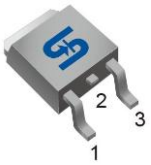
TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TSM60N03

30V N-Channel Power MOSFET

TO-252 (DPAK)



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

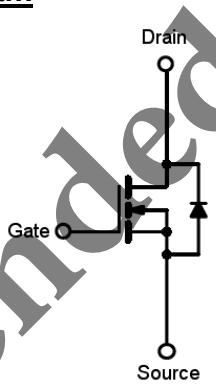
PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$(mΩ)	I_D (A)
30	4.5 @ V_{GS}=10V	60

Features

- Advanced Trench Technology
- Low $R_{DS(ON)}$ 4.5mΩ (Max.)
- Low gate charge typical @ 12nC (Typ.)
- Low Crss typical @ 140pF (Typ.)

Block Diagram



N-Channel MOSFET

Ordering Information

Part No.	Package	Packing
TSM60N03CP ROG	TO-252	2.5Kpcs / 13" Reel

Note: "G" denote for Halogen Free Product

Absolute Maximum Rating (T_C = 25℃ 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℃	I_D	60	A
	T_C = 70℃		48	
	T_A = 25℃		19	
	T_A = 70℃		15	
Drain Current-Pulsed *		I_{DM}	140	A
Avalanche Current, L = 0.1mH		I_{AS}, I_{AR}	38	A
Avalanche Energy, L = 0.1mH		E_{AS}, E_{AR}	72	mJ
Maximum Power Dissipation	T_C = 25℃	P_D	41	W
	T_C = 70℃		26	
	T_A = 25℃		2.5	
	T_A = 70℃		1.6	
Storage Temperature Range		T_{STG}	-55 to +150	℃
Operating Junction Temperature Range		T_J	-55 to +150	℃

* Limited by maximum junction temperature

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R_{\Theta JC}$	3	℃/W
Thermal Resistance - Junction to Ambient	$R_{\Theta JA}$	50	℃/W

Notes: Surface mounted on FR4 board t ≤ 10sec

TSM60N03

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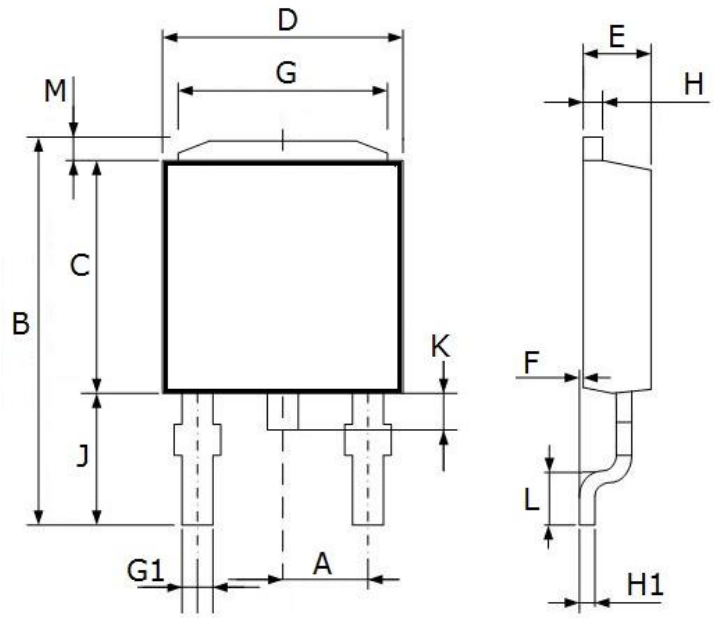
Electrical Specifications (T_C = 25℃ unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	BV_{DSS}	30	--	--	V
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 19A	$R_{DS(ON)}$	--	3.5	4.5	mΩ
	V_{GS} = 4.5V, I_D = 16A	$R_{DS(ON)}$	--	4.6	5.8	mΩ
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	$V_{GS(TH)}$	1.15	--	2.2	V
Zero Gate Voltage Drain Current	V_{DS} = 30V, V_{GS} = 0V	I_{DSS}	--	--	1	uA
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Dynamic						
Total Gate Charge	V_{DS} = 15V, I_D = 19A, V_{GS} = 4.5V	Q_g	--	12	--	nC
Gate-Source Charge		Q_{gs}	--	5.4	--	
Gate-Drain Charge		Q_{gd}	--	4.6	--	
Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	1700	--	pF
Output Capacitance		C_{oss}	--	350	--	
Reverse Transfer Capacitance		C_{rss}	--	140	--	
Switching						
Turn-On Delay Time	V_{GS} = 4.5V, V_{DS} = 15V, R_G = 1.5Ω, I_D = 10A	$t_{d(on)}$	--	25	--	nS
Turn-On Rise Time		t_r	--	20	--	
Turn-Off Delay Time		$t_{d(off)}$	--	25	--	
Turn-Off Fall Time		t_f	--	15	--	
Drain-Source Diode Characteristics and Maximum Rating						
Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 10A	V_{SD}	-	0.8	1.2	V
Reverse Recovery Time	I_S = 10A, T_J = 25℃ dI/dt = 100A/us	t_{fr}		25		nS
Reverse Recovery Charge		Q_{fr}		17		nC

Notes:

1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on FR-4 in still air
3. The maximum current rating is limited by package

TO-252 Mechanical Drawing



TO-252 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.286 BSC		0.090 BSC	
B	9.40	10.40	0.370	0.409
C	5.40	6.23	0.213	0.245
D	6.40	6.80	0.252	0.268
E	2.20	2.40	0.087	0.094
F	0.00	0.20	0.000	0.008
G	5.20	5.50	0.205	0.217
G1	0.50	0.91	0.020	0.036
H	0.45	0.60	0.018	0.024
H1	0.40	0.60	0.016	0.024
J	2.50	2.90	0.098	0.114
K	0.60	1.00	0.023	0.039
L	1.40	1.78	0.055	0.070
M	0.88	1.28	0.034	0.050

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