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

N-Channel Power MOSFET

100V, 70A, 13mΩ

FEATURES

- Low $R_{DS(ON)}$ to minimize conductive loss
- Low gate charge for fast power switching
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

APPLICATION

- Synchronous Rectifier in SMPS
- LED lighting application
- 48V Battery System

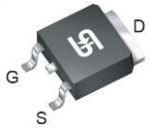
KEY PERFORMANCE PARAMETERS		
PARAMETER	**VALUE**	**UNIT**
V_{DS}	100	V
$R_{DS(on)}$ (max)	13	mΩ
Q_g	145	nC

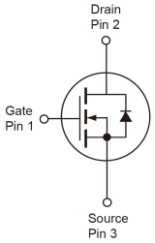
Pb-Free RoHS COMPLIANT HALOGEN FREE

TO-251 (IPAK)

TO-251S (IPAK SL)

TO-252 (DPAK)





Notes: MSL 3 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)				
PARAMETER		**SYMBOL**	**Limit**	**UNIT**
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (Note 3)	T_C = 25°C	I_D	70	A
	T_C = 70°C		61	
	T_A = 25°C		12	
	T_A = 70°C		9	
Drain Current-Pulsed (Note 1)		I_{DM}	150	A
Avalanche Current, L=0.5mH		I_{AS}, I_{AR}	25	A
Avalanche Energy, L=0.5mH		E_{AS}, E_{AR}	156	mJ
Maximum Power Dissipation (Note 2)	T_C = 25°C	I_D	120	W
	T_C = 70°C		80	
	T_A = 25°C		8.3	
	T_A = 70°C		5.3	
Storage Temperature Range		T_{STG}	- 55 to +150	°C
Operating Junction Temperature Range		T_J	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	**SYMBOL**	**Limit**	**UNIT**
Thermal Resistance – Junction to Case	$R_{\Theta JC}$	1	°C/W
Thermal Resistance – Junction to Ambient	$R_{\Theta JA}$	40	°C/W

ELECTRICAL SPECIFICATIONS (T_A = 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}	100	--	--	V
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 30A	$R_{DS(ON)}$	--	10	13	mΩ
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	2	3	4	V
Zero Gate Voltage Drain Current	V_{DS} = 80V, V_{GS} = 0V	I_{DSS}	--	--	1	μA
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Dynamic						
Total Gate Charge	V_{DS} = 50V, I_D = 30A, V_{GS} = 10V	Q_g	--	145	--	nC
Gate-Source Charge		Q_{gs}	--	25	--	
Gate-Drain Charge		Q_{gd}	--	43	--	
Input Capacitance	V_{DS} = 30V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	4300	--	pF
Output Capacitance		C_{oss}	--	300	--	
Reverse Transfer Capacitance		C_{rss}	--	120	--	--
Switching						
Turn-On Delay Time	V_{GS} = 10V, V_{DS} = 50V, R_G = 3Ω,	$t_{d(on)}$	--	27	--	ns
Turn-On Rise Time		t_r	--	13	--	
Turn-Off Delay Time		$t_{d(off)}$	--	15	--	
Turn-Off Fall Time		t_f	--	42	--	
Source-Drain Diode						
Forward On Voltage	V_{GS} = 0V, I_S = 30A	V_{SD}	--	0.8	1.3	V
Reverse Recovery Time	I_S = 30A, T_J = 25°C, dI_F/dt = 100A/μs	t_{rr}	--	165	--	ns
Reverse Recovery Charge		Q_{rr}	--	175	--	nC

Notes:

1. Pulse Test: Pulse Width ≦ 300μs, Duty Cycle ≦ 2%
2. $R_{\theta JA}$ 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-4PCB in still air.
3. The maximum current is limited by package.

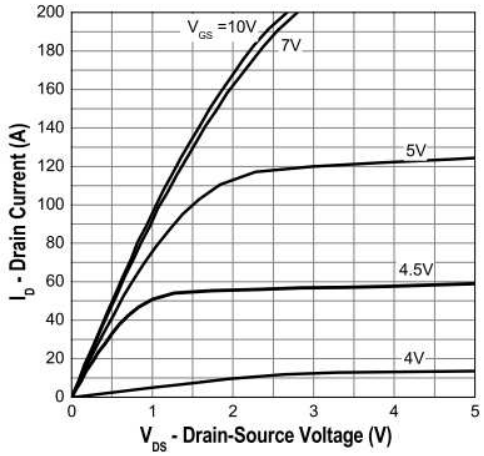
ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM70N10CP ROG	TO-252 (DPAK)	2,500pcs / 13” Reel
TSM70N10CH C5G	TO-251 (IPAK)	75pcs / Tube
TSM70N10CH X0G	TO-251S (IPAK SL)	75pcs / Tube

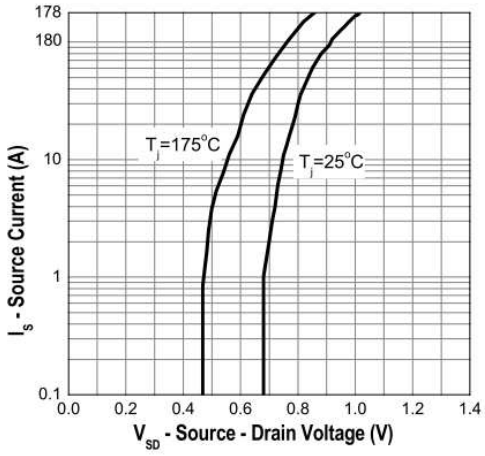
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

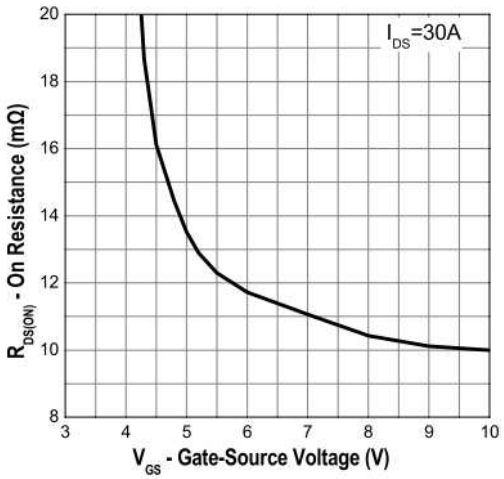
Output Characteristics



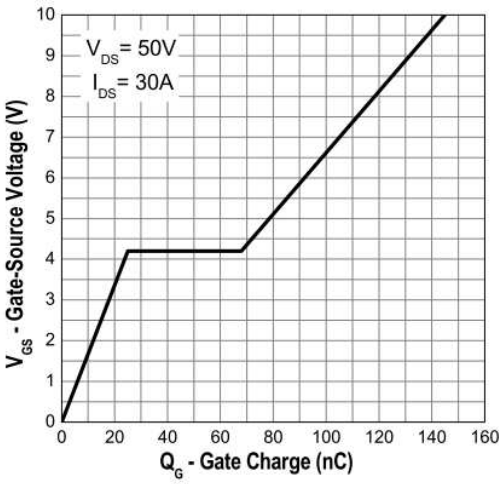
Transfer Characteristics



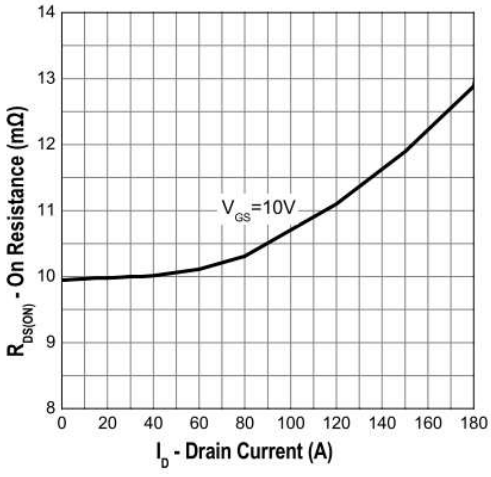
On-Resistance vs. Gate-Source Voltage



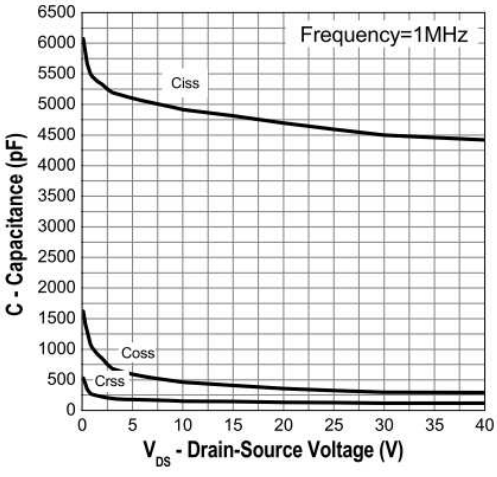
Gate Charge



On-Resistance vs. Junction Temperature



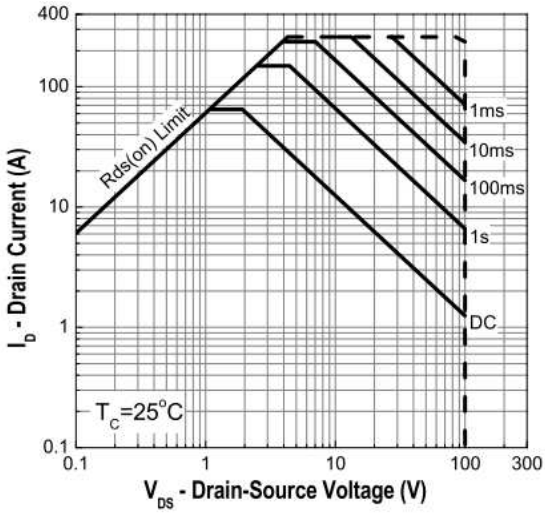
Capacitance



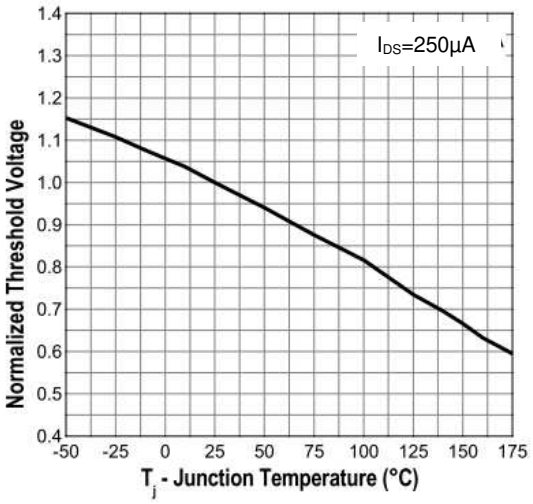
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

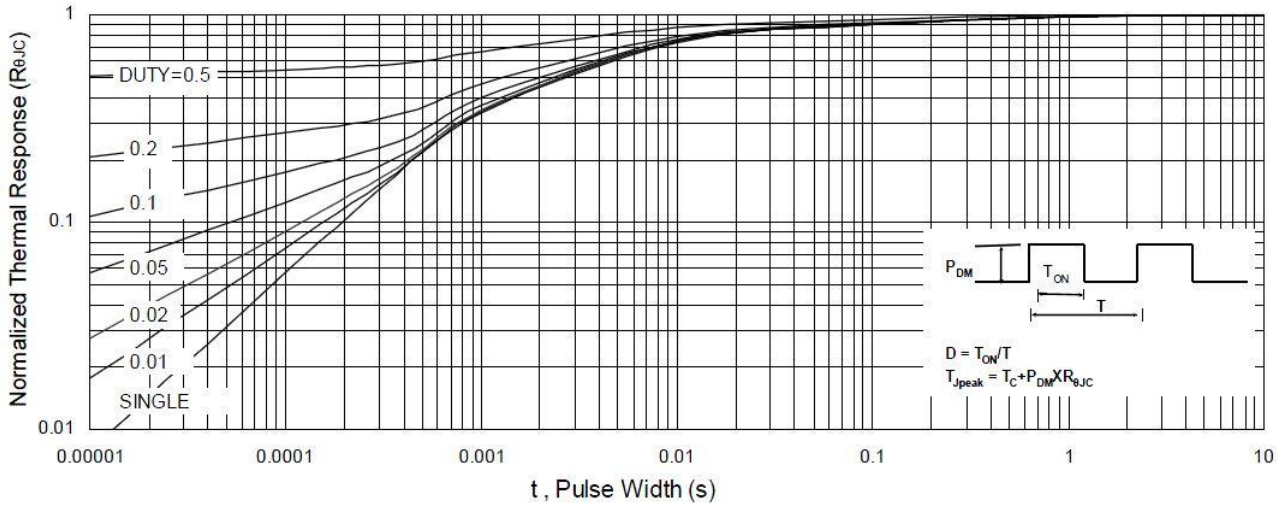
Maximum Safe Operating Area



Threshold Voltage vs. Temperature

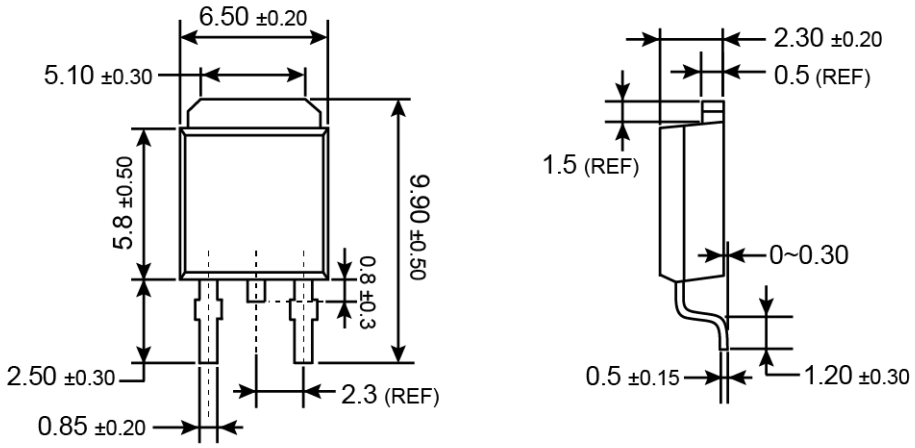


Normalized Thermal Transient Impedance, Junction-to-Ambient

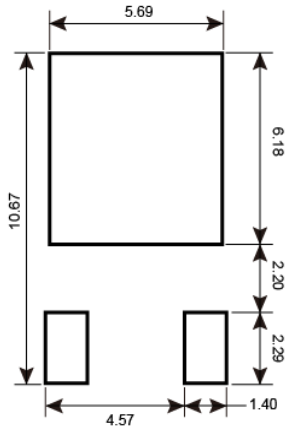


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

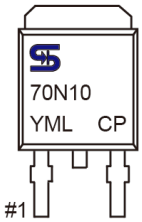
TO-252



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



Y = Year Code

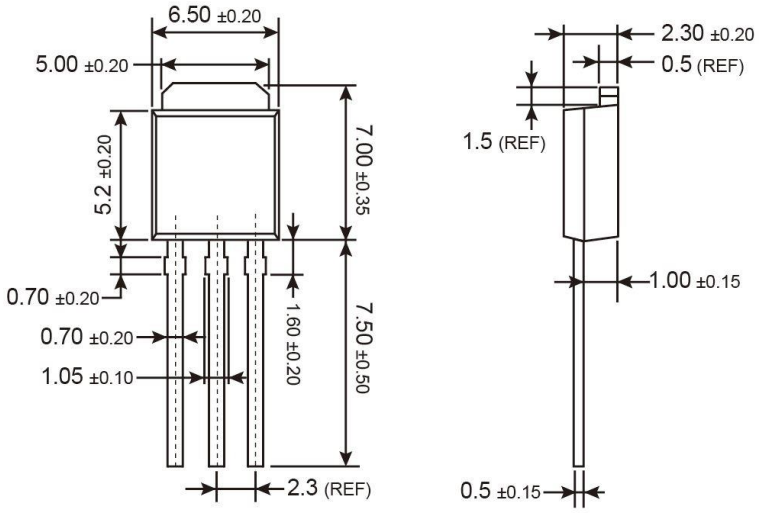
M = Month Code for Halogen Free Product

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

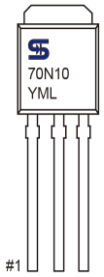
L = Lot Code (1~9, A~Z)

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-251



MARKING DIAGRAM



Y = Year Code

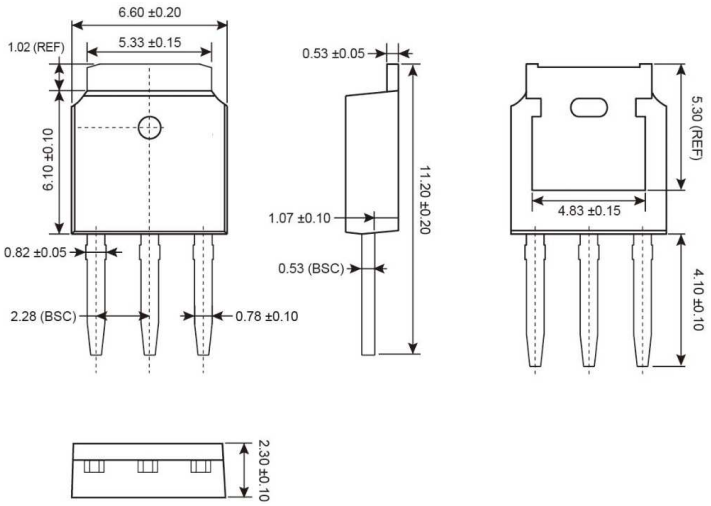
M = Month Code for Halogen Free Product

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

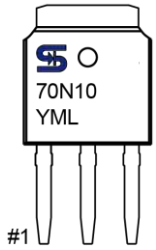
L = Lot Code (1~9, A~Z)

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-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)

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.