TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TSM25N03

25V N-Channel MOSFET

TO-252



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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$(mΩ)	I_D (A)
25	14 @ V_{GS} = 10V	25
	19 @ V_{GS} = 4.5V	25

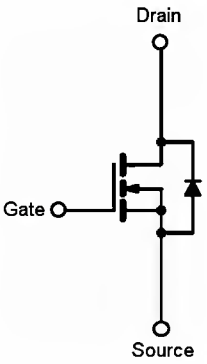
Features

- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

Application

- Load Switch
- Dc-DC Converters and Motors Drivers

Block Diagram



N-Channel MOSFET

Ordering Information

Part No.	Package	Packing
TSM25N03CP RO	TO-252	2.5Kpcs / 13" Reel

Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	25	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current, V_{GS} @4.5V.		I_D	25	A
Pulsed Drain Current, V_{GS} @4.5V		I_{DM}	100	A
Continuous Source Current (Diode Conduction)[a,b]		I_S	20	A
Single Pulse Drain to Source Avalanche Energy (V_{DD} = 100V, V_{GS}=10V, I_{AS}=2A, L=10mH, R_G=25Ω)		EAS	45	mJ
Maximum Power Dissipation	Ta = 25°C	P_D	60	W
	Ta = 70°C		23	
Operating Junction Temperature		T_J	+150	°C
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Lead Temperature (1/8" from case)	T_L	10	S
Junction to Case Thermal Resistance	$R\Theta_{JC}$	1.8	°C/W
Junction to Ambient Thermal Resistance (PCB mounted)	$R\Theta_{JA}$	40	°C/W

Notes:

a. Maximum DC current limited by the package

b. Surface Mounted on 1" x 1" FR4 Board, t ≤ 10 sec.

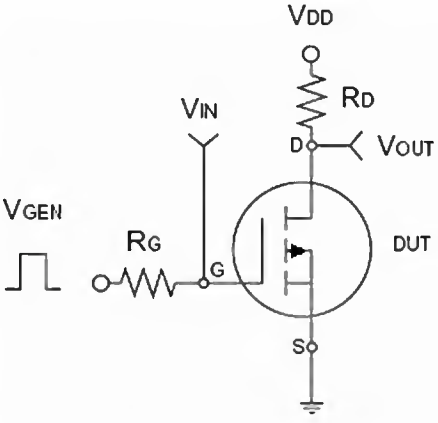
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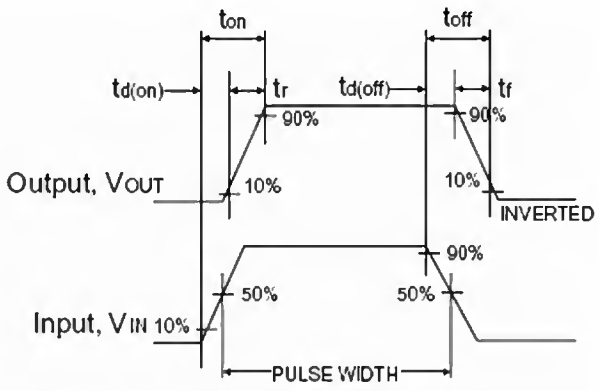
Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	BV_{DSS}	25	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	$V_{GS(TH)}$	1.0	1.9	3.0	V
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 25V, V_{GS} = 0V	I_{DSS}	--	--	1.0	uA
On-State Drain Current	V_{DS} ≥5V, V_{GS} = 10V	$I_{D(ON)}$	25	--	--	A
Drain-Source On-State Resistance	V_{GS} = 4.5V, I_D = 25A	$R_{DS(ON)}$	--	14.5	19	mΩ
	V_{GS} = 10V, I_D = 25A		--	9.5	14	
Forward Transconductance	V_{DS} = 15V, I_D = 15A	g_{fs}	--	12	--	S
Diode Forward Voltage	I_S = 20A, V_{GS} = 0V	V_{SD}	--	0.87	1.5	V
Dynamic[b]						
Total Gate Charge	V_{DS} = 15V, I_D = 25A, V_{GS} = 10V	Q_g	--	14.7	26	nC
Gate-Source Charge		Q_{gs}	--	2.5	--	
Gate-Drain Charge		Q_{gd}	--	3	--	
Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	921	--	pF
Output Capacitance		C_{oss}	--	208.7	--	
Reverse Transfer Capacitance		C_{rss}	--	108.2	--	
Switching[c]						
Turn-On Delay Time	V_{DD} = 15V, R_L = 15Ω, I_D = 1A, V_{GEN} = 10V, R_G = 16Ω	$t_{d(on)}$	--	20.2	--	nS
Turn-On Rise Time		t_r	--	5.9	--	
Turn-Off Delay Time		$t_{d(off)}$	--	49.5	--	
Turn-Off Fall Time		t_f	--	16.7	--	

Notes:
a. pulse test: PW ≤300μS, duty cycle ≤2%
b. For DESIGN AID ONLY, not subject to production testing.
b. Switching time is essentially independent of operating temperature.



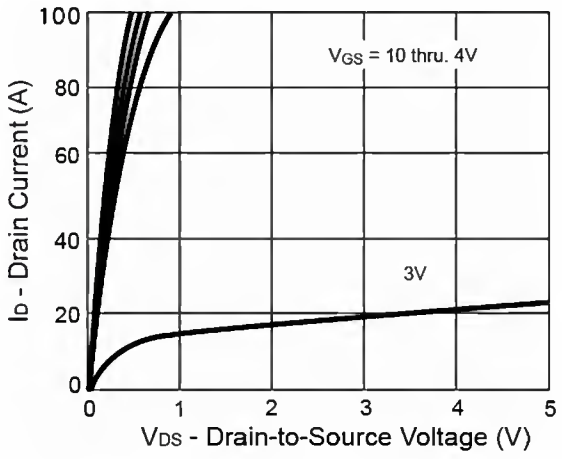
Switching Test Circuit



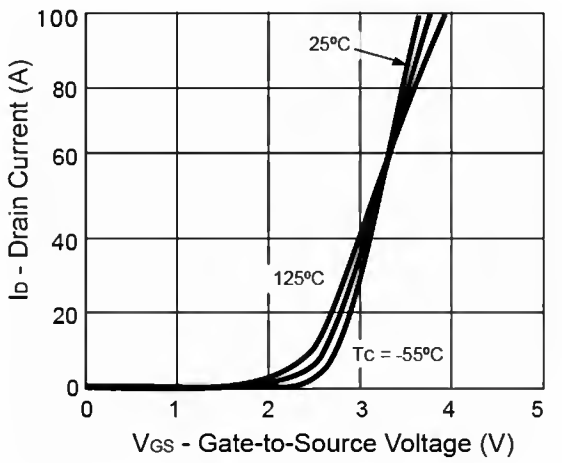
Switchin Waveforms

Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

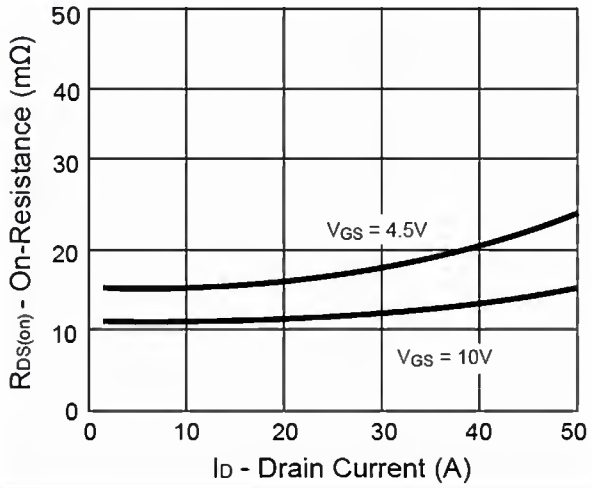
Output Characteristics



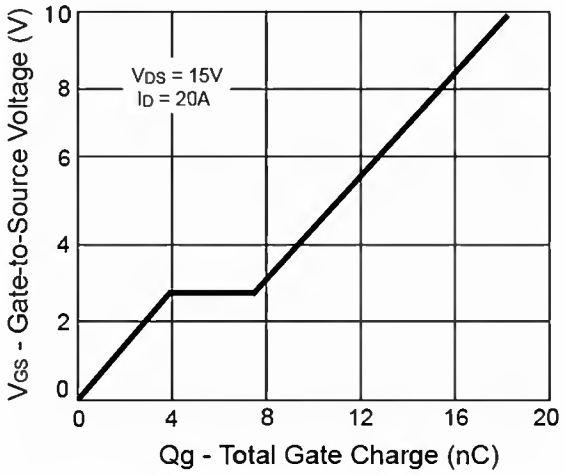
Transfer Characteristics



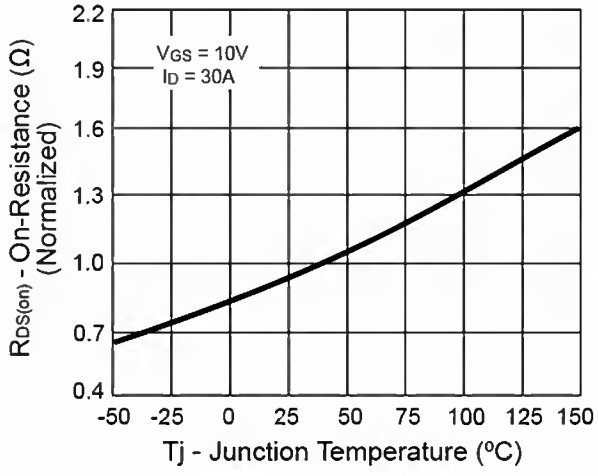
On-Resistance vs. Drain Current



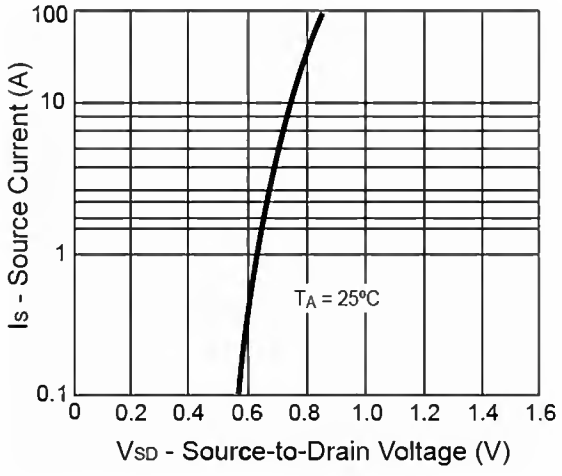
Gate Charge



On-Resistance vs. Junction Temperature

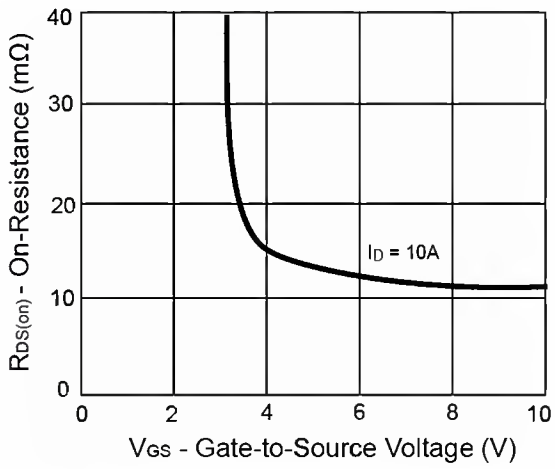


Source-Drain Diode Forward Voltage

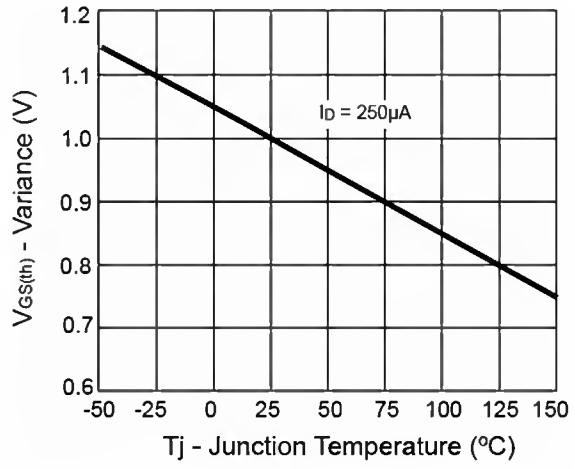


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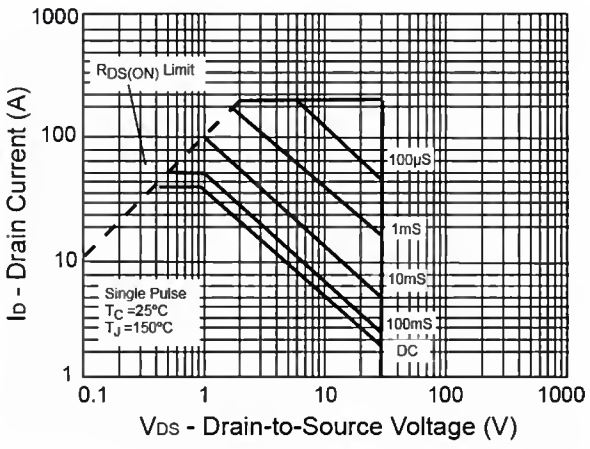
On-Resistance vs. Gate-Source Voltage



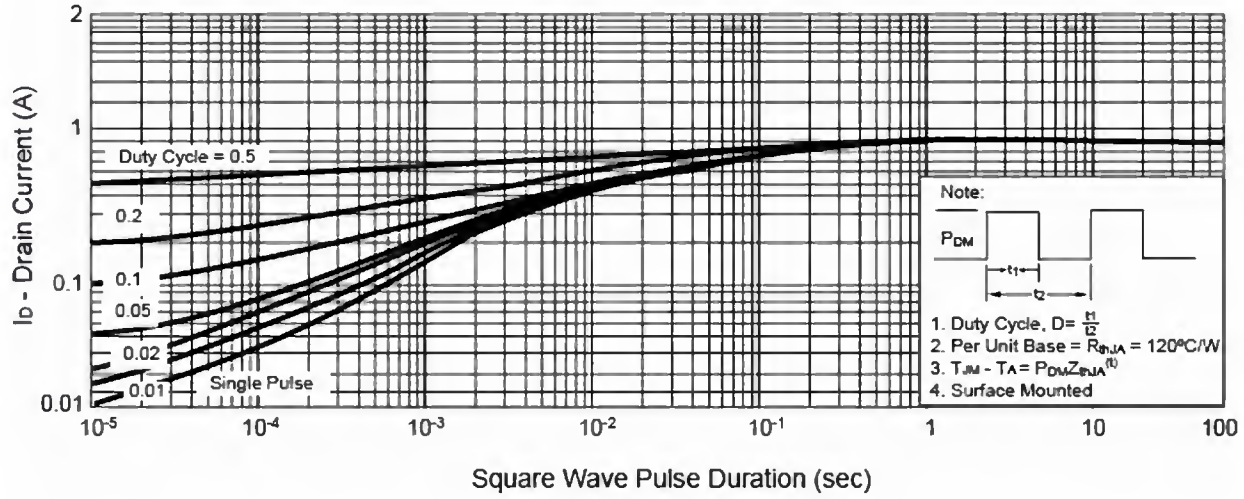
Threshold Voltage



Maximum Safe Operating Area



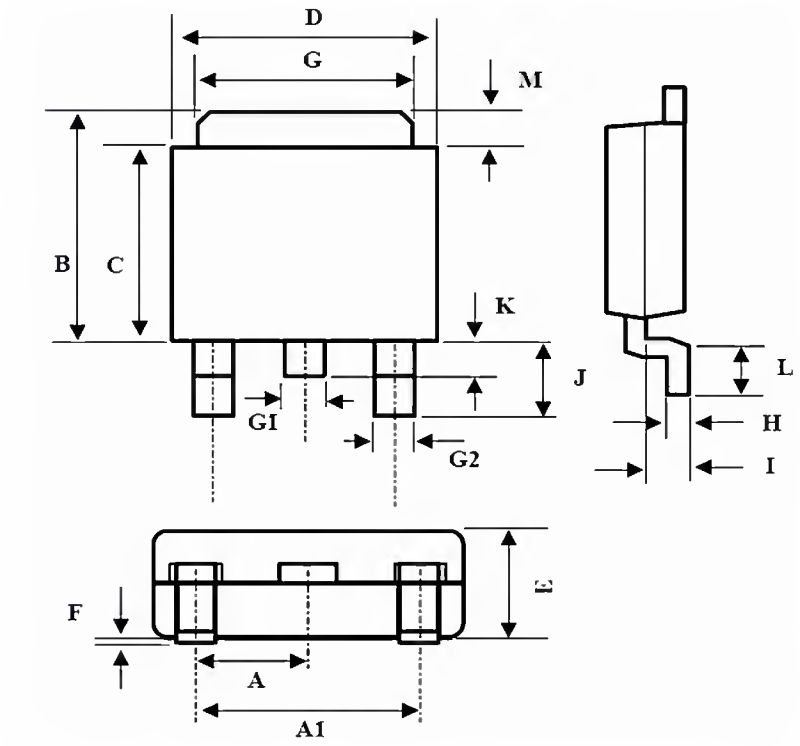
Normalized Thermal Transient Impedance, Junction-to-Ambient



TSM25N03

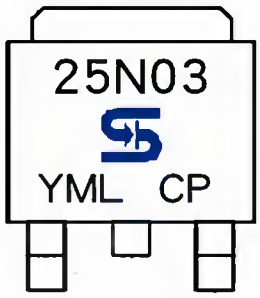
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SOT-252 Mechanical Drawing



TO-252 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.3BSC		0.09BSC	
A1	4.6BSC		0.18BSC	
B	6.80	7.20	0.268	0.283
C	5.40	5.60	0.213	0.220
D	6.40	6.65	0.252	0.262
E	2.20	2.40	0.087	0.094
F	0.00	0.20	0.000	0.008
G	5.20	5.40	0.205	0.213
G1	0.75	0.85	0.030	0.033
G2	0.55	0.65	0.022	0.026
H	0.35	0.65	0.014	0.026
I	0.90	1.50	0.035	0.059
J	2.20	2.80	0.087	0.110
K	0.50	1.10	0.020	0.043
L	0.90	1.50	0.035	0.059
M	1.30	1.70	0.051	0.67

Marking Diagram



Y = Year Code
M = Month Code
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apl, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
L = Lot Code

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