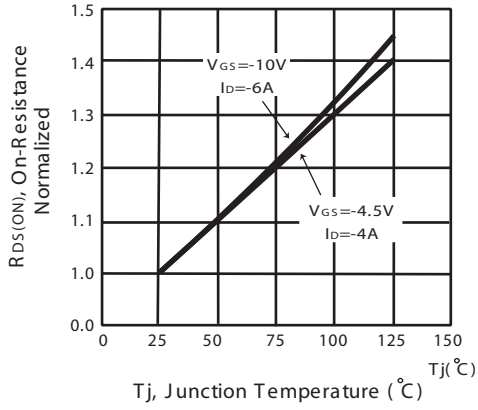

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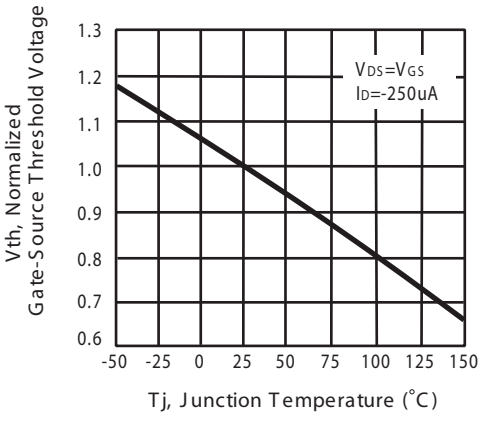

Figure 5. Gate Threshold Variation with Temperature

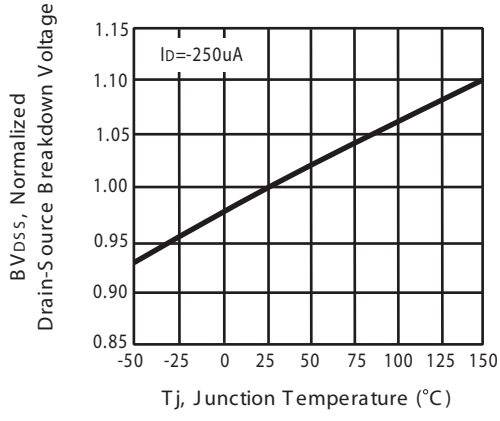

Figure 6. Breakdown Voltage Variation with Temperature

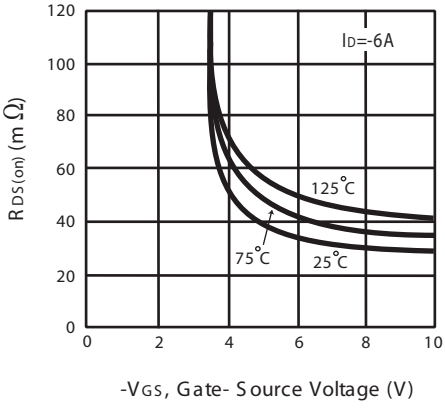

Figure 7. On-Resistance vs. Gate-Source Voltage

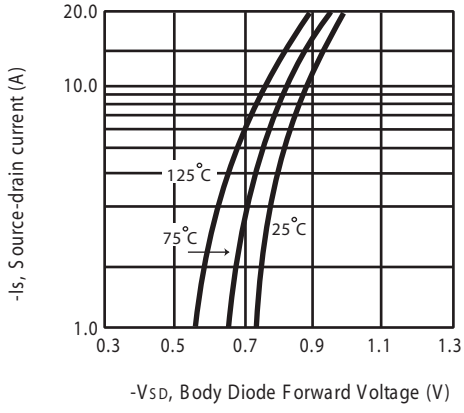

Figure 8. Body Diode Forward Voltage Variation with Source Current

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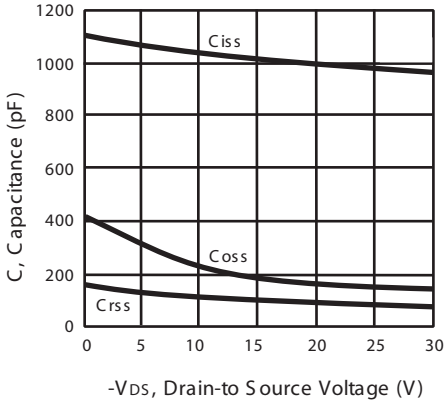


Figure 9. Capacitance

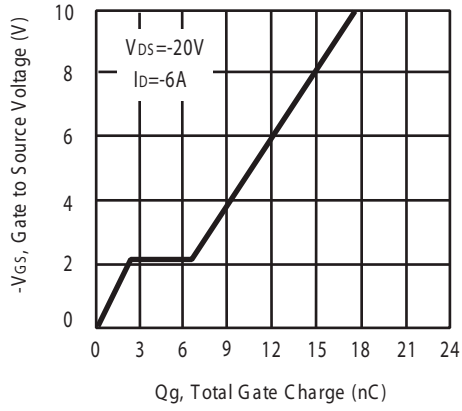
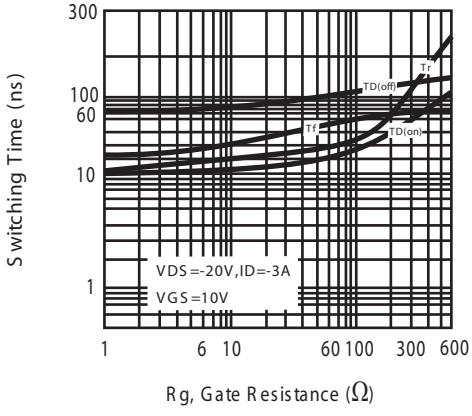


Figure 10. Gate Charge



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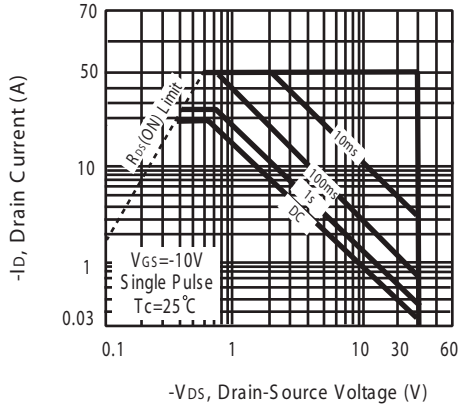

Figure 12. Maximum Safe Operating Area

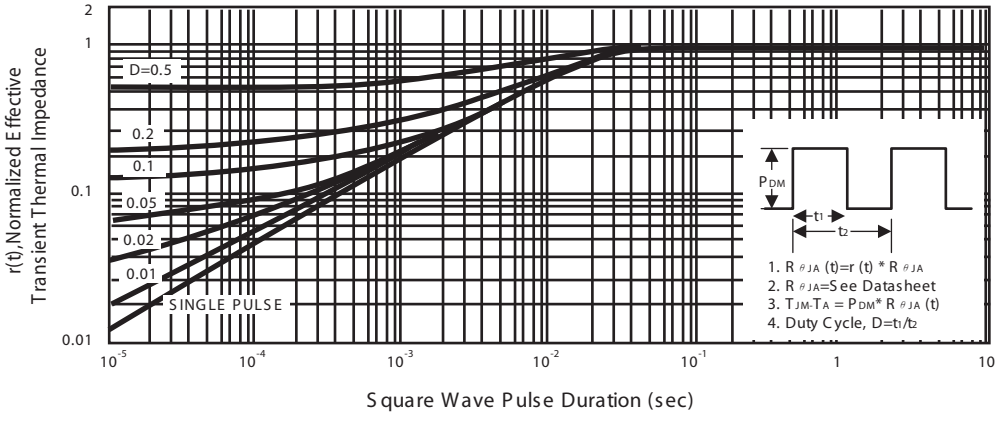

Figure 13. Normalized Thermal Transient Impedance Curve

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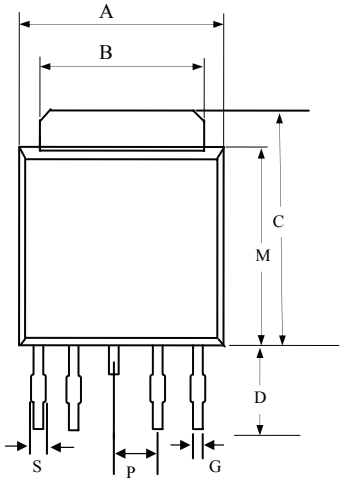
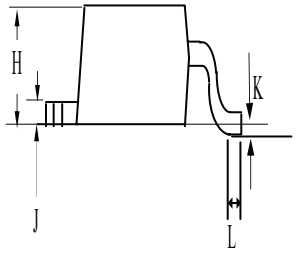
PACKAGE OUTLINE DIMENSIONS

TO-252-4L

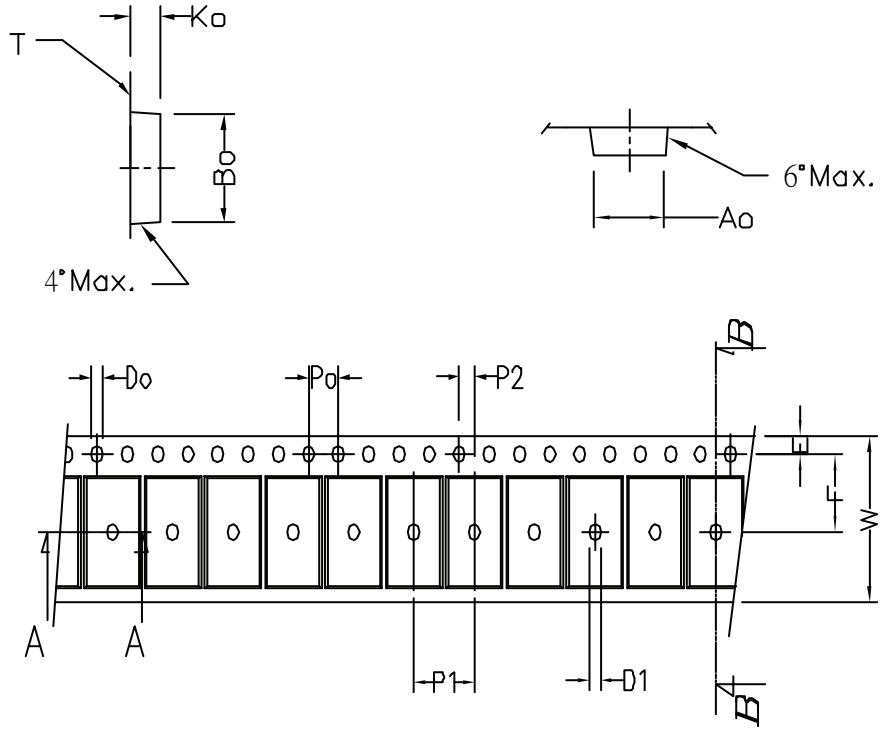




REF.	Millimeters	
	MIN	MAX
A	6.40	6.80
B	5.2	5.50
C	6.80	10.20
D	2.20	3.00
P	1.27 REF.	
S	0.50	0.80
G	0.40	0.60
H	2.20	2.40
J	0.45	0.60
K	0	0.15
L	0.90	1.50
M	5.40	5.80

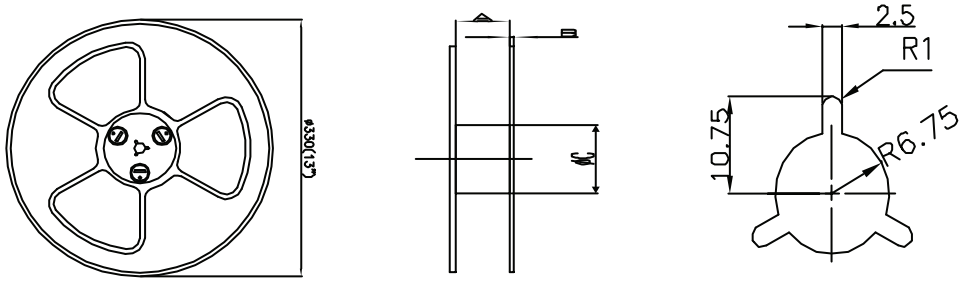
TO-252-4L Tape and Reel Data

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:㎜

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