P-Channel Power MOSFET

-60V, -18A, 68mΩ

FEATURES

- Improved dV/dt capability
- Fast switching
- 100% Eas Guaranteed
- Pb-free plating
- RoHS compliant
- Halogen-free mold compound

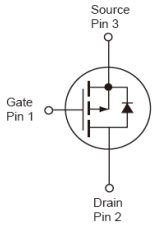
APPLICATION

- Motor Drive
- Power Tools
- LED Lighting

KEY PERFORMANCE PARAMETERS			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		-60	V
$R_{DS(on)}$ (max)	V_{GS} = -10V	68	mΩ
	V_{GS} = -4.5V	110	
Q_g		16.4	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

TO-220 **ITO-220** **TO-251S (IPAK SL)** **TO-252 (DPAK)**



Notes: Moisture sensitivity level: level 3. Per J-STD-020

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)						
PARAMETER		**SYMBOL**	**IPAK/DPAK**	**ITO-220**	**TO-220**	**UNIT**
Drain-Source Voltage		V_{DS}	-60			V
Gate-Source Voltage		V_{GS}	±20			V
Continuous Drain Current (Note 1)	T_C = 25°C	I_D	-18			A
	T_C = 100°C		-11			
Pulsed Drain Current (Note 2)		I_{DM}	-72			A
Total Power Dissipation @ T_C = 25°C		P_{DTOT}	20	17	42	W
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	12.8			mJ
Single Pulsed Avalanche Current (Note 3)		I_{AS}	-16			A
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150			°C

THERMAL PERFORMANCE					
PARAMETER	**SYMBOL**	**IPAK/DPAK**	**ITO-220**	**TO-220**	**UNIT**
Junction to Case Thermal Resistance	$R_{\Theta JC}$	6.1	7.5	3	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	62			°C/W

Notes: $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case thermal reference is defined at the solder mounting surface of the drain pins. $R_{\Theta JA}$ is guaranteed by design while $R_{\Theta CA}$ is determined by the user's board design. $R_{\Theta JA}$ shown below for single device operation on FR-4 PCB in still air.

ELECTRICAL SPECIFICATIONS (T_C = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static (Note 4)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250μA	BV_{DSS}	-60	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	$V_{GS(TH)}$	-1.2	-1.6	-2.2	V
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = -60V, V_{GS} = 0V	I_{DSS}	--	--	-1	μA
	V_{DS} = -48V, T_C = 125°C		--	--	-10	
Drain-Source On-State Resistance	V_{GS} = -10V, I_D = -6A	$R_{DS(on)}$	--	54	68	mΩ
	V_{GS} = -4.5V, I_D = -3A		--	72	110	
Forward Transconductance	V_{DS} = -10V, I_D = -6A	g_{fs}	--	8.5	--	S
Dynamic (Note 5)						
Total Gate Charge	V_{DS} = -30V, I_D = -6A, V_{GS} = -10V	Q_g	--	16.4	--	nC
Gate-Source Charge		Q_{gs}	--	2.8	--	
Gate-Drain Charge		Q_{gd}	--	3.6	--	
Input Capacitance	V_{DS} = -30V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	870	--	pF
Output Capacitance		C_{oss}	--	70	--	
Reverse Transfer Capacitance		C_{rss}	--	42	--	
Gate Resistance	F = 1MHz, open drain	R_g	--	16	--	Ω
Switching (Note 6)						
Turn-On Delay Time	V_{DD} = -30V, R_{GEN} = 6Ω, I_D = -1A	$t_{d(on)}$	--	8.3	--	ns
Turn-On Rise Time		t_r	--	29.6	--	
Turn-Off Delay Time		$t_{d(off)}$	--	51.7	--	
Turn-Off Fall Time		t_f	--	15.6	--	
Source-Drain Diode (Note 3)						
Forward On Voltage	I_S = -1A, V_{GS} = 0V	V_{SD}	--	--	-1	V
Reverse Recovery Time	I_S =1A dI$_F$/dt = 100A/μs	t_{rr}	--	20	--	ns
Reverse Recovery Charge		Q_{rr}	--	10	--	nC
Maximum Continuous Forward Current	Integral reverse diode in the MOSFET	I_S	--	--	-13	A
Maximum Pulse Forward Current		I_{SM}	--	--	-52	A

Notes:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. L = 0.1mH, I_{AS} = -16A, V_{DD} = -25V, R_G = 25Ω, Starting T_J = 25°C
4. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM680P06CZ C0G	TO-220	50pcs / Tube
TSM680P06CI C0G	ITO-220	50pcs / Tube
TSM680P06CH C5G	TO-251S (IPAK SL)	75pcs / Tube
TSM680P06CP ROG	TO-252 (DPAK)	2,500pcs / 13” Reel

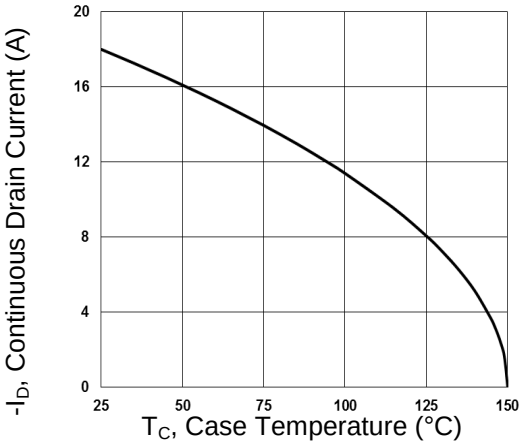
Note:

1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

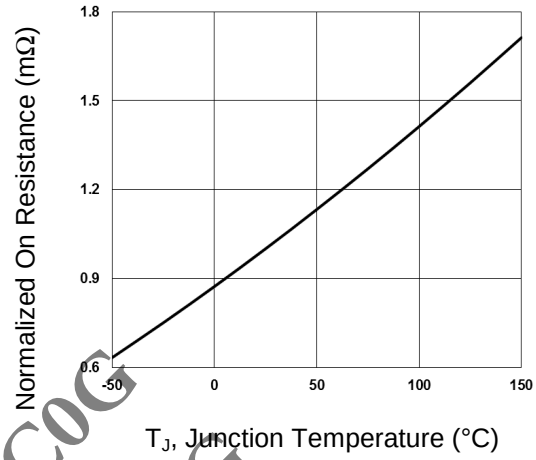
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

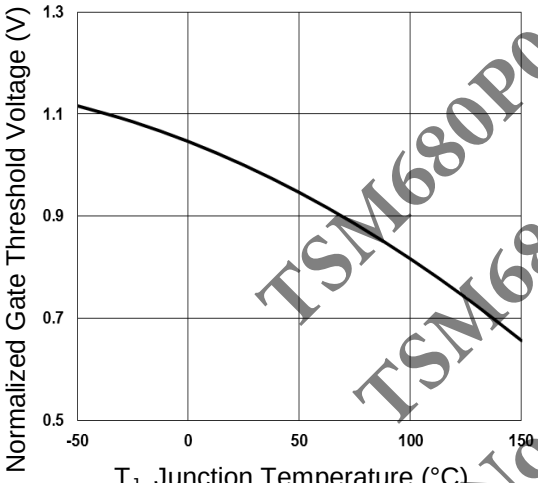
Continuous Drain Current vs. Tc



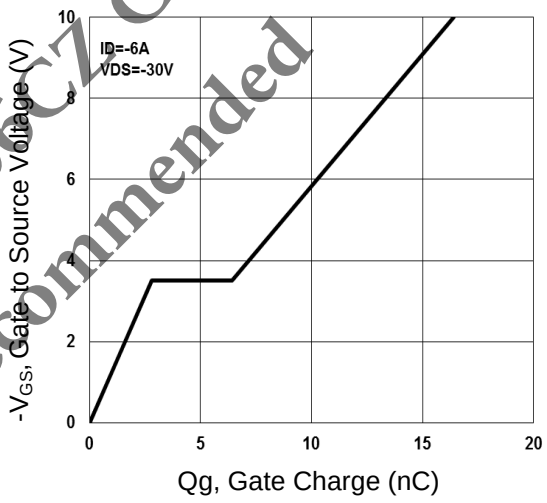
Normalized Rds(on) vs. Tj



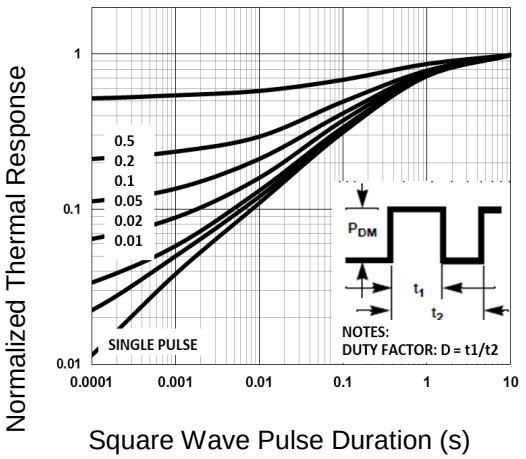
Normalized Vth vs. Tj



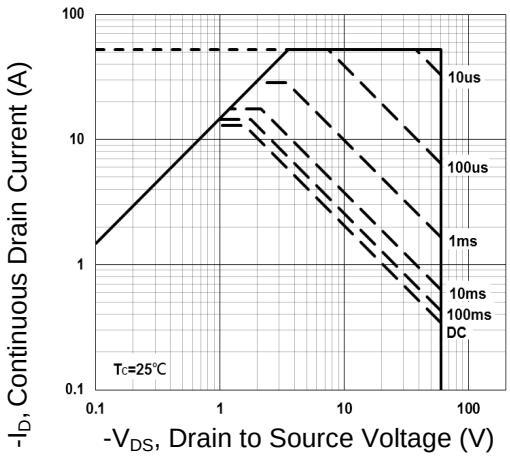
Gate Charge Waveform



Normalized Transient Impedance (TO-251S)



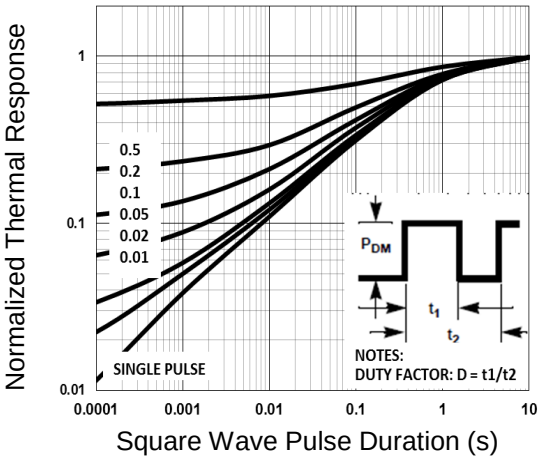
Maximum Safe Operation Area (TO-251S)



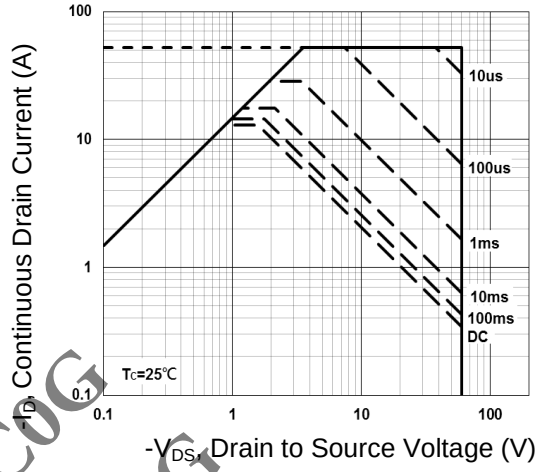
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

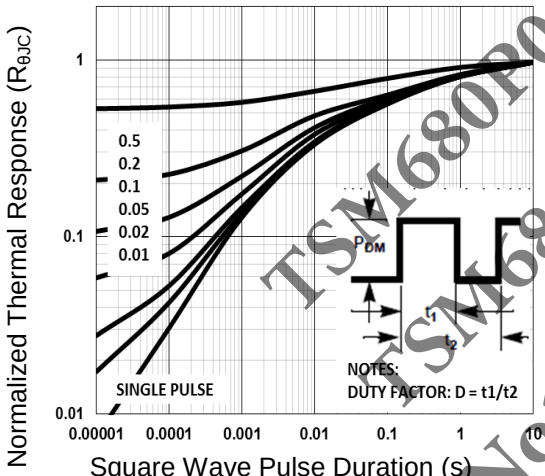
Normalized Transient Impedance (TO-252)



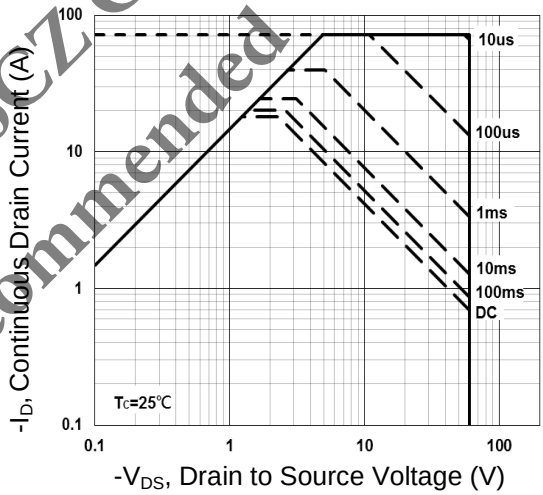
Maximum Safe Operation Area (TO-252)



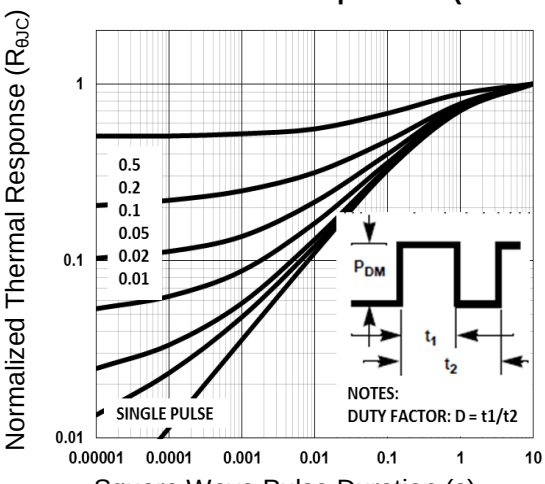
Normalized Transient Impedance (TO-220)



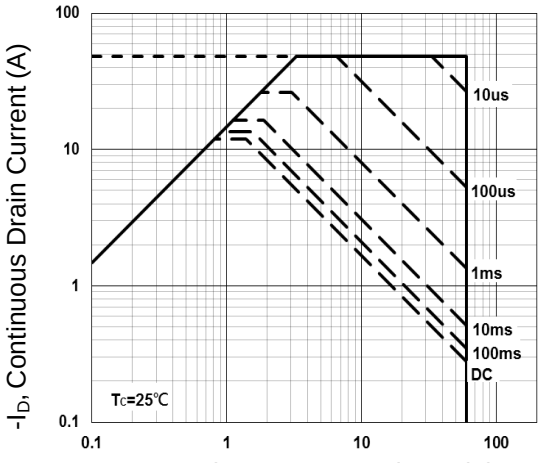
Maximum Safe Operation Area (TO-220)



Normalized Transient Impedance (ITO-220)

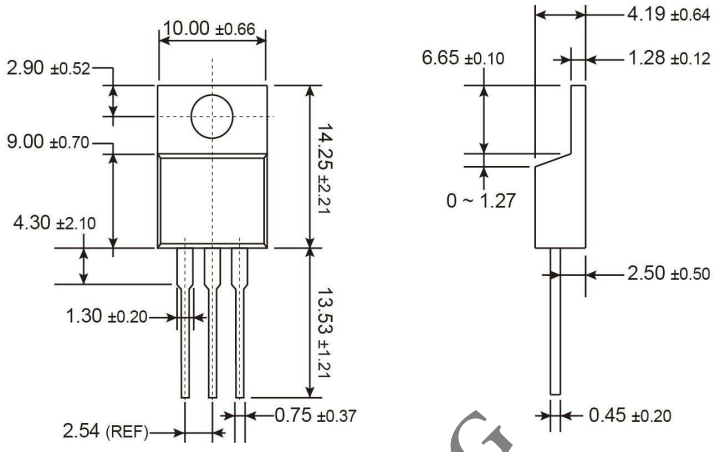


Maximum Safe Operation Area (ITO-220)

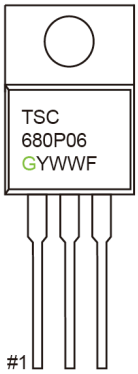


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-220



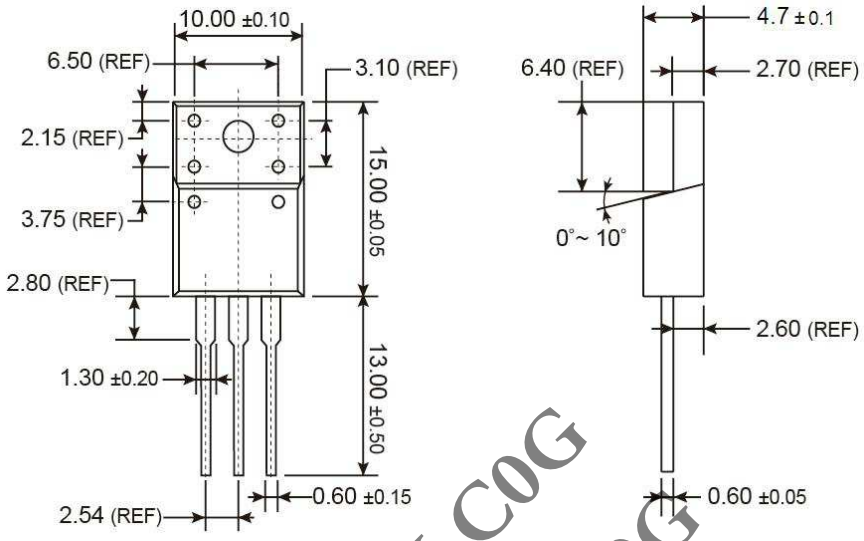
MARKING DIAGRAM



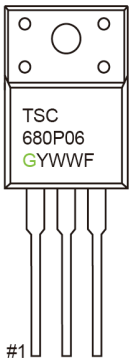
G = Halogen Free
Y = Year Code
WW = Week Code (01~52)
F = Factory Code

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

ITO-220



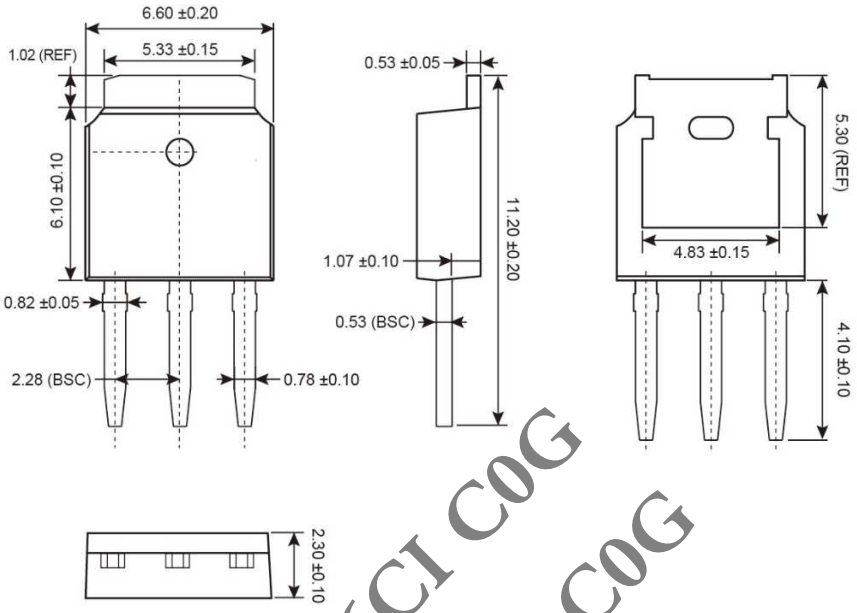
MARKING DIAGRAM



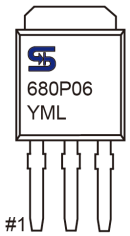
G = Halogen Free
Y = Year Code
WW = Week Code (01~52)
F = Factory Code

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-251S



MARKING DIAGRAM



Y = Year Code

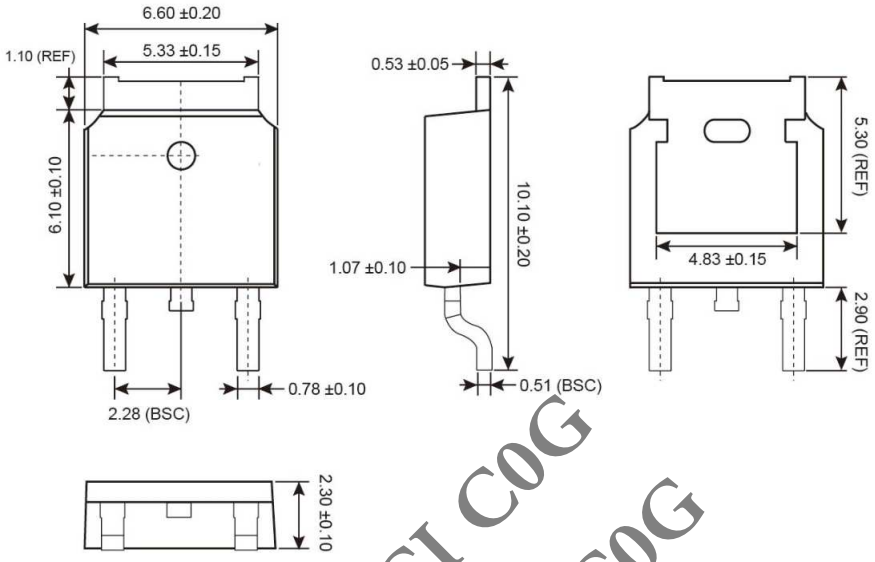
M = Month Code for Halogen Free Product

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

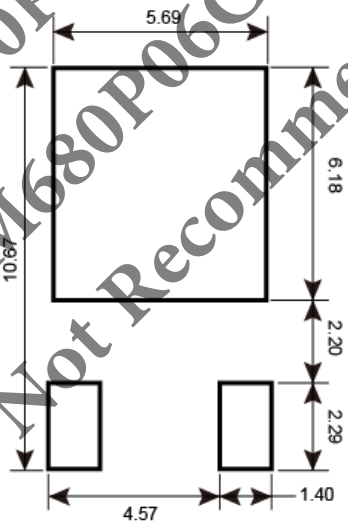
L = Lot Code (1~9, A~Z)

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

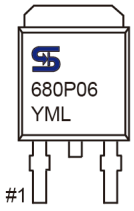
TO-252



SUGGESTED PAD LAYOUT



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 (1~9, A~Z)

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.

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

FORSTAR®

Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А