TSM230N06CP

60V N-Channel Power MOSFET

TO-252 (DPAK)

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	23	mΩ
	V_{GS} = 4.5V	28	
Q_g		28	nC

Features

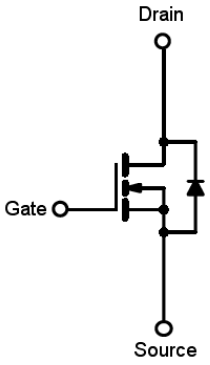
- 100% avalanche tested
- Fast Switching

Ordering Information

Ordering code	Package	Packing
TSM230N06CP ROG	TO-252	2.5kpcs / 13” Reel

Note: Halogen-free according to IEC 61249-2-21 definition

Block Diagram



N-Channel MOSFET

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

Parameter		Symbol	Limit	Unit
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	53	W
Operating Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R_{\Theta JC}$	2	°C/W
Thermal Resistance - Junction to Ambient	$R_{\Theta JA}$	62	

Pb-Free RoHS COMPLIANT

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

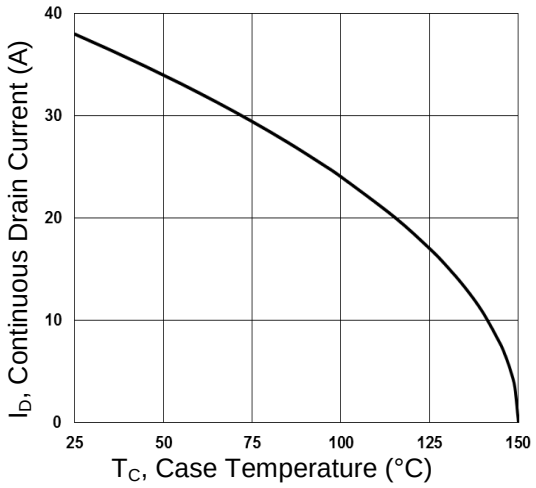
Note:

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.

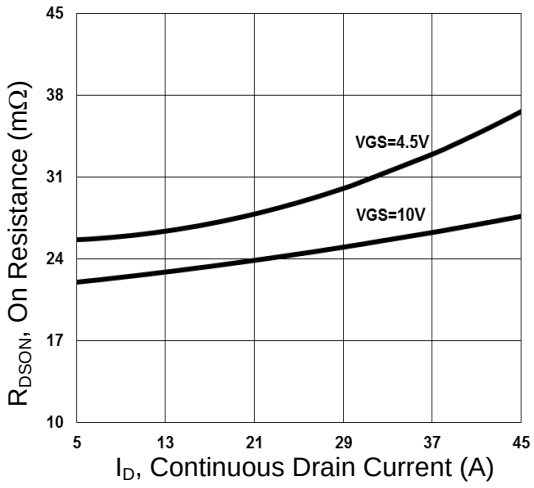
Pb-Free RoHS COMPLIANT

Electrical Characteristics Curve

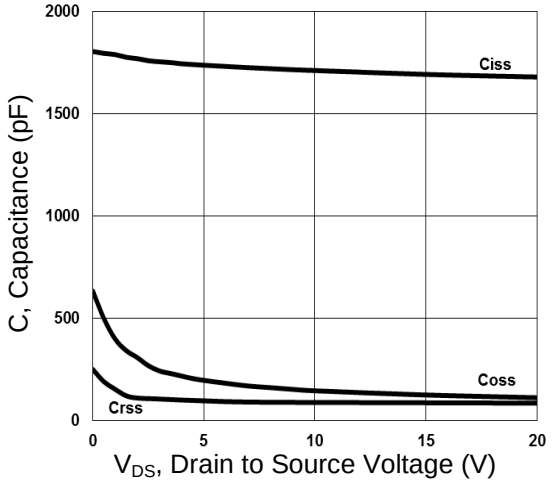
Continuous Drain Current vs. T_C



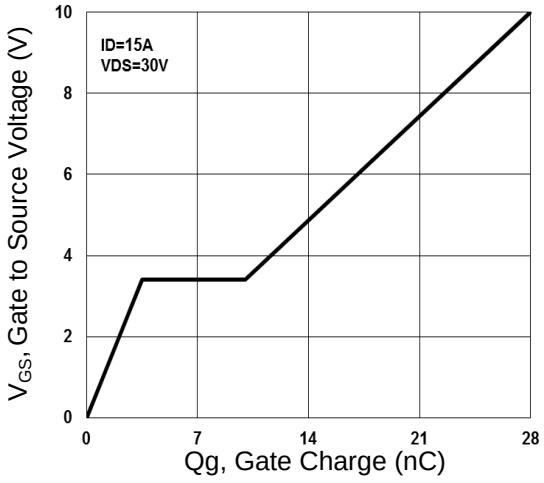
RDSON vs. Continuous Drain Current



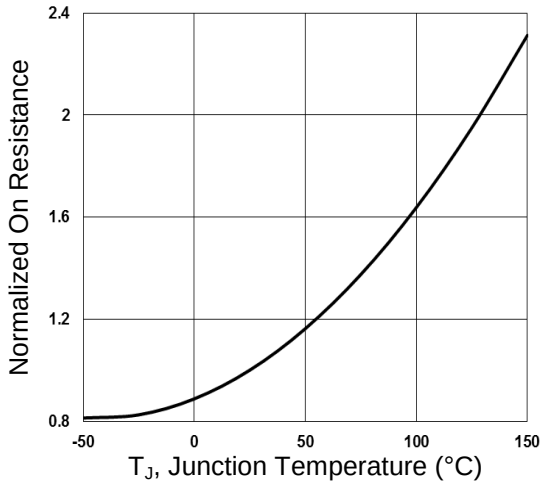
Capacitance



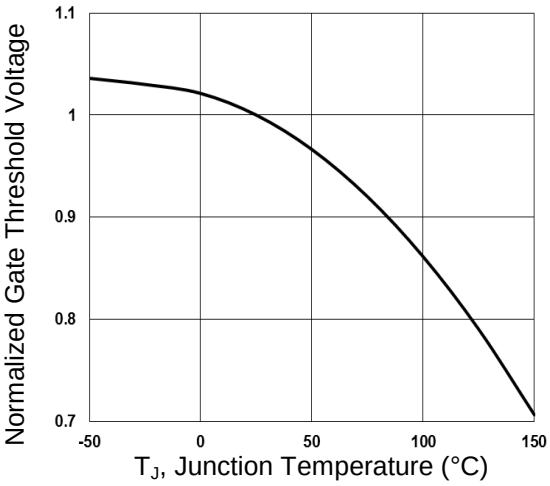
Gate Charge



On-Resistance vs. Junction Temperature



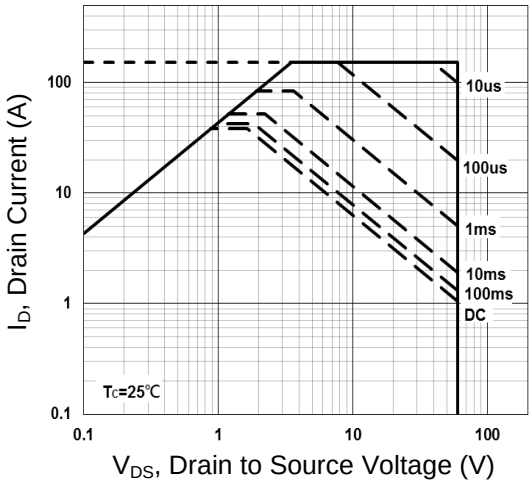
Threshold Voltage vs. Junction Temperature



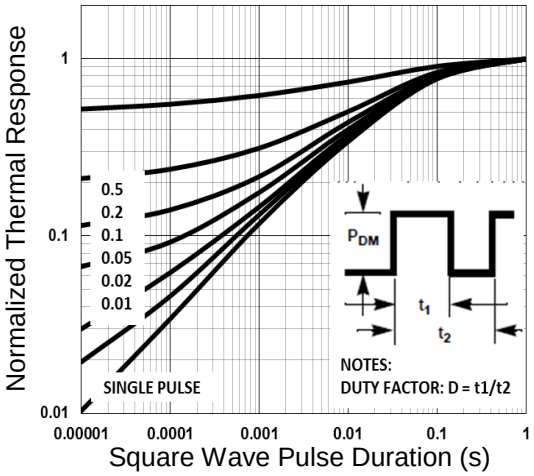
Pb-Free RoHS COMPLIANT

Electrical Characteristics Curve

Maximum Safe Operating Area

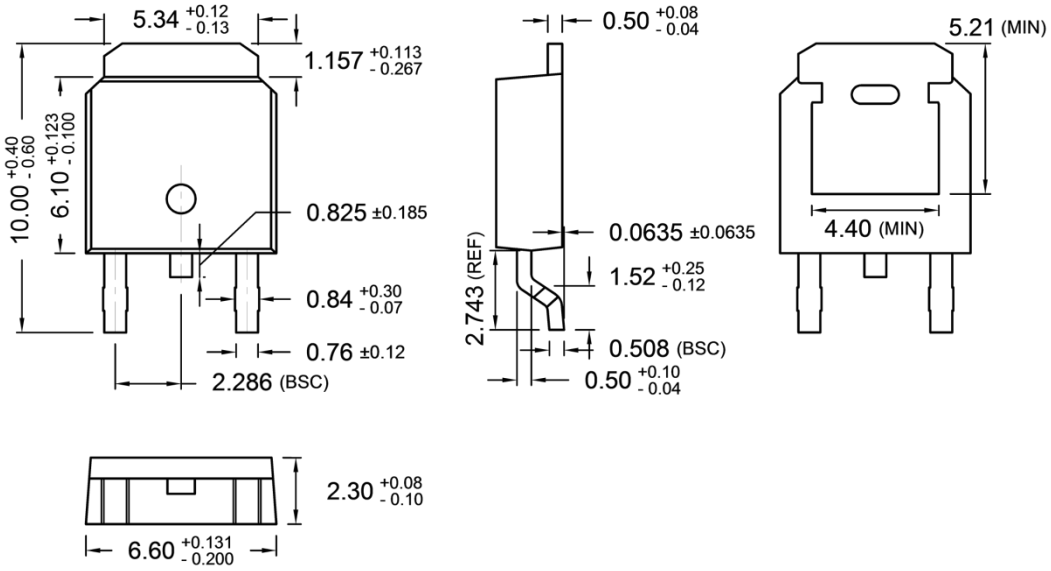


Normalized Thermal Transient Impedance



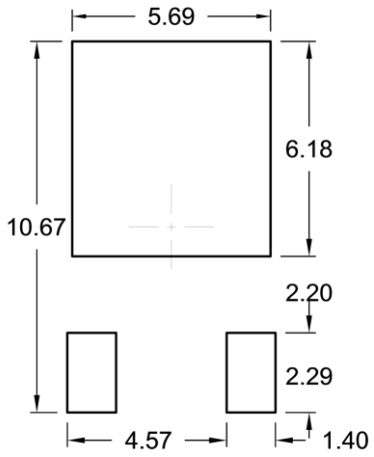
Pb-Free RoHS COMPLIANT

TO-252 Mechanical Drawing

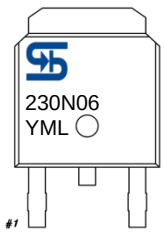


Unit: Millimeters

SUGGESTED PAD LAYOUT (Unit: Millimeters)



Marking Diagram



Y = Year Code

M = Month Code

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.