Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

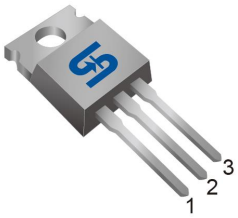
TAIWAN SEMICONDUCTOR

TSM230N06

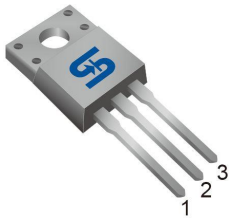
60V N-Channel Power MOSFET

Pb-Free RoHS COMPLIANT

TO-220

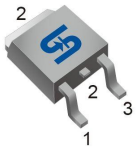


ITO-220



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

TO-252 (DPAK)



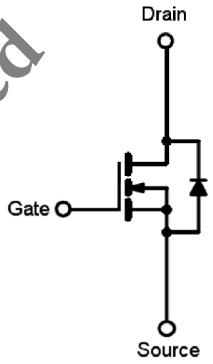
Key Parameter Performance

Parameter		Value	Unit
V_{DS}		60	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	23	mΩ
	V_{GS} = 4.5V	28	
Q_g		28	nC

Features

- 100% avalanche tested
- Fast Switching

Block Diagram



N-Channel MOSFET

Ordering Information

Part No.	Package	Packing
TSM230N06CZ C0G	TO-220	50pcs / Tube
TSM230N06CI C0G	ITO-220	50pcs / Tube
TSM230N06CP ROG	TO-252	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

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

Parameter		Symbol	Limit			Unit
			TO-220	ITO-220	DPAK	
Drain-Source Voltage		V_{DS}	60			V
Gate-Source Voltage		V_{GS}	±20			V
Continuous Drain Current (Note 1)	Tc = 25°C	I_D	50*			A
	Tc = 100°C		32*			A
Pulsed Drain Current (Note 2)		I_{DM}	200			A
Single Pulse Avalanche Energy (Note 3)		E_{AS}	42			mJ
Power Dissipation @ T_C = 25°C		P_D	104	42	53	W
Operating Junction Temperature		T_J	150			°C
Storage Temperature Range		T_{STG}	-55 to +150			°C

TSM230N06

60V N-Channel Power MOSFET

Thermal Performance

Parameter	Symbol	Limit			Unit
		TO-220	ITO-220	DPAK	
Thermal Resistance - Junction to Case	$R_{\theta JC}$	1.2	3	2	°C/W
Thermal Resistance - Junction to Ambient	$R_{\theta JA}$	62	62	62	

Electrical Specifications (T_C = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	60	--	--	V
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 20A	$R_{DS(ON)}$	--	20	23	mΩ
	V_{GS} = 4.5V, I_D = 12A		--	23	28	
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	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°C		--	--	10	
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Forward Transconductance (Note 4)	V_{DS} = 10V, I_D = 10A	g_{fs}	--	9	--	S
Dynamic						
Total Gate Charge (Note 4,5)	V_{DS} = 30V, I_D = 15A, V_{GS} = 10V	Q_g	--	28	--	nC
Gate-Source Charge (Note 4,5)		Q_{gs}	--	3.5	--	
Gate-Drain Charge (Note 4,5)		Q_{gd}	--	6.5	--	
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	1680	--	pF
Output Capacitance		C_{oss}	--	115	--	
Reverse Transfer Capacitance		C_{rss}	--	85	--	
Switching						
Turn-On Delay Time (Note 4,5))	V_{DD} = 30V, I_D = 1A, V_{GS} = 10V, R_G = 6Ω	$t_{d(on)}$	--	7.2	--	ns
Turn-On Rise Time (Note 4,5))		t_r	--	38	--	
Turn-Off Delay Time (Note 4,5)		$t_{d(off)}$	--	34	--	
Turn-Off Fall Time (Note 4,5)		t_f	--	8.2	--	
Source-Drain Diode Ratings and Characteristic						
Maximum Continuous Drain-Source Diode Forward Current	Integral reverse diode in the MOSFET	I_S	--	--	50	A
Maximum Pulse Drain-Source Diode Forward Current		I_{SM}	--	--	200	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, dI_F/dt = 100A/μs	t_{rr}	--	19.6	--	ns
Reverse Recovery Charge (Note4)		Q_{rr}	--	14.2	--	nC

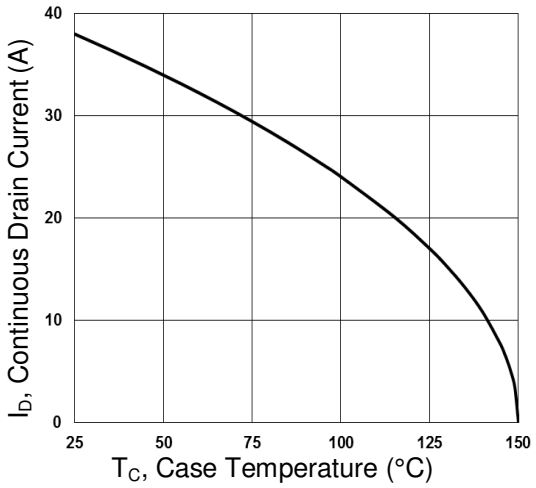
Note:

1. Limited by maximum junction temperature
2. Pulse width limited by safe operating area
3. L = 0.1mH, I_{AS} = 29A, V_{DD} = 25V, R_G = 25Ω , Starting T_J = 25°C
4. Pulse test: pulse width ≤300μs, duty cycle ≤2%
5. Switching time is essentially independent of operating temperature.

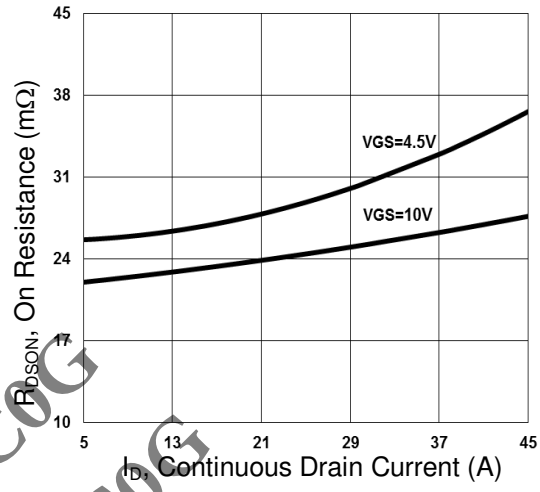
Pb-Free RoHS COMPLIANT

Electrical Characteristics Curve

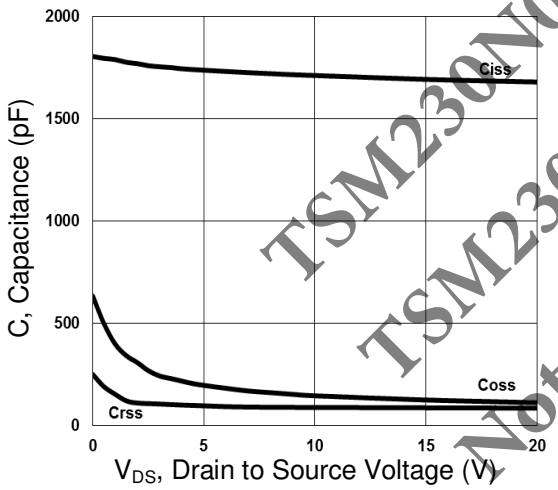
Continuous Drain Current vs. T_C



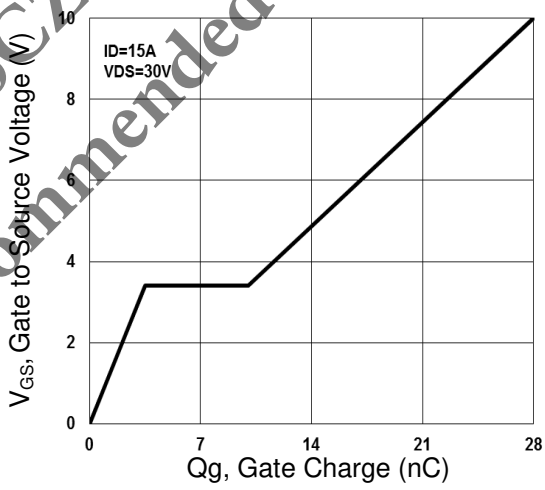
RDSON vs. Continuous Drain Current



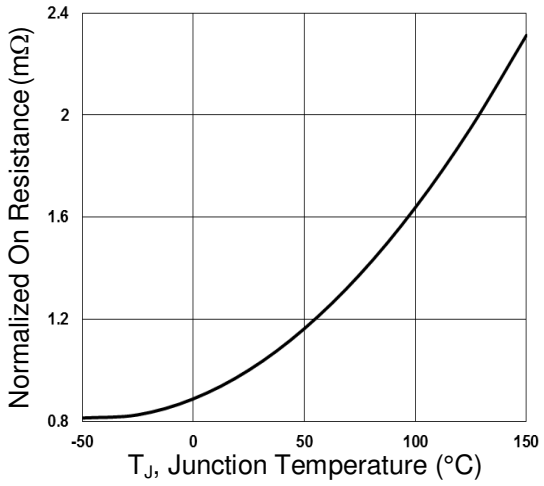
Capacitance



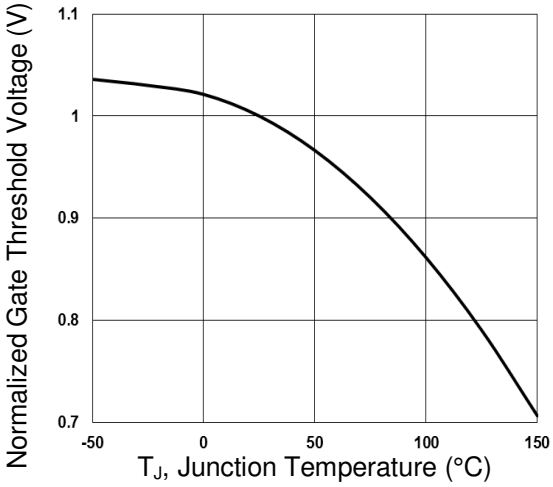
Gate Charge



On-Resistance vs. Junction Temperature



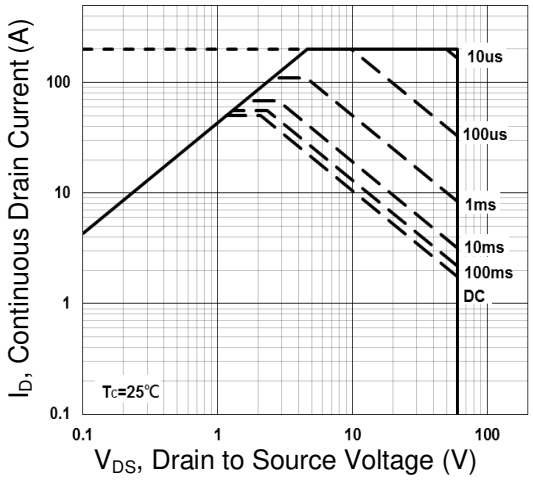
Threshold Voltage vs. Junction Temperature



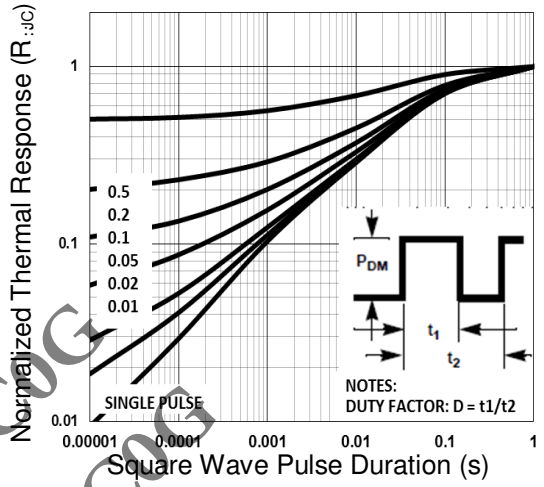
Pb-Free RoHS COMPLIANT

Electrical Characteristics Curve

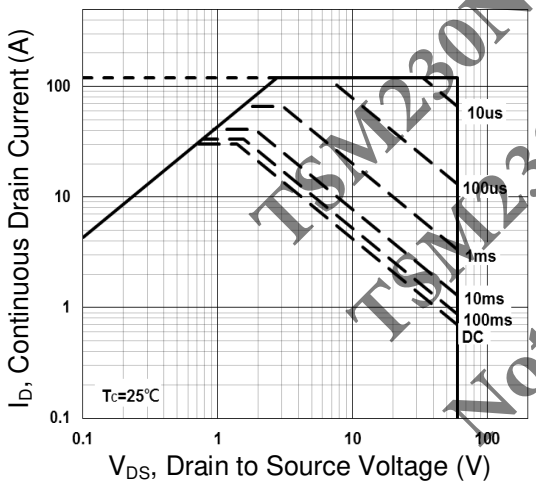
Maximum Safe Operating Area (TO-220)



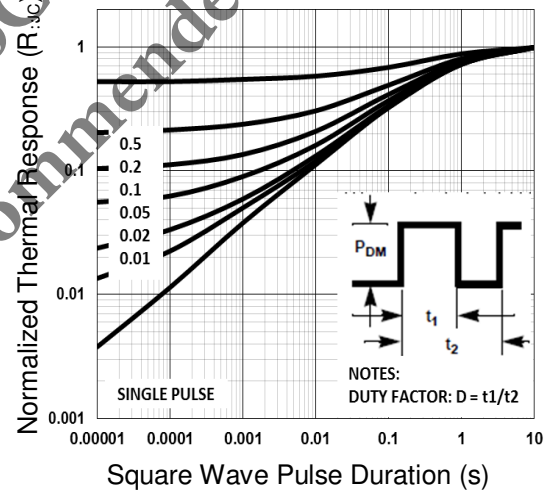
Normalized Thermal Transient Impedance (TO-220)



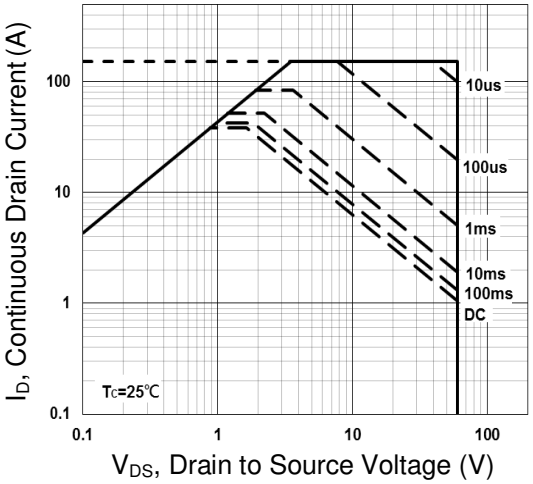
Maximum Safe Operating Area (ITO-220)



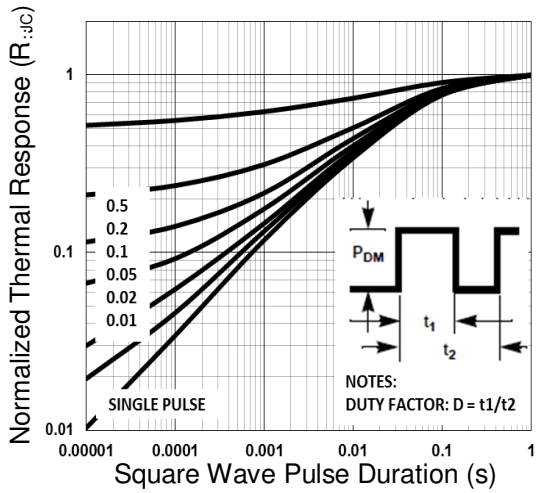
Normalized Thermal Transient Impedance (ITO-220)



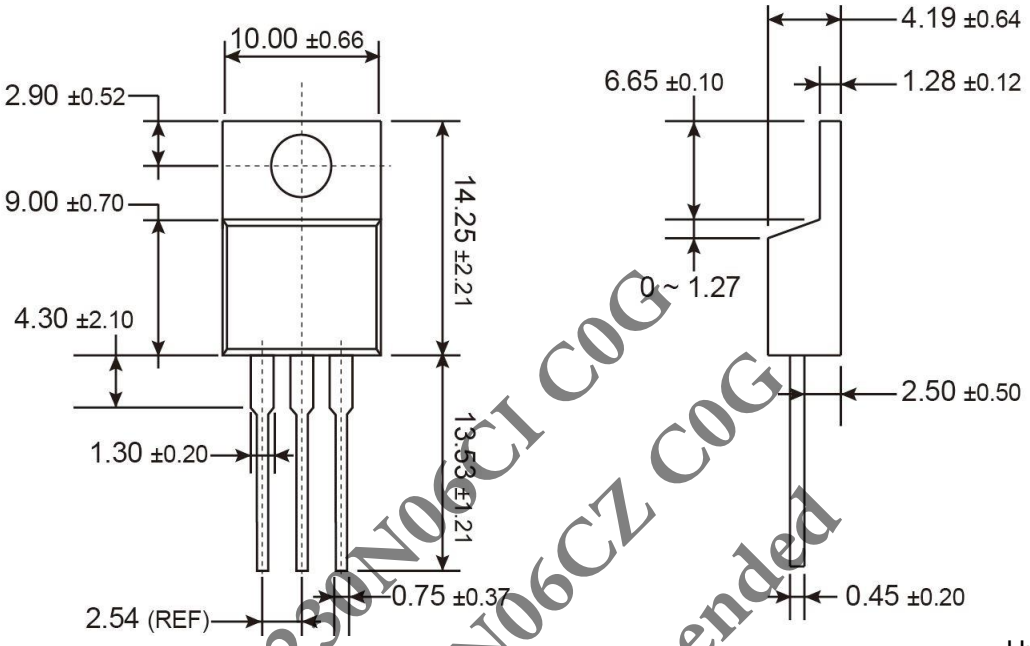
Maximum Safe Operating Area (TO-252)



Normalized Thermal Transient Impedance (TO-252)

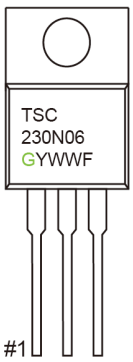


TO-220 Mechanical Drawing



Unit: Millimeters

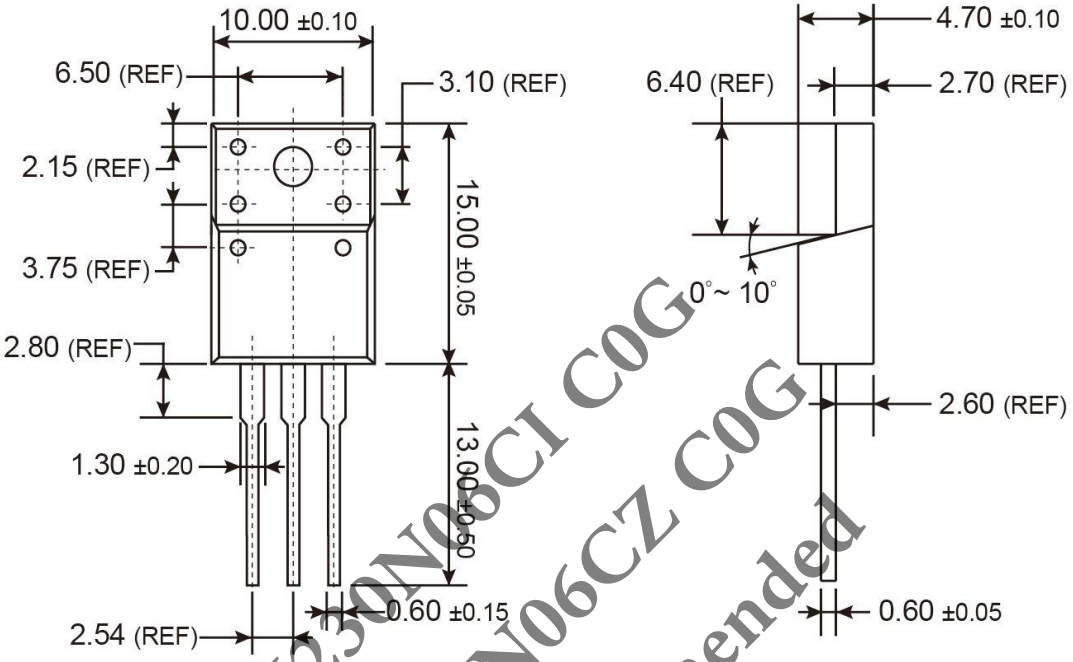
Marking Diagram



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

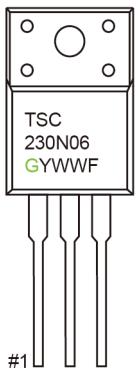
Pb-Free RoHS COMPLIANT

ITO-220 Mechanical Drawing



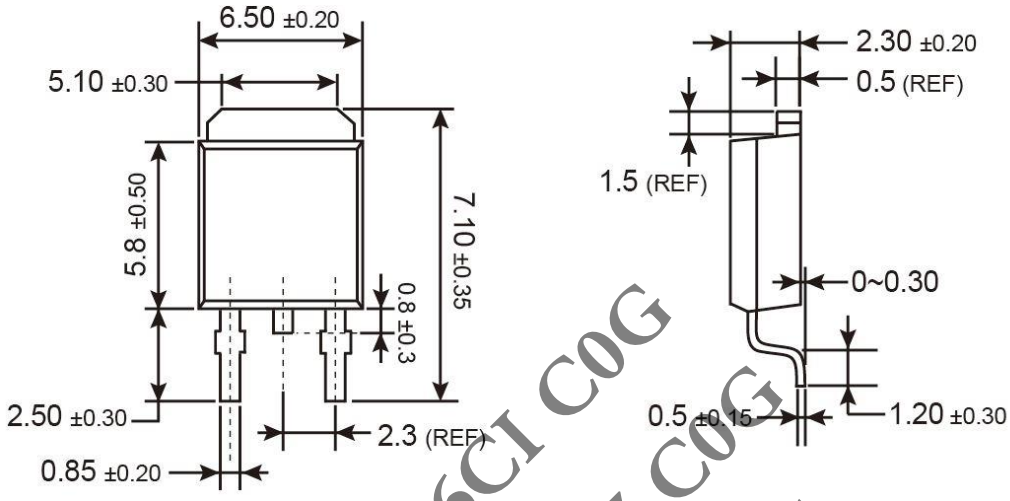
Unit: Millimeters

Marking Diagram



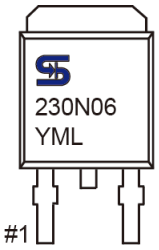
G = Halogen Free
Y = Year Code
WW = Week Code (01~52)
F = Factory Code

TO-252 Mechanical Drawing



Unit: Millimeters

Marking Diagram



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

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.