

TSM900N06

60V N-Channel Power MOSFET



Pin Definition:
 1. Gate
 2. Drain
 3. Source



Key Parameter Performance

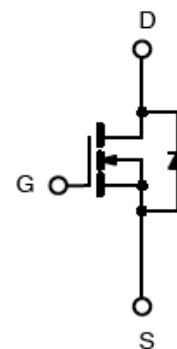
Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	90
	$V_{GS} = 4.5V$	100
Q_g	9.3	nC

Ordering Information

Part No.	Package	Packing
TSM900N06CH X0G	TO-251S	75pcs / Tube
TSM900N06CP ROG	TO-252	2.5kpcs / 13" Reel
TSM900N06CW RPG	SOT-223	2.5kpcs / 13" Reel

Note: "G" denotes for Halogen- and Antimony-free as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds

Block Diagram



N-Channel MOSFET

Absolute Maximum Ratings (T_c = 25°C unless otherwise noted)

Parameter	Symbol	Limit			Unit	
		IPAK	DPAK	SOT-223		
Drain-Source Voltage	V_{DS}	60			V	
Gate-Source Voltage	V_{GS}	±20			V	
Continuous Drain Current ^(Note 1)	I_D	T _c =25°C			A	
		T _c =100°C			A	
Pulsed Drain Current ^(Note 1)	I_{DM}	44			A	
Single Pulse Avalanche Energy ^(Note 3)	E_{AS}	25			mJ	
Single Pulse Avalanche Current ^(Note 3)	I_{AS}	7			A	
Total Power Dissipation	P_D	@ T _c =25°C	25	25	4.17	W
Dissipation		Derate above T _c =25°C	0.2	0.2	0.014	W/°C
Operating Junction Temperature	T_J	150			°C	
Storage Temperature Range	T_{STG}	-55 to +150			°C	



Thermal Performance

Parameter	Symbol	Limit			Unit
		IPAK	DKPAK	SOT-223	
Thermal Resistance - Junction to Case	$R_{\theta JC}$	5	5	30	$^{\circ}C/W$
Thermal Resistance - Junction to Ambient	$R_{\theta JA}$	62	62	70	$^{\circ}C/W$

Electrical Specifications ($T_C = 25^{\circ}C$ unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	60	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 6A$	$R_{DS(ON)}$	--	76	90	m Ω
	$V_{GS} = 4.5V, I_D = 3A$		--	87	100	
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1.2	1.8	2.5	V
Zero Gate Voltage Drain Current	$V_{DS} = 60V, V_{GS} = 0V$	I_{DSS}	--	--	1	μA
	$V_{DS} = 48V, T_J = 125^{\circ}C$		--	--	10	
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	μA
Forward Transconductance	$V_{DS} = 10V, I_D = 3A$	g_{fs}	--	4	--	S

Dynamic

Total Gate Charge ^(Note 4,5)	$V_{DS} = 48V, I_D = 6A, V_{GS} = 10V$	Q_g	--	9.3	--	nC
Gate-Source Charge ^(Note 4,5)		Q_{gs}	--	2.1	--	
Gate-Drain Charge ^(Note 4,5)		Q_{gd}	--	1.8	--	
Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$	C_{iss}	--	500	--	pF
Output Capacitance		C_{oss}	--	45	--	
Reverse Transfer Capacitance		C_{rss}	--	16	--	
Gate Resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	R_g	--	2	--	Ω

Switching

Turn-On Delay Time ^(Note 4,5)	$V_{DD} = 30V, V_{GS} = 10V, R_G = 3.3\Omega, I_D = -1A$	$t_{d(on)}$	--	2.9	--	ns
Turn-On Rise Time ^(Note 4,5)		t_r	--	9.5	--	
Turn-Off Delay Time ^(Note 4,5)		$t_{d(off)}$	--	18.4	--	
Turn-Off Fall Time ^(Note 4,5)		t_f	--	5.3	--	

Source-Drain Diode Ratings and Characteristic

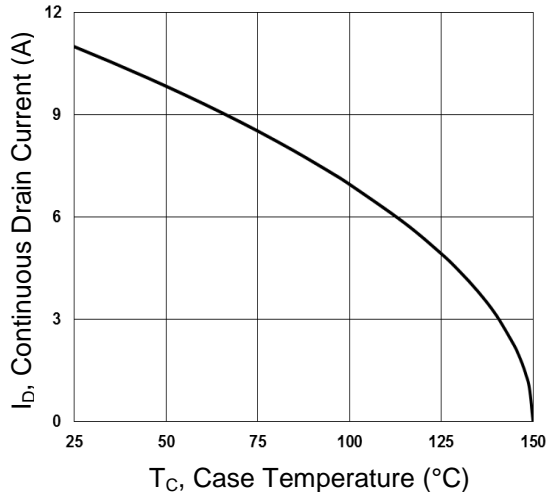
Continuous Drain-Source Diode	$V_G = V_D = 0V, \text{Force Current}$	I_S	--	--	11	A
Pulse Drain-Source Diode		I_{SM}	--	--	44	A
Diode-Source Forward Voltage	$V_{GS} = 0V, I_S = 1A$	V_{SD}	--	--	1.2	V
Reverse Recovery Time ^(Note 4)	$V_{GS} = 30V, I_S = 1A$	t_{rr}	--	23.2	--	ns
Reverse Recovery Charge ^(Note 4)		$dI_F/dt = 100A/\mu s$	Q_{rr}	--	14.3	--

Note:

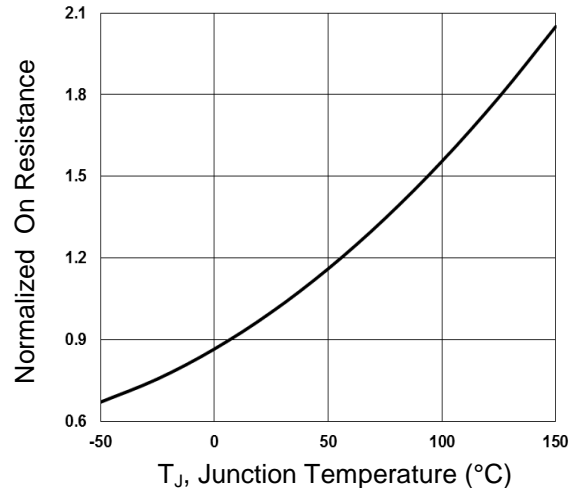
- Limited by maximum junction temperature.
- Repetitive Rating : Pulsed width limited by maximum junction temperature.
- $V_{DD}=25V, V_{GS}=10V, L=1mH, I_{AS}=7A, R_G=25\Omega, \text{Starting } T_J= 25^{\circ}C$
- Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- Essentially independent of operating temperature.

Electrical Characteristics Curve

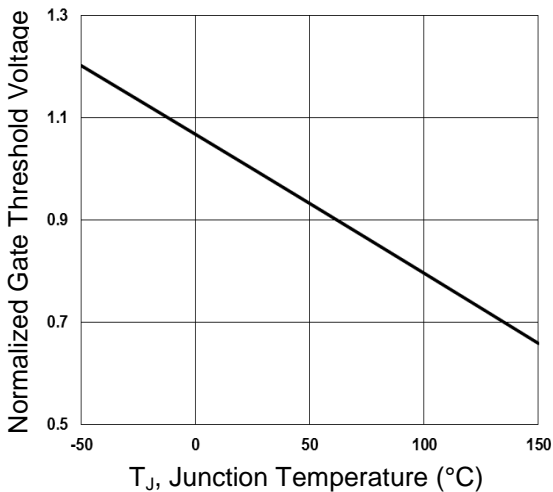
Continuous Drain Current vs. T_c



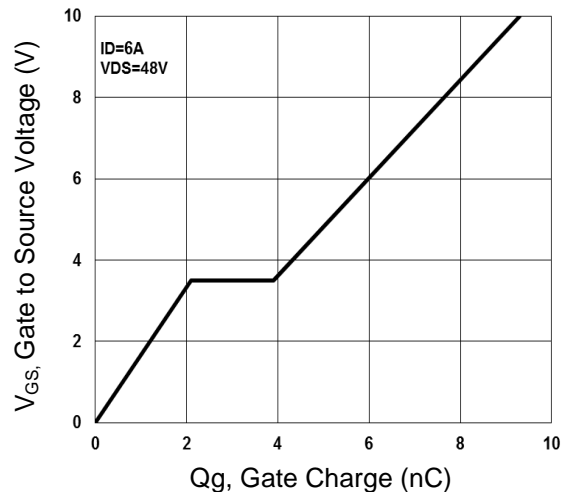
Normalized R_{DS(on)} vs. T_J



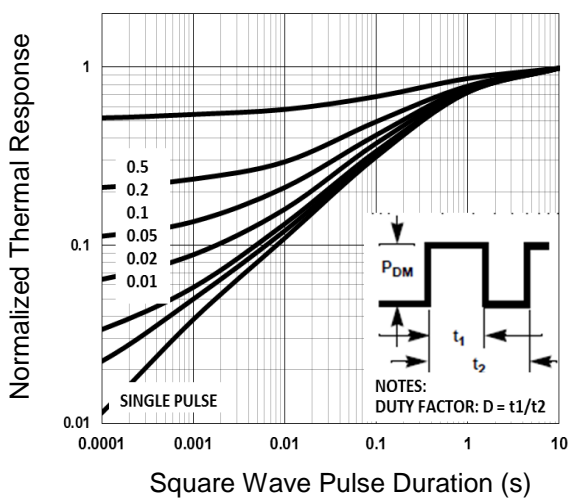
Normalized V_{th} vs. T_J



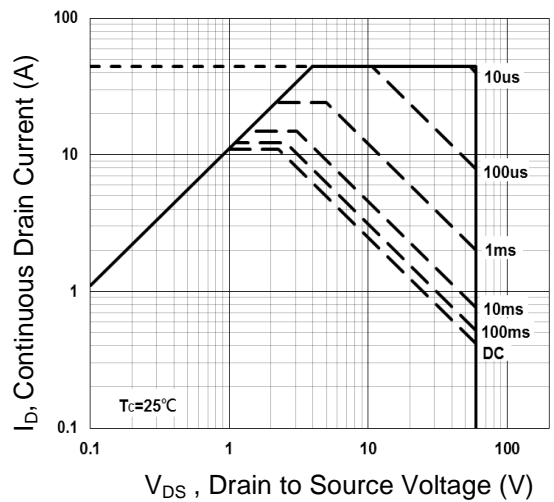
Gate Charge Waveform



Normalized Transient Impedance (TO-251S)

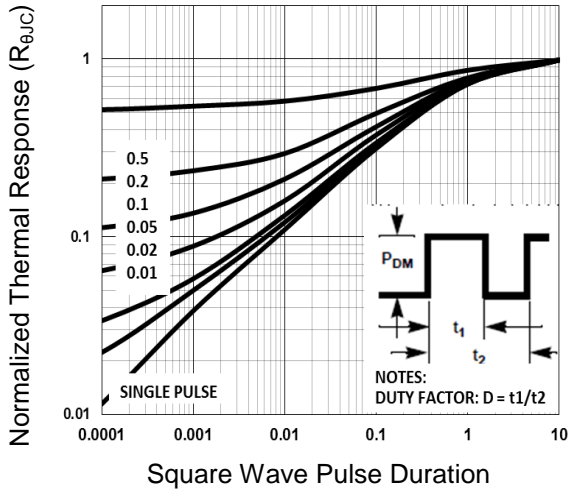


Maximum Safe Operation Area (TO-251S)

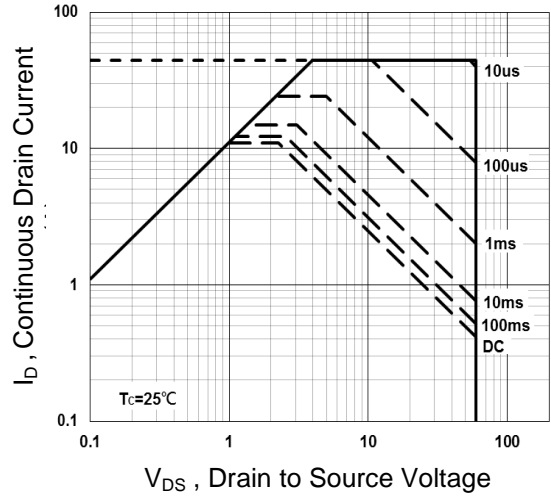


Electrical Characteristics Curve ($T_c=25^\circ\text{C}$, unless otherwise noted)

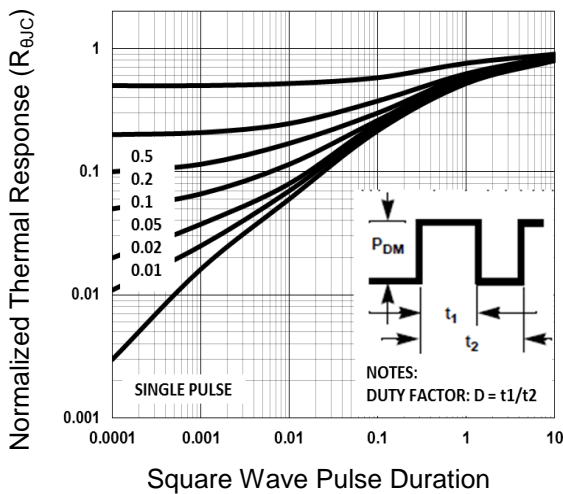
Normalized Transient Impedance (TO-252)



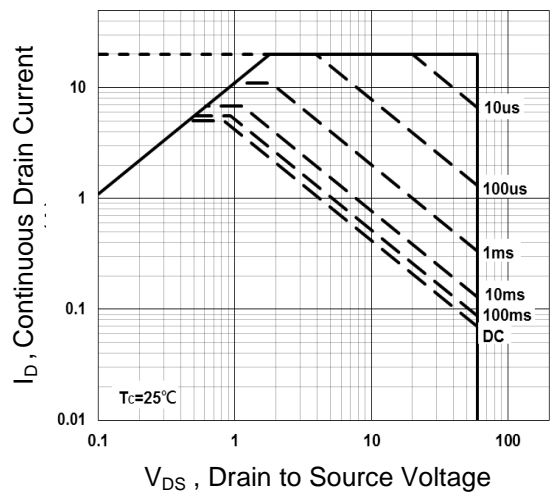
Maximum Safe Operation Area (TO-252)



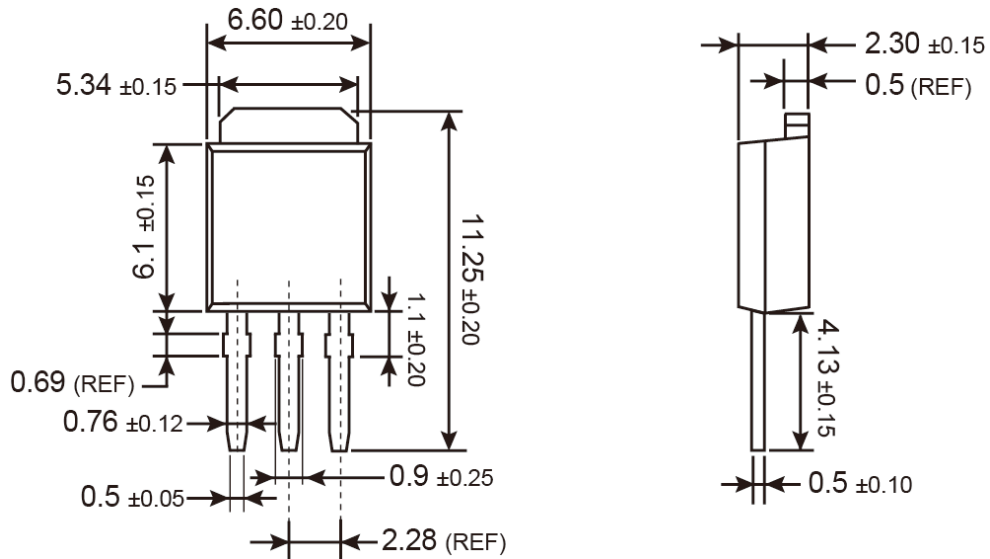
Normalized Transient Impedance (SOT-223)



Maximum Safe Operation Area (SOT-223)

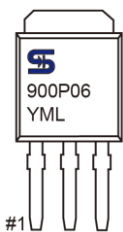


TO-251S Mechanical Drawing



Unit: Millimeters

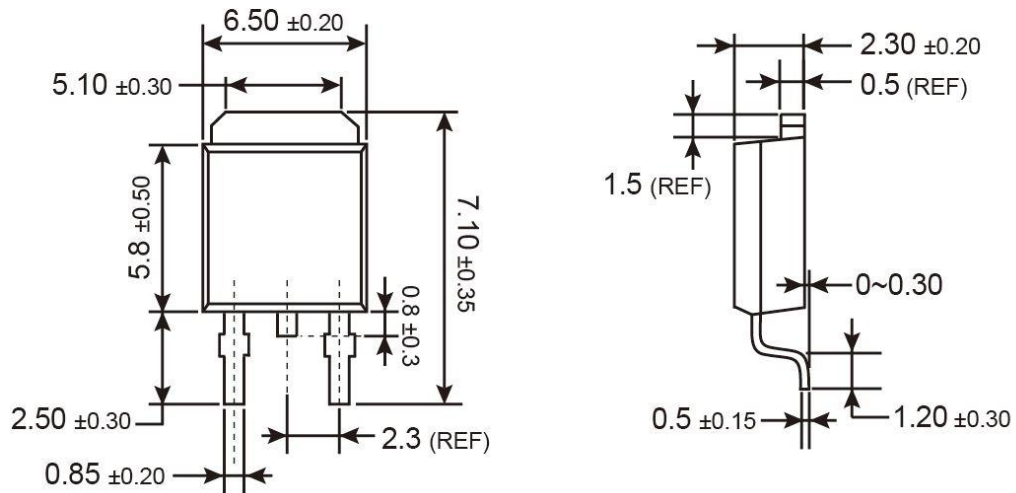
Marking Diagram



- Y** = Year Code
- M** = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
- L** = Lot Code

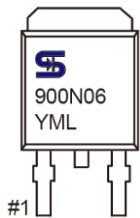


TO-252 Mechanical Drawing



Unit: Millimeters

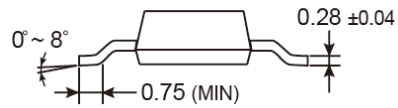
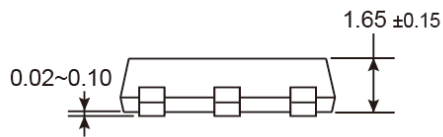
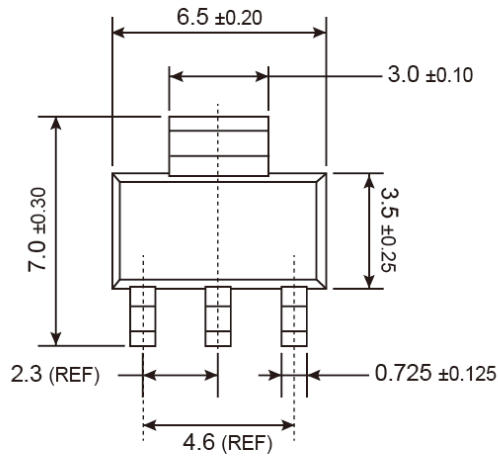
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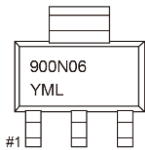


SOT-223 Mechanical Drawing



Unit: Millimeters

Marking Diagram



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