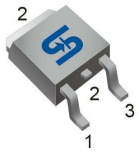
TAIWAN SEMICONDUCTOR

TSM500N03

30V N-Channel Power MOSFET

Pb-Free RoHS COMPLIANT

TO-252 (DPAK)



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

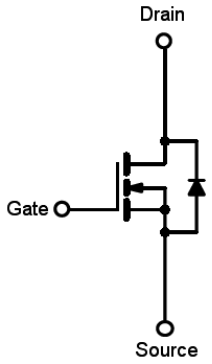
Key Parameter Performance

Parameter		Value	Unit
V_{DS}		30	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	50	mΩ
	V_{GS} = 4.5V	80	
Q_g		4	nC

Application

- Portable application
- DC to DC converter

Block Diagram



N-Channel MOSFET

Ordering Information

Part No.	Package	Packing
TSM500N03CP 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 (T_C=25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	12.5	A
	T_C=100°C		8	A
Pulsed Drain Current (Note 1)		I_{DM}	40	A
Power Dissipation @ T_C=25°C		P_D	12.5	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	$R_{\Theta JC}$	10	°C/W
Thermal Resistance - Junction to Ambient	$R_{\Theta JA}$	110	

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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}	30	--	--	V
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 8A	$R_{DS(ON)}$	--	40	50	mΩ
	V_{GS} = 4.5V, I_D = 8A		--	65	80	
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	1	1.7	3	V
Zero Gate Voltage Drain Current	V_{DS} = 30V, V_{GS} = 0V	I_{DSS}	--	--	1	μA
	V_{DS} = 24V, Tc = 150°C		--	--	25	
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Dynamic						
Total Gate Charge (Note 2,3)	V_{DS} = 24V, I_D = 10A, V_{GS} = 4.5V	Q_g	--	4	--	nC
Gate-Source Charge (Note 2,3)		Q_{gs}	--	1.6	--	
Gate-Drain Charge (Note 2,3)		Q_{gd}	--	2.4	--	
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	270	--	pF
Output Capacitance		C_{oss}	--	70	--	
Reverse Transfer Capacitance		C_{rss}	--	50	--	
Switching						
Turn-On Delay Time (Note 2,3)	V_{DD} = 15V, I_D = 10A, V_{GS} = 10V, R_{GEN} =3.3Ω	$t_{d(on)}$	--	7	--	ns
Turn-On Rise Time (Note 2,3)		t_r	--	30	--	
Turn-Off Delay Time (Note 2,3)		$t_{d(off)}$	--	10	--	
Turn-Off Fall Time (Note 2,3)		t_f	--	3	--	
Source-Drain Diode Ratings and Characteristic						
Diode-Source Forward Voltage	V_{GS} = 0V, I_S = 5A	V_{SD}	--	--	1.3	V
Reverse Recovery Time (Note 2)	V_{GS} = 0V, I_S = 10A, dI_F/dt = 100A/μs	t_{rr}	--	17	--	ns
Reverse Recovery Charge (Note 2)		Q_{rr}	--	10	--	nC

Note:

1. Pulse width limited by safe operating area
2. Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%
3. Switching time is essentially independent of operating temperature.

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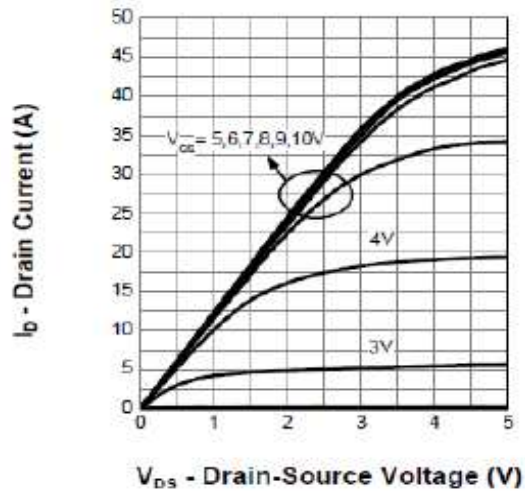
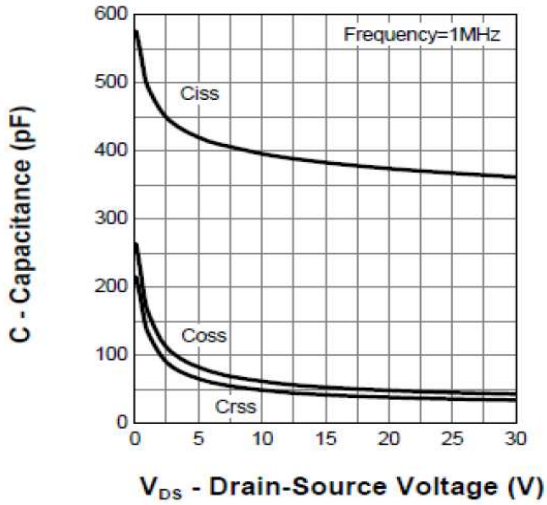
Electrical Characteristics Curves

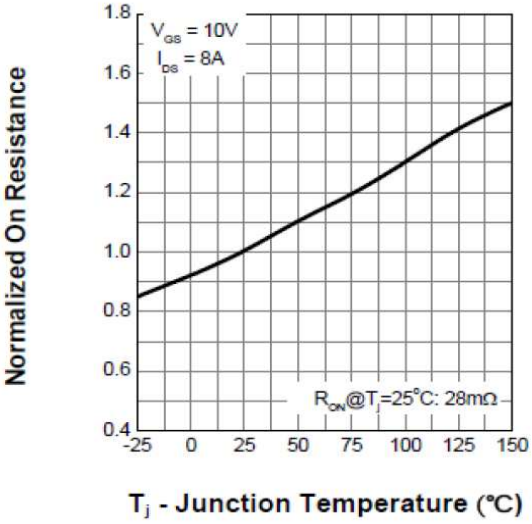
Output Characteristics



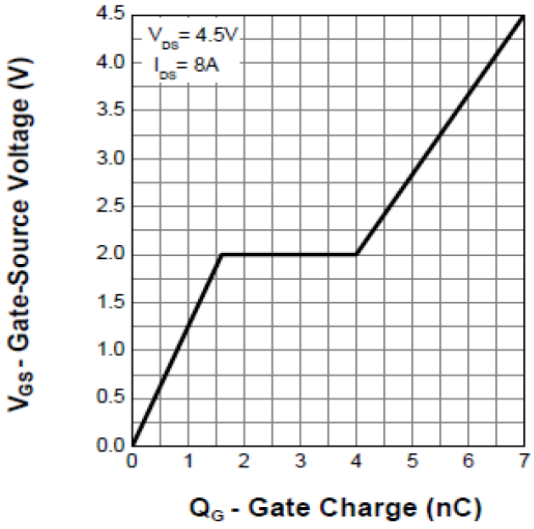
Capacitance



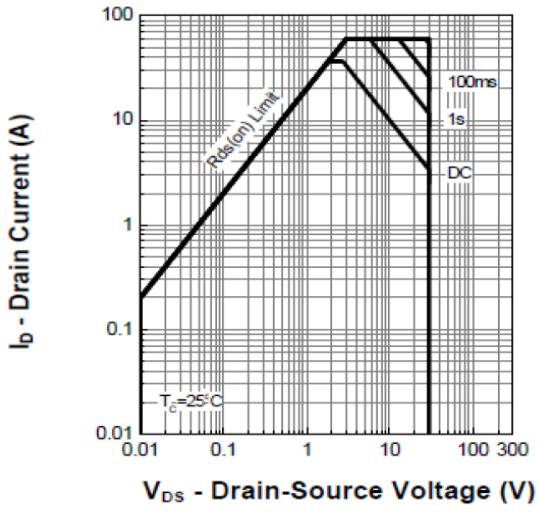
Drain-Source On-Resistance



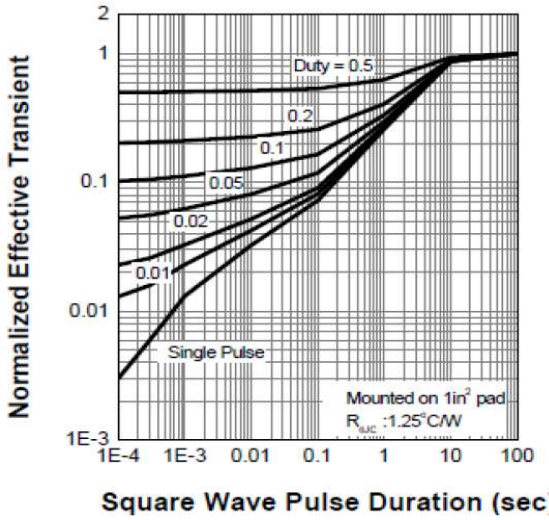
Gate-Source Voltage vs. Gate Charge



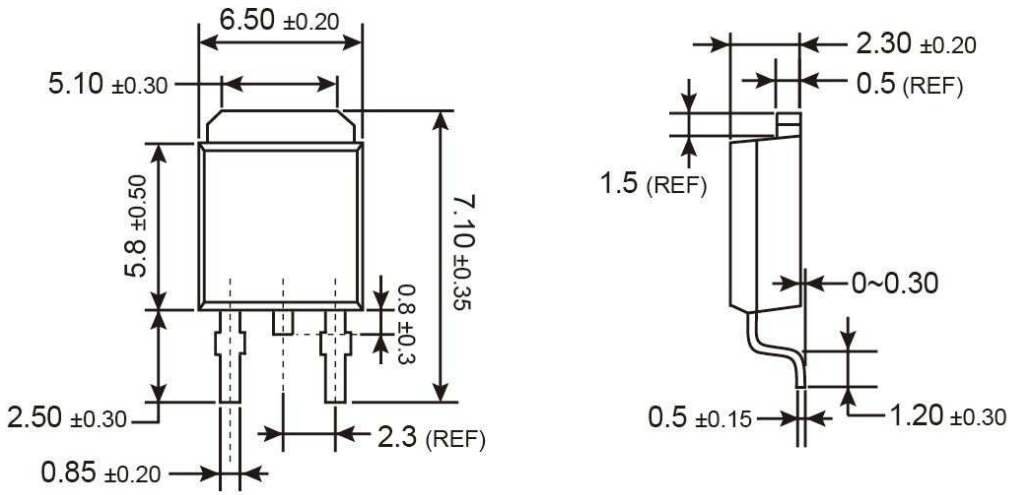
Safe Operation Area



Thermal Transient Impedance

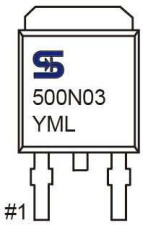


TO-252 Mechanical Drawing



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

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