TSM040N03CP

30V N-Channel Power MOSFET

TO-252 (DPAK)



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

Key Parameter Performance

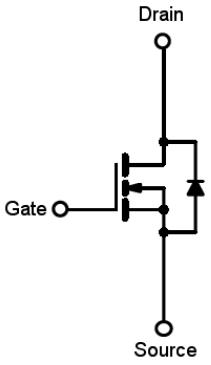
Parameter		Value	Unit
V_{DS}		30	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	4	mΩ
	V_{GS} = 4.5V	6	
Q_g		24	nC

Ordering Information

Ordering code	Package	Packing
TSM040N03CP 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 (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=25ºC	I_D	90	A
	T_C=100ºC		57	A
Pulsed Drain Current (Note 1)		I_{DM}	360	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	125	mJ
Single Pulse Avalanche Current (Note 2)		I_{AS}	50	A
Total Power Dissipation	@ T_C=25°C	P_D	88	W
	Derate above T_C=25°C		0.59	W/ºC
Operating Junction Temperature		T_J	150	ºC
Storage Temperature Range		T_{STG}	-55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R_{\Theta JC}$	1.7	°C/W
Thermal Resistance - Junction to Ambient	$R_{\Theta JA}$	62	°C/W

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Electrical Specifications (T_C=25°C unless otherwise noted)

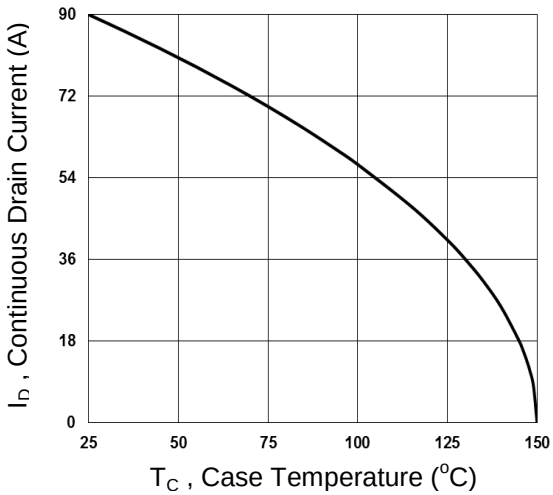
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	30	--	--	V
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 24A	$R_{DS(ON)}$	--	3.1	4	mΩ
	V_{GS} = 4.5V, I_D = 12A		--	4.5	6	
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	1.2	1.6	2.5	V
Zero Gate Voltage Drain Current	V_{DS} = 30V, V_{GS} = 0V	I_{DSS}	--	--	1	μA
	V_{DS} = 24V, T_J = 125ºC		--	--	10	
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Forward Transconductance	V_{DS} = 10V, I_D = 10A	g_{fs}	--	15.5	--	S
Dynamic						
Total Gate Charge (Note 3,4)	V_{DS} = 15V, I_D = 24A, V_{GS} = 4.5V	Q_g	--	24	--	nC
Gate-Source Charge (Note 3,4)		Q_{gs}	--	4.2	--	
Gate-Drain Charge (Note 3,4)		Q_{gd}	--	13	--	
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz	C_{iss}	--	2200	--	pF
Output Capacitance		C_{oss}	--	280	--	
Reverse Transfer Capacitance		C_{rss}	--	177	--	
Gate Resistance	f = 1MHz	R_g	--	2	--	Ω
Switching						
Turn-On Delay Time (Note 3,4)	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω, I_D=-15A	$t_{d(on)}$	--	12.6	--	ns
Turn-On Rise Time (Note 3,4)		t_r	--	19.5	--	
Turn-Off Delay Time (Note 3,4)		$t_{d(off)}$	--	42.8	--	
Turn-Off Fall Time (Note 3,4)		t_f	--	13.2	--	
Source-Drain Diode Ratings and Characteristic						
Continuous Drain-Source Diode		I_S	--	--	90	A
Pulse Drain-Source Diode		I_{SM}	--	--	360	A
Diode-Source Forward Voltage	V_{GS} = 0V, I_S = 1A	V_{SD}	--	--	1	V

Note:

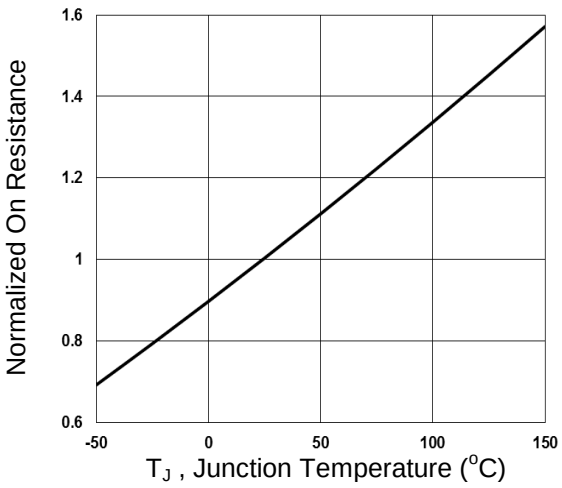
1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=50A, R_G=25Ω, Starting T_J=25°C
3. The data tested by pulsed, pulse width ≤300μs, duty cycle ≤2%
4. Essentially independent of operating temperature.

Electrical Characteristics Curves

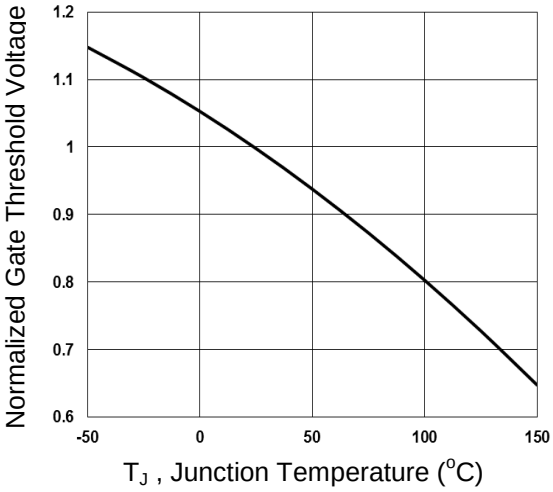
Continuous Drain Current vs. Tc



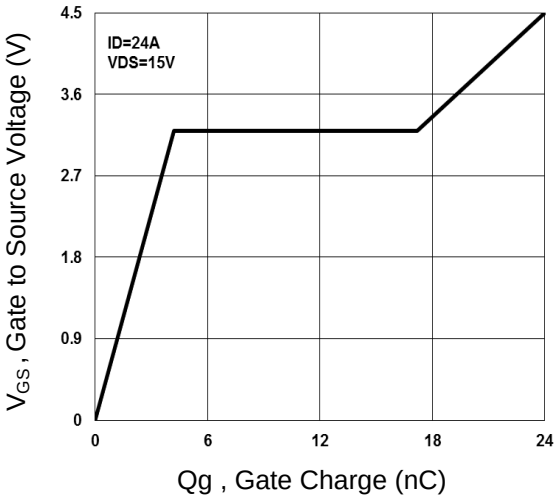
Normalized RDSON vs. T_J



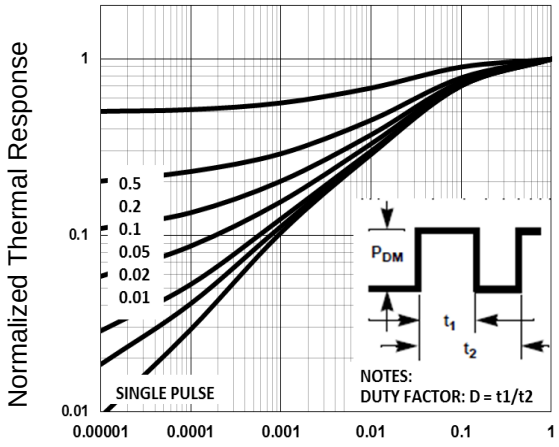
Normalized V_{th} vs. T_J



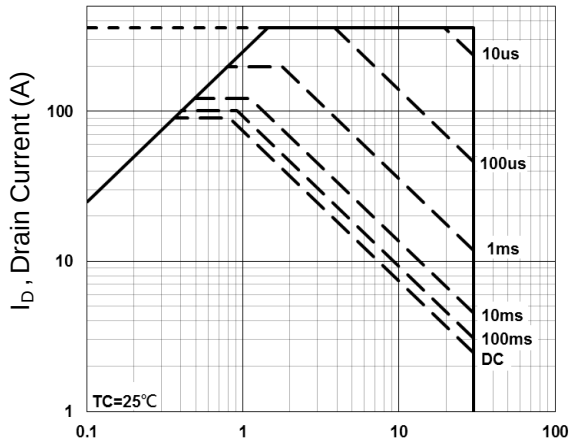
Gate Charge Waveform



Normalized Transient Impedance



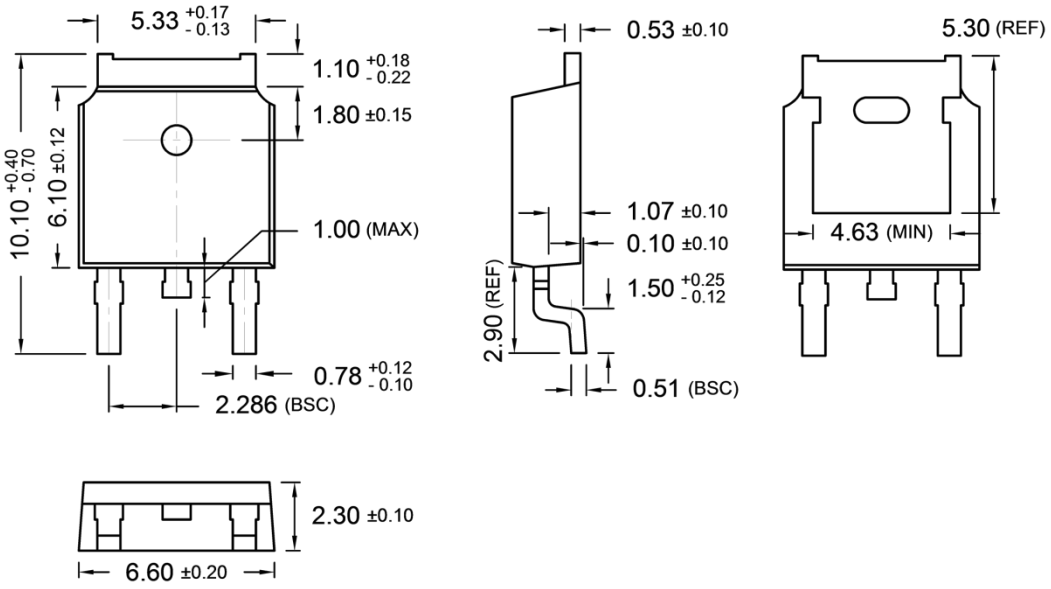
Maximum Safe Operation Area



TSM040N03CP

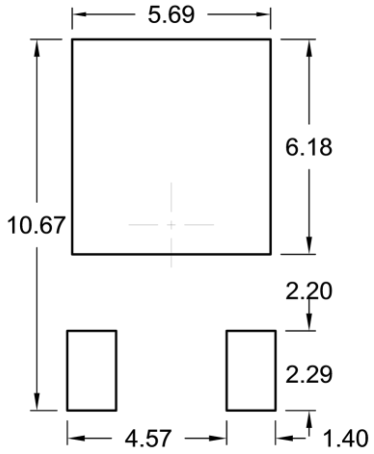
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TO-252 Mechanical Drawing

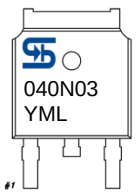


Unit: Millimeters

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)

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