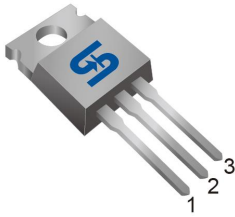


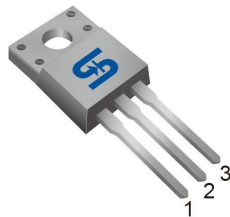
TSM340N06

60V N-Channel Power MOSFET

TO-220



ITO-220



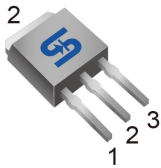
Pin Definition:

1. Gate
2. Drain
3. Source

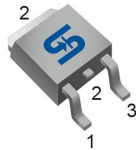
Key Parameter Performance

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	34
	$V_{GS} = 4.5V$	40
Q_g	16.6	nC

TO-251S
(IPAK)



TO-252
(DPAK)

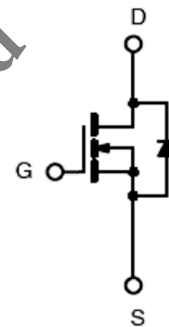


Ordering Information

Part No.	Package	Packing
TSM340N06CI C0G	ITO-220	50pcs / Tube
TSM340N06CZ C0G	TO-220	50pcs / Tube
TSM340N06CH X0G	TO-251S	75pcs / Tube
TSM340N06CP ROG	TO-252	2.5kpcs / 136Reel

Note: 60 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	ITO-220	TO-220	
Drain-Source Voltage	V_{DS}	60			V
Gate-Source Voltage	V_{GS}	±20			V
Continuous Drain Current (Note 1)	I_D	30			A
		19			A
Pulsed Drain Current (Note 2)	I_{DM}	120			A
Single Pulse Avalanche Energy (Note 3)	E_{AS}	24			mJ
Single Pulse Avalanche Current (Note 2)	I_{AS}	22			A
Total Power Dissipation @ T _c = 25°C	P_D	40	27	66	W
Operating Junction Temperature	T_J	150			°C
Storage Temperature Range	T_{STG}	-55 to +150			°C

Thermal Performance

Parameter	Symbol	Limit			Unit
		IPAK/DPAK	ITO-220	TO-220	
Thermal Resistance - Junction to Case	R_{JC}	3.1	4.7	1.9	°C/W
Thermal Resistance - Junction to Ambient	R_{JA}	62			°C/W

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

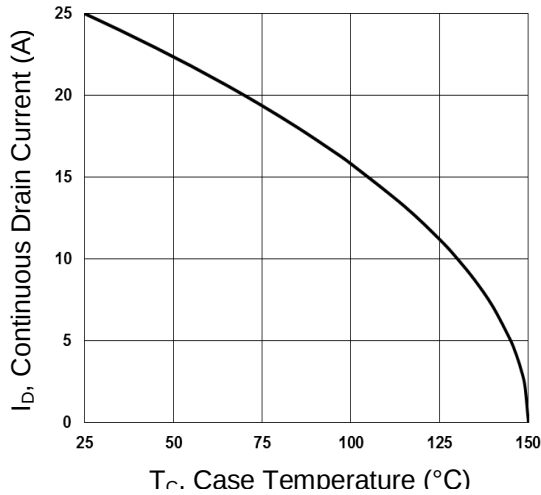
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	60	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 15A$	$R_{DS(ON)}$	--	28	34	m Ω
	$V_{GS} = 4.5V, I_D = 10A$		--	33	40	
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1.2	1.7	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	nA
Forward Transconductance	$V_{DS} = 10V, I_D = 8A$	g_{fs}	--	8	--	S
Dynamic						
Total Gate Charge (Note 4,5)	$V_{DS} = 30V, I_D = 20A, V_{GS} = 10V$	Q_g	--	16.6	--	nC
Gate-Source Charge (Note 4,5)		Q_{gs}	--	2.2	--	
Gate-Drain Charge (Note 4,5)		Q_{gd}	--	3.9	--	
Input Capacitance	$V_{DS} = 30V, V_{GS} = 0V, f = 1MHz$	C_{iss}	--	1180	--	pF
Output Capacitance		C_{oss}	--	68	--	
Reverse Transfer Capacitance		C_{rss}	--	45	--	
Gate Resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	R_g	--	2.1	--	Ω
Switching						
Turn-On Delay Time (Note 4,5)	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega, I_D=-1A$	$t_{d(on)}$	--	4.6	--	ns
Turn-On Rise Time (Note 4,5)		t_r	--	14.8	--	
Turn-Off Delay Time (Note 4,5)		$t_{d(off)}$	--	27.2	--	
Turn-Off Fall Time (Note 4,5)		t_f	--	7.8	--	
Source-Drain Diode Ratings and Characteristic						
Continuous Drain-Source Diode	$V_G=V_D=0V$, Force Current	I_S	--	--	25	A
Pulse Drain-Source Diode		I_{SM}	--	--	100	A
Diode-Source Forward Voltage	$V_{GS} = 0V, I_S = 1A$	V_{SD}	--	--	1	V
Reverse Recovery Time (Note 4)	$V_{GS} = 0V, I_S = 1A$	t_{rr}	--	17	--	ns
Reverse Recovery Charge (Note 4)	$dl_F/dt = 100A/\mu s$	Q_{rr}	--	12	--	nC

Note:

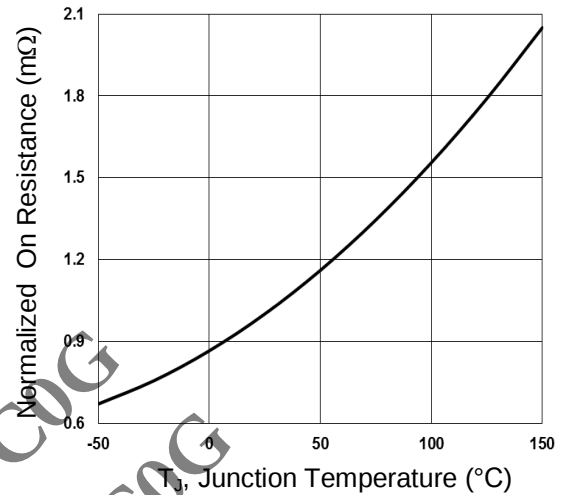
- Limited by maximum junction temperature
- Pulse width limited by safe operating area
- $L = 0.1\text{mH}$, $I_{AS} = 22A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: pulse width $\hat{O}300\mu s$, duty cycle $\hat{O}2\%$
- Switching time is essentially independent of operating temperature.

Electrical Characteristics Curve

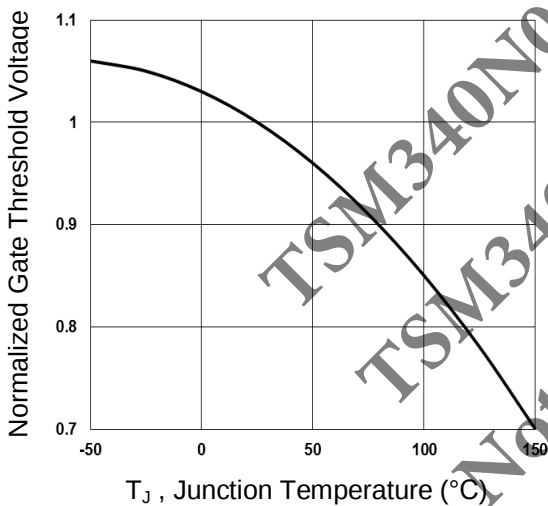
Continuous Drain Current vs. T_c



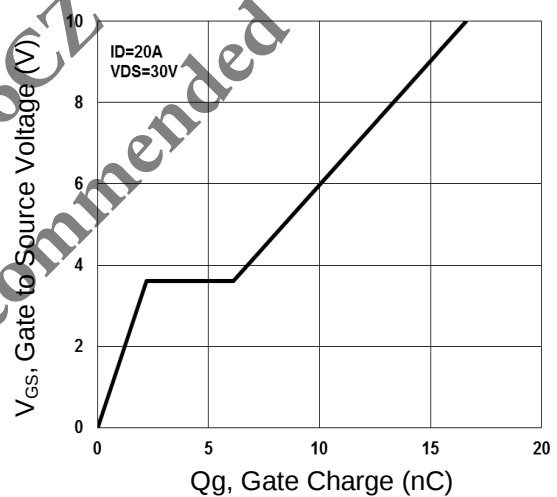
Normalized $R_{DS(on)}$ vs. T_J



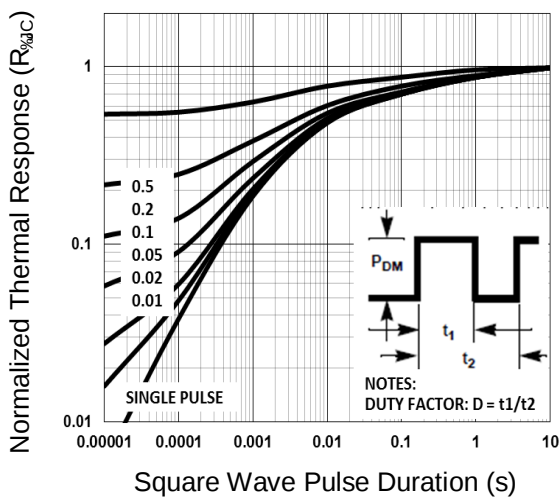
Normalized V_{th} vs. T_J



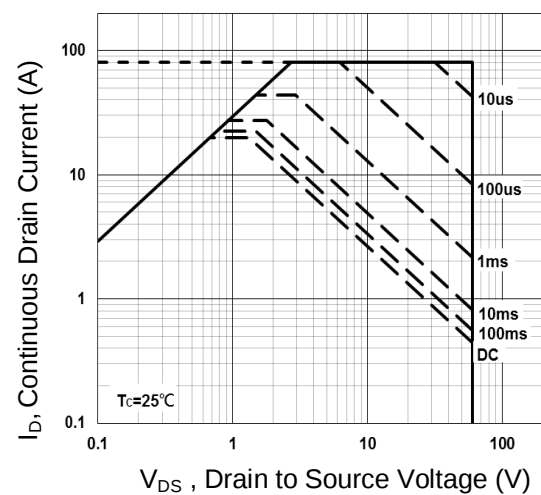
Gate Charge Waveform



Normalized Transient Impedance (ITO-220)

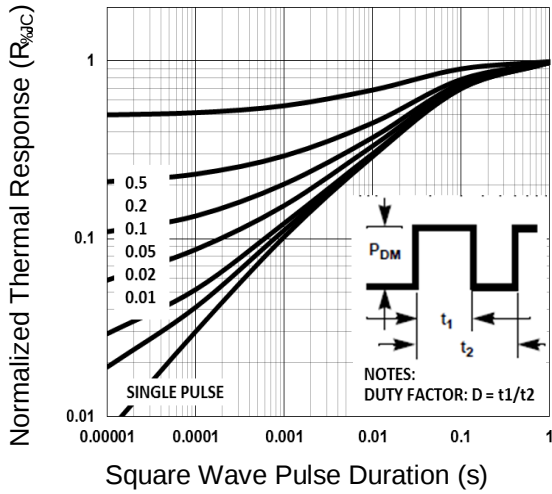


Maximum Safe Operation Area (ITO-220)

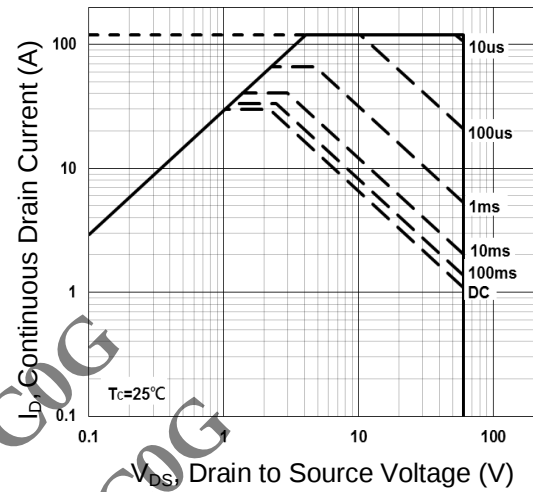


Electrical Characteristics Curve

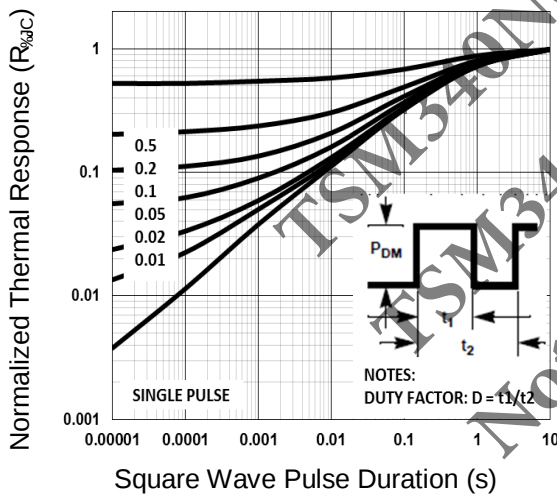
Normalized Transient Impedance (TO-220)



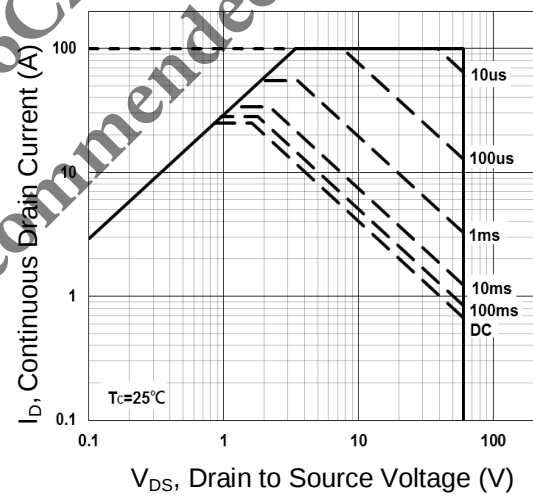
Maximum Safe Operation Area (TO-220)



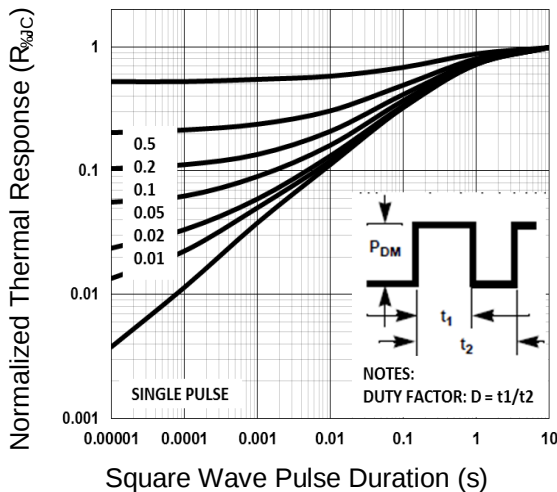
Normalized Transient Impedance (TO-251S)



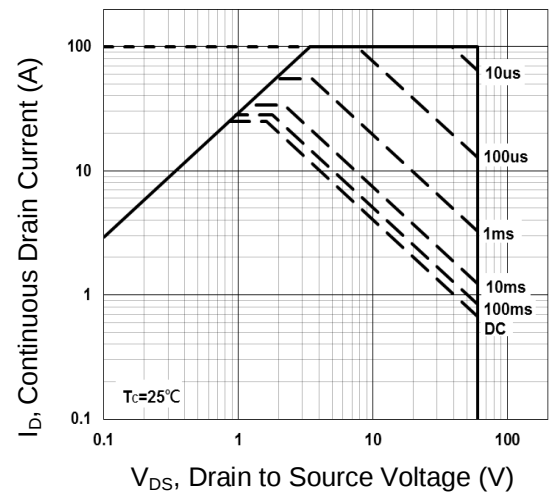
Maximum Safe Operation Area (TO-251S)



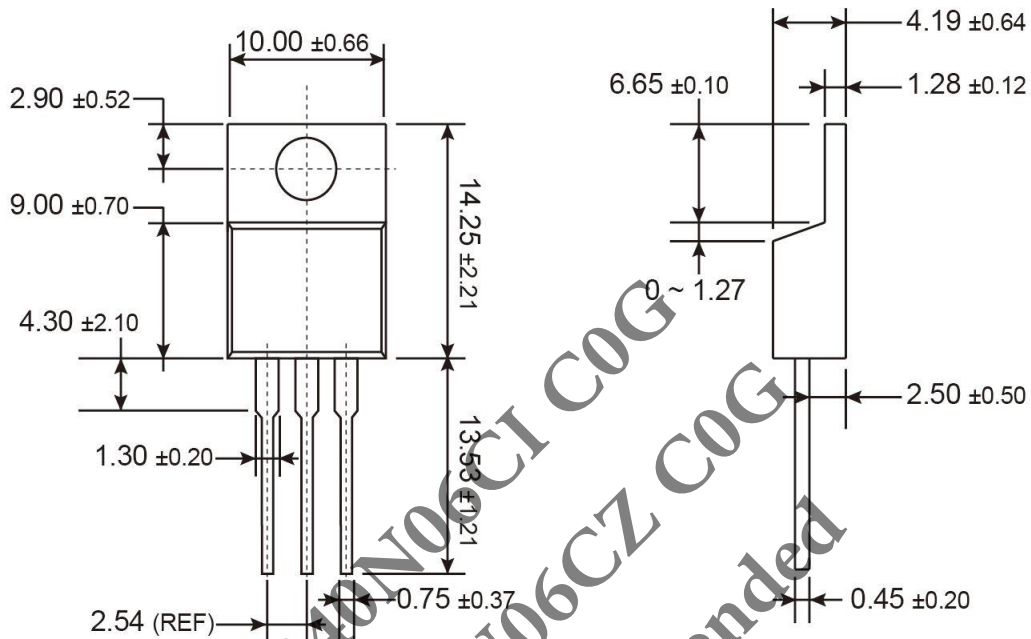
Normalized Transient Impedance (TO-252)



Maximum Safe Operation Area (TO-252)

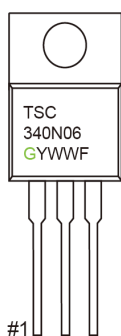


TO-220 Mechanical Drawing



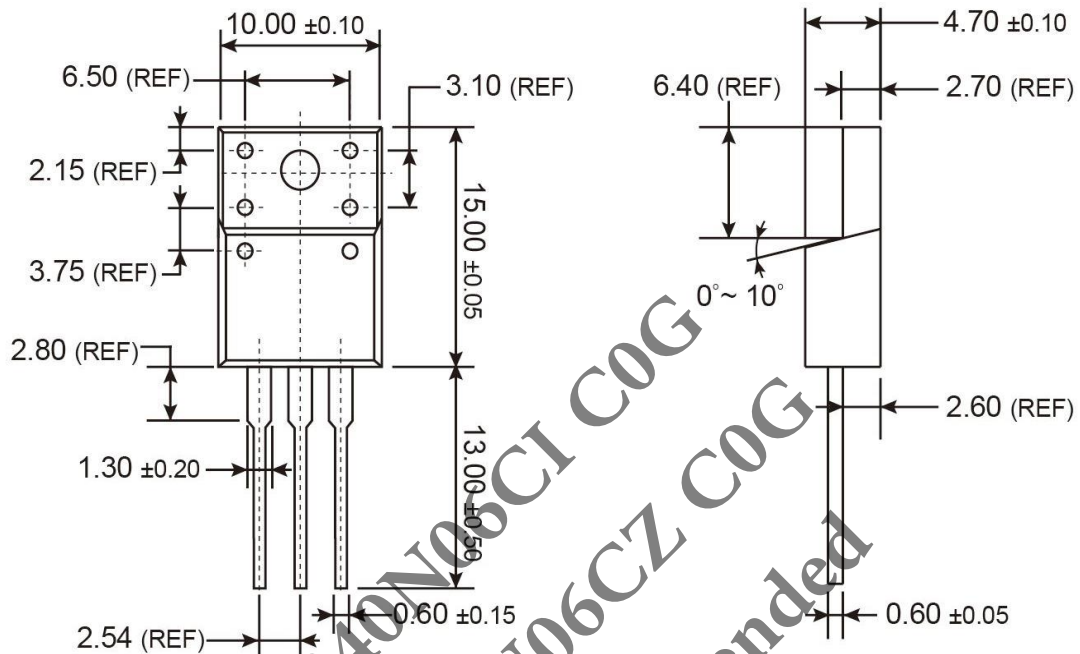
Unit: Millimeters

Marking Diagram



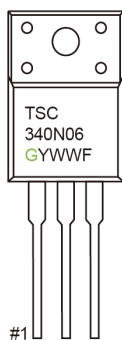
- G** = Halogen Free
- Y** = Year Code
- WW** = Week Code (01~52)
- F** = Factory Code

ITO-220 Mechanical Drawing



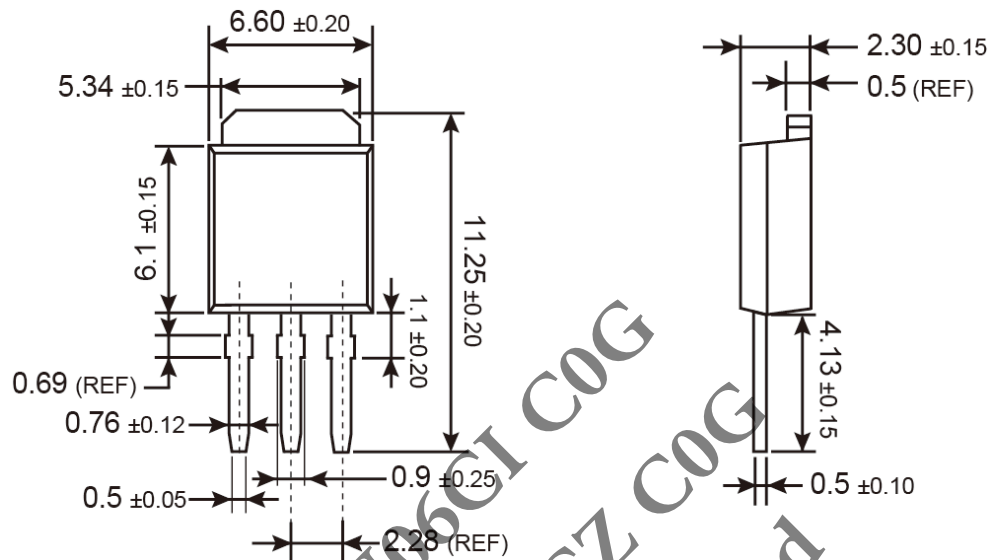
Unit: Millimeters

Marking Diagram



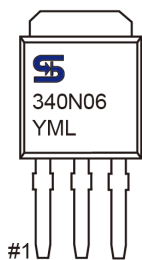
G = Halogen Free
Y = Year Code
WW = Week Code (01~52)
F = Factory Code

TO-251S Mechanical Drawing



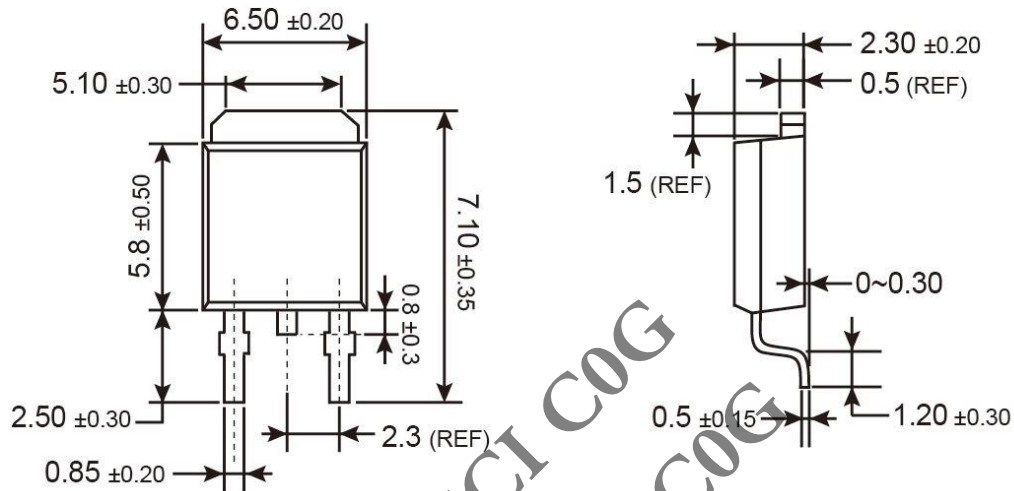
Unit: Millimeters

Marking Diagram



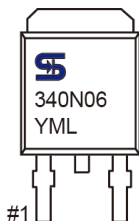
- Y** = Year Code
M = Month Code for Halogen Free Product
 (O=Jan, P=Feb, Q=Mar, R=Apr, S=May, T=Jun, U=Jul, V=Aug, W=Sep, X=Oct, Y=Nov, Z=Dec)
L = Lot Code

TO-252 Mechanical Drawing



Unit: Millimeters

Marking Diagram



Y = Year Code

M = Month Code for Halogen Free Product

(**Q**=Jan, **P**=Feb, **O**=Mar, **R**=Apr, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)

L = Lot Code

TSM340N06

60V N-Channel Power MOSFET

TSM340N06CI C0G
TSM340N06CZ C0G
Not Recommended

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