

TSM090N03CP

30V N-Channel Power MOSFET



Pin Definition:

1. Gate
2. Drain
3. Source

Key Parameter Performance

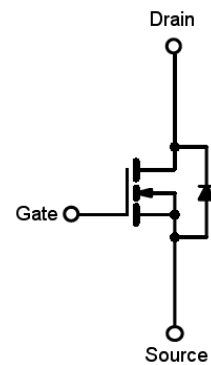
Parameter	Value	Unit
V_{DS}	30	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	9
	$V_{GS} = 4.5V$	13
Q_g	7.5	nC

Ordering Information

Ordering code	Package	Packing
TSM090N03CP 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 ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	55
		$T_C=100^\circ\text{C}$	35
Pulsed Drain Current (Note 1)	I_{DM}	220	A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	45	mJ
Single Pulse Avalanche Current (Note 2)	I_{AS}	30	A
Total Power Dissipation	P_D	@ $T_C=25^\circ\text{C}$	40
		Derate above $T_C=25^\circ\text{C}$	0.32
Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R_{\theta JC}$	3.1	$^\circ\text{C/W}$
Thermal Resistance - Junction to Ambient	$R_{\theta JA}$	62	$^\circ\text{C/W}$

Electrical Specifications ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

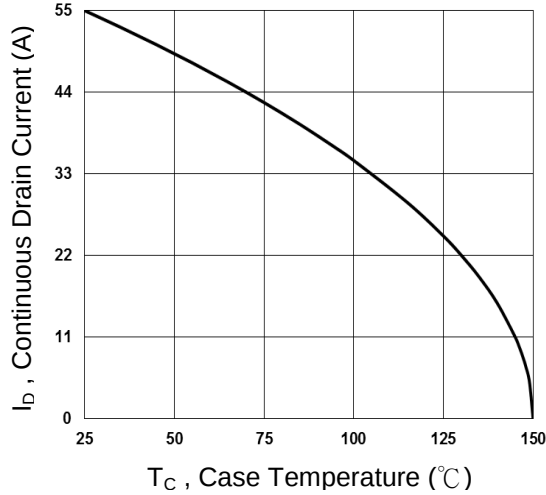
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	BV _{DSS}	30	--	--	V
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 16A	R _{DS(ON)}	--	7.5	9	mΩ
	V _{GS} = 4.5V, I _D = 8A		--	10	13	
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V _{GS(TH)}	1	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 = 125°C		--	--	10	
Gate Body Leakage	V _{GS} = ±20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Forward Transconductance	V _{DS} = 10V, I _D = 8A	g _{fs}	--	14	--	S
Dynamic						
Total Gate Charge ^(Note 3,4)	V _{DS} = 15V, I _D = 20A, V _{GS} = 4.5V	Q _g	--	7.5	--	nC
Gate-Source Charge ^(Note 3,4)		Q _{gs}	--	1.3	--	
Gate-Drain Charge ^(Note 3,4)		Q _{gd}	--	4.5	--	
Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz	C _{iss}	--	750	--	pF
Output Capacitance		C _{oss}	--	150	--	
Reverse Transfer Capacitance		C _{rss}	--	110	--	
Gate Resistance	f = 1MHz	R _g	--	2.7	--	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)}	--	4.8	--	ns
Turn-On Rise Time ^(Note 3,4)		t _r	--	12.5	--	
Turn-Off Delay Time ^(Note 3,4)		t _{d(off)}	--	27.6	--	
Turn-Off Fall Time ^(Note 3,4)		t _f	--	8.2	--	
Source-Drain Diode Ratings and Characteristic						
Continuous Drain-Source Diode		I _S	--	--	55	A
Pulse Drain-Source Diode		I _{SM}	--	--	220	A
Diode-Source Forward Voltage	V _{GS} = 0V, I _S = 1A	V _{SD}	--	--	1	V

Note:

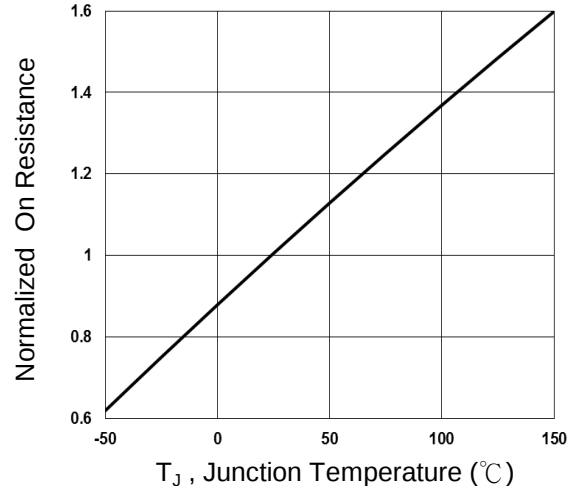
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=30A., R_G=25\Omega,$ Starting $T_J=25^{\circ}\text{C}$
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Essentially independent of operating temperature.

Electrical Characteristics Curve

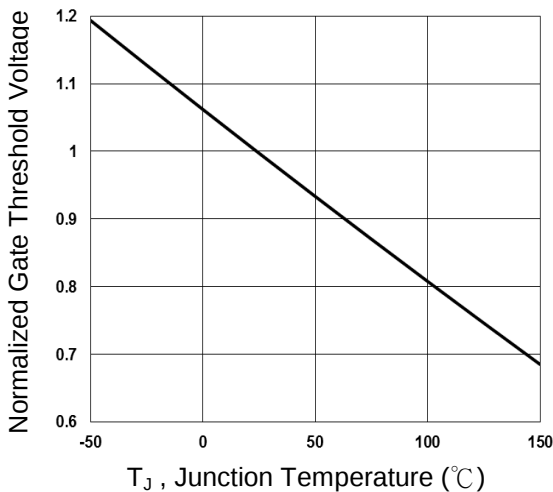
Continuous Drain Current vs. T_c



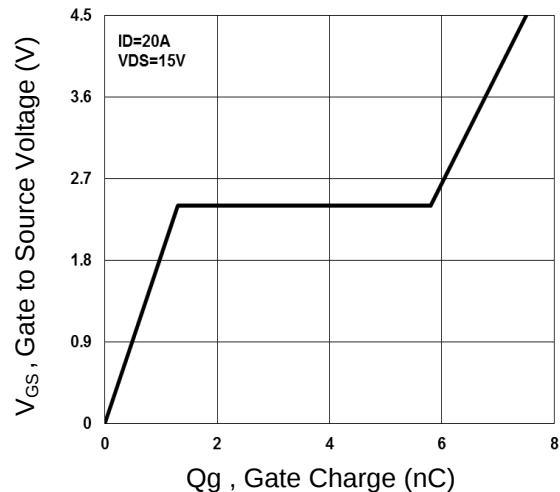
Normalized $R_{DS(on)}$ vs. T_J



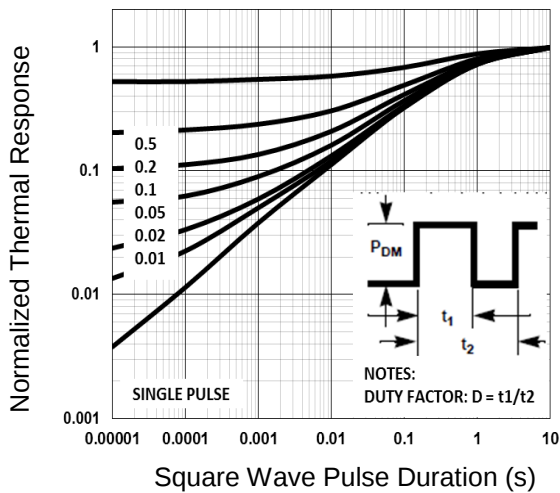
Normalized V_{th} vs. T_J



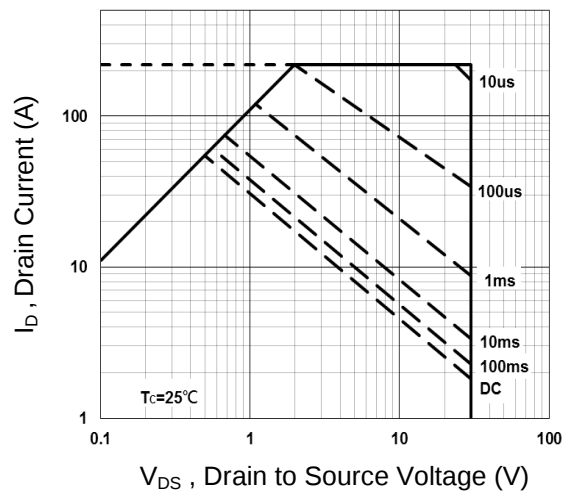
Gate Charge Waveform



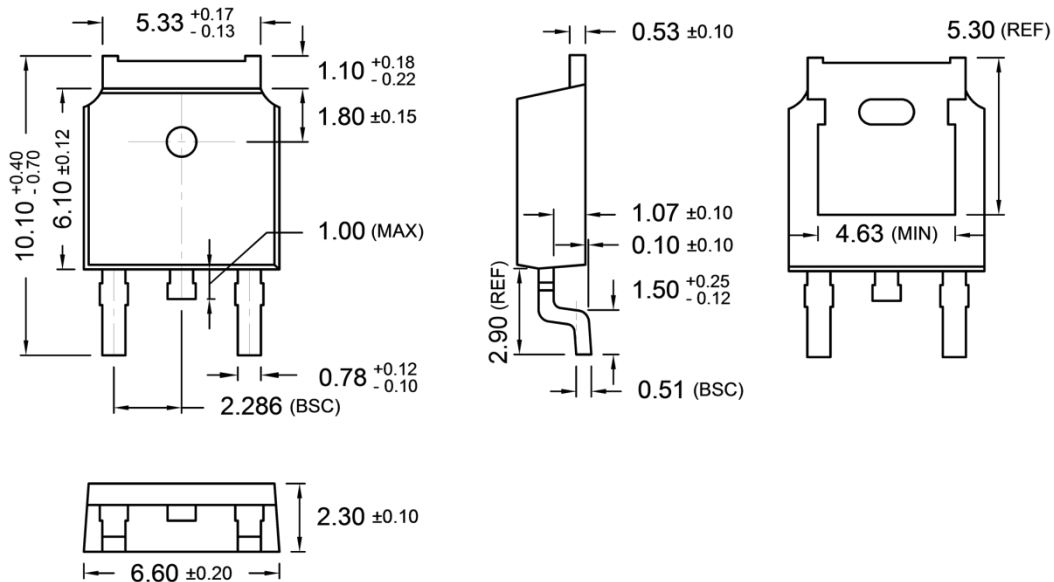
Normalized Transient Impedance



Maximum Safe Operation Area

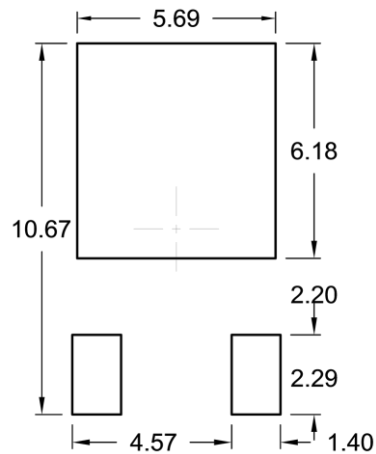


TO-252 Mechanical Drawing

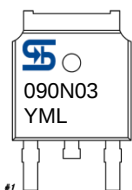


Unit: Millimeters

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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