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

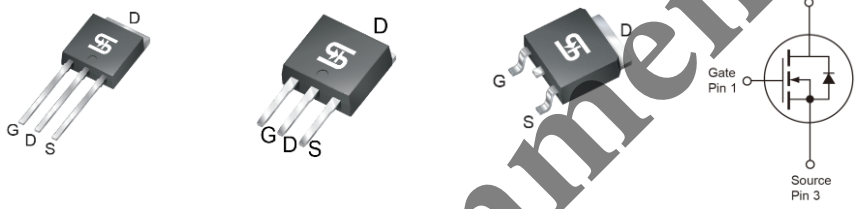
APPLICATION

- 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.

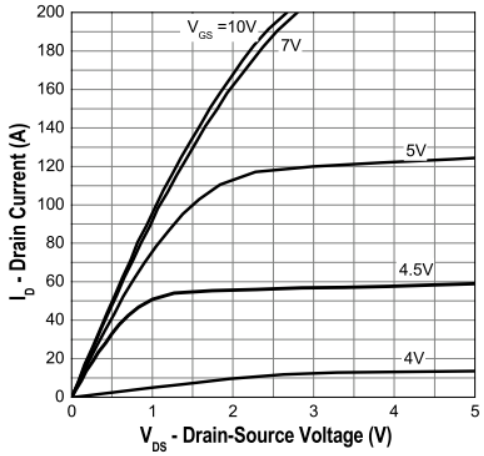
ORDERING INFORMATION

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

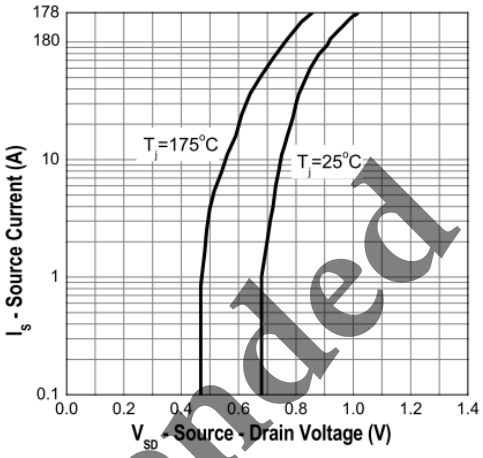
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

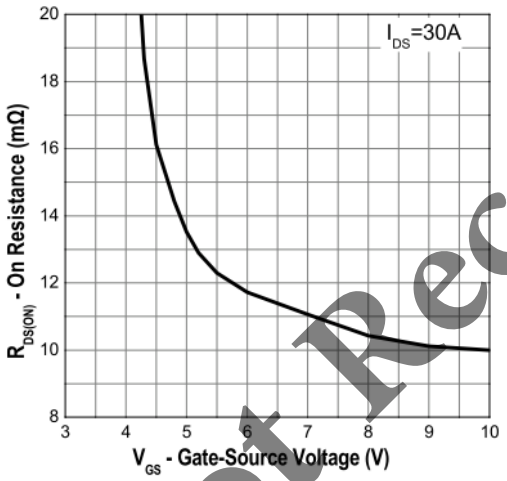
Output Characteristics



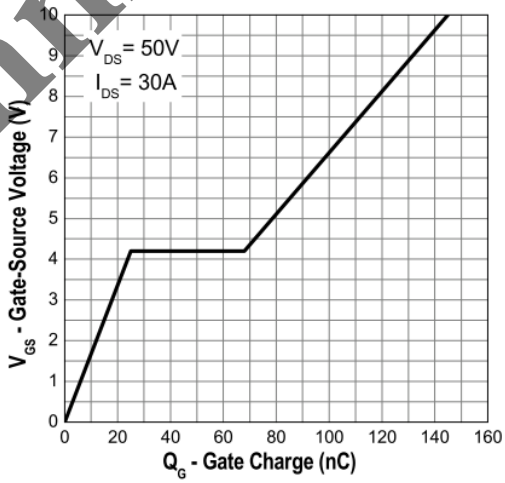
Transfer Characteristics



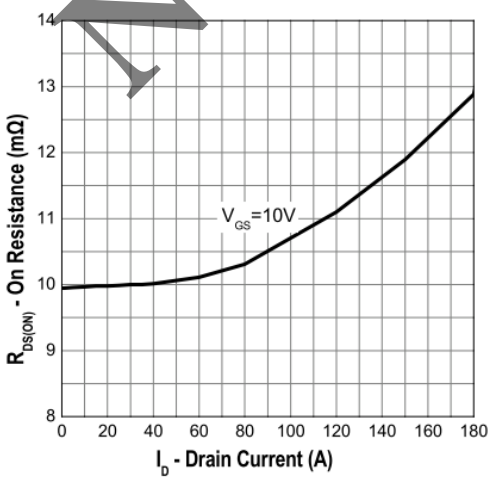
On-Resistance vs. Gate-Source Voltage



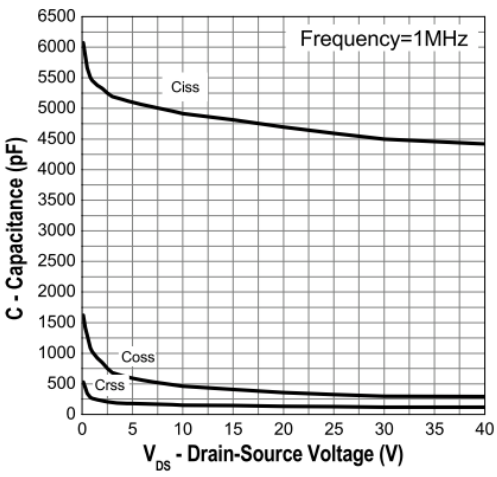
Gate Charge



On-Resistance vs. Junction Temperature



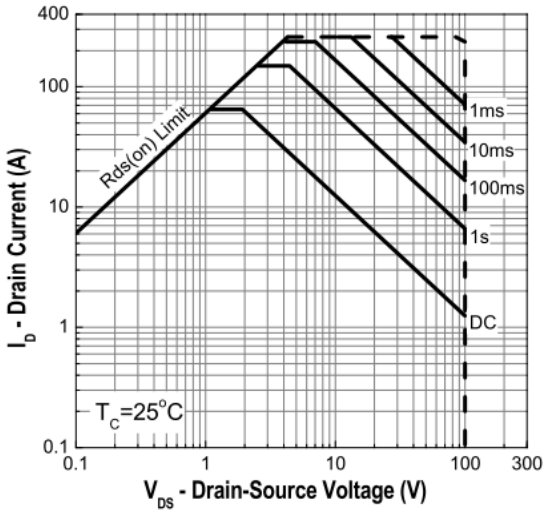
Capacitance



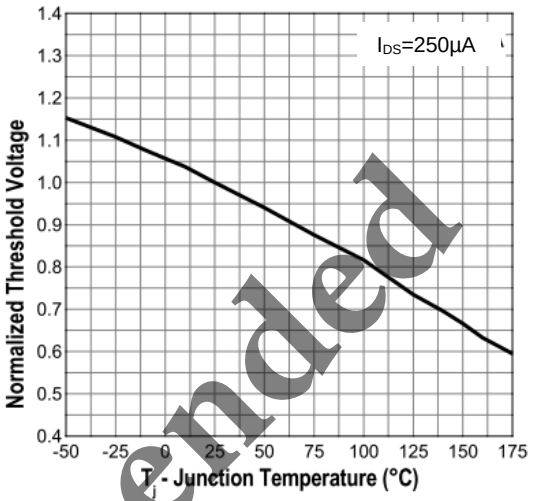
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

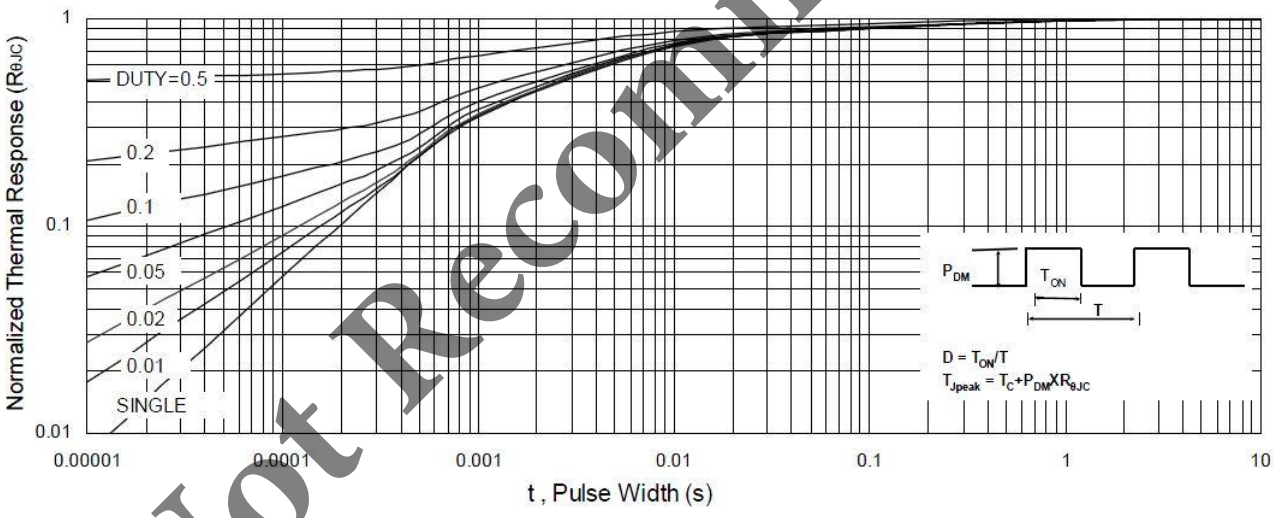
Maximum Safe Operating Area



Threshold Voltage vs. Temperature

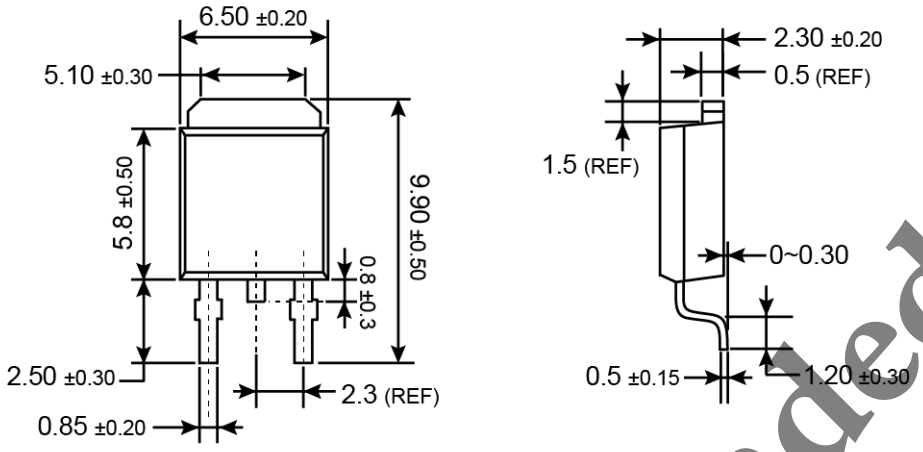


Normalized Thermal Transient Impedance, Junction-to-Ambient

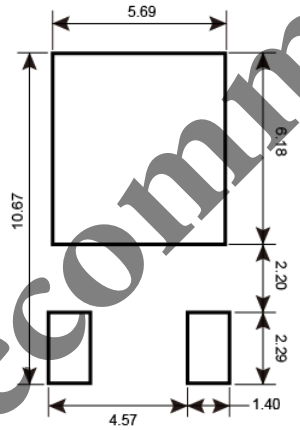


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

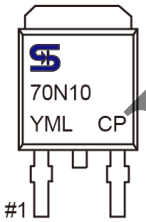
TO-252



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



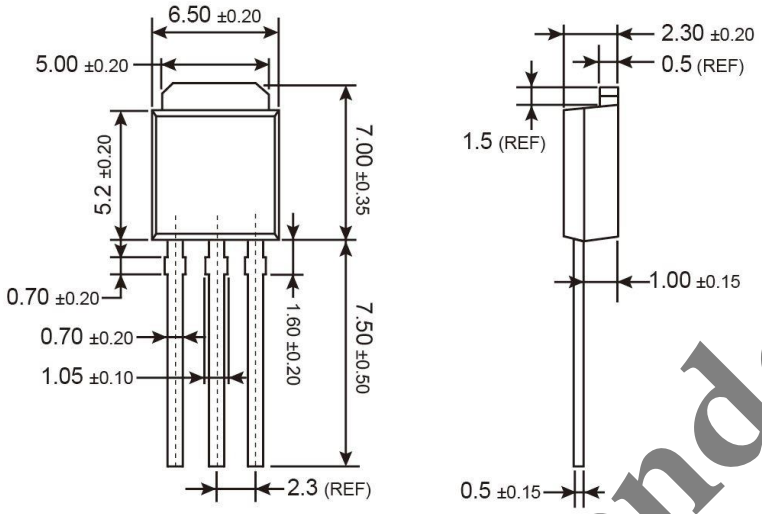
Y = Year Code
M = Month Code for Halogen Free Product

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



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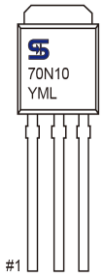

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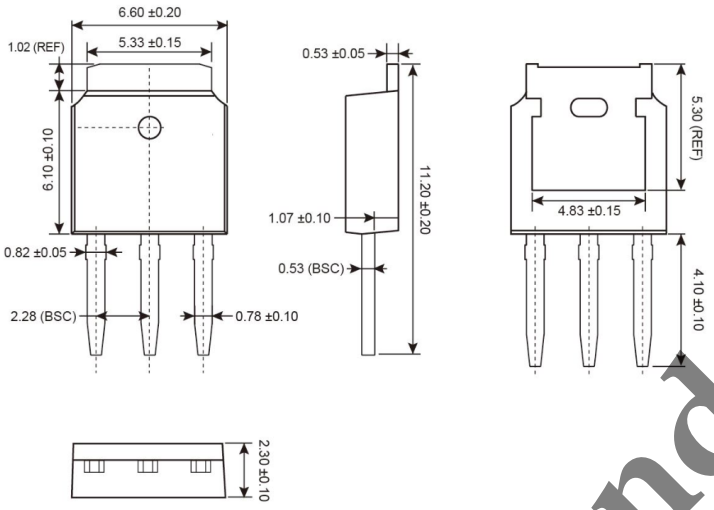
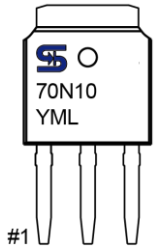
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-251S



MARKING DIAGRAM



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