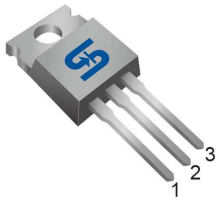
TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TSM100N06

60V N-Channel Power MOSFET

TO-220



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

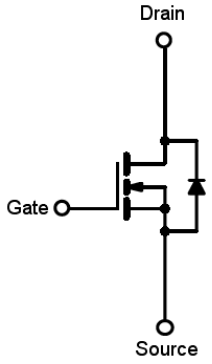
PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$(mΩ)	I_D (A)
60	6.7 @ V_{GS}=10V	100

Features

- Advanced Trench Technology
- Low $R_{DS(ON)}$ 6.7mΩ (Max.)
- Low gate charge typical @ 81nC (Typ.)
- Low Crss typical @ 339pF (Typ.)

Block Diagram



N-Channel MOSFET

Ordering Information

Part No.	Package	Packing
TSM100N06CZ C0	TO-220	50pcs / Tube

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25℃	I_D	100(3)	A
	T_C=70℃		80	
	T_A=25℃		14	
	T_A=70℃		11	
Drain Current-Pulsed Note 1		I_{DM}	400	A
Avalanche Current, L=0.1mH		I_{AS}	71	A
Avalanche Energy, L=0.1mH		E_{AS}, E_{AR}	400	mJ
Maximum Power Dissipation	T_C=25℃	P_D	167	W
	T_C=70℃		107	
	T_A=25℃		2	
	T_A=70℃		1.3	
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	$R\Theta_{JC}$	0.8	°C/W
Thermal Resistance - Junction to Ambient	$R\Theta_{JA}$	62.5	°C/W

Notes: Surface mounted on FR4 board t ≤ 10sec

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}	60	--	--	V
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 30A	$R_{DS(ON)}$	--	5.7	6.7	mΩ
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	$V_{GS(TH)}$	2	3	4	V
Zero Gate Voltage Drain Current	V_{DS} = 48V, 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} = 30V, I_D = 30A, V_{GS} = 10V	Q_g	--	81	--	nC
Gate-Source Charge		Q_{gs}	--	23	--	
Gate-Drain Charge		Q_{gd}	--	24	--	
Input Capacitance	V_{DS} = 30V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	4382	--	pF
Output Capacitance		C_{oss}	--	668	--	
Reverse Transfer Capacitance		C_{rss}	--	339	--	
Switching						
Turn-On Delay Time	V_{GS} = 10V, V_{DS} = 30V, R_G = 3.3Ω	$t_{d(on)}$	--	25	--	nS
Turn-On Rise Time		t_r	--	19	--	
Turn-Off Delay Time		$t_{d(off)}$	--	85	--	
Turn-Off Fall Time		t_f	--	43	--	
Drain-Source Diode Characteristics and Maximum Rating						
Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=20A	V_{SD}	-	0.8	1.3	V
Reverse Recovery Time	I_S = 30A, T_J=25 °C dI/dt = 100A/us	t_{fr}		36		nS
Reverse Recovery Charge		Q_{fr}		53		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. Calculated continuous current based on maximum allowable junction temperature, Package limitation current is 75A

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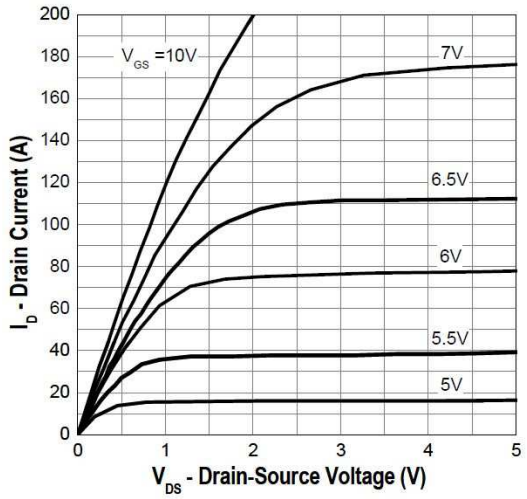
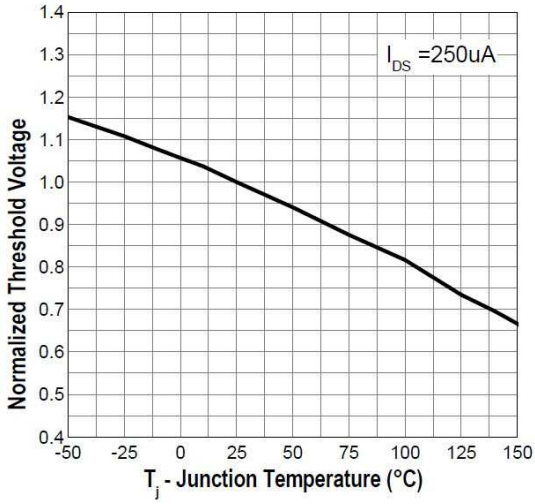
Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

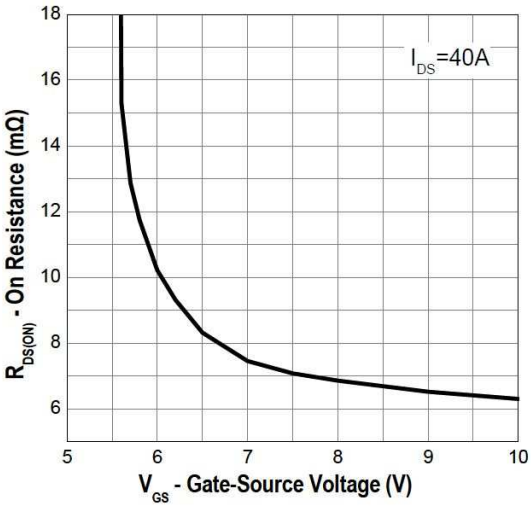
Output Characteristics



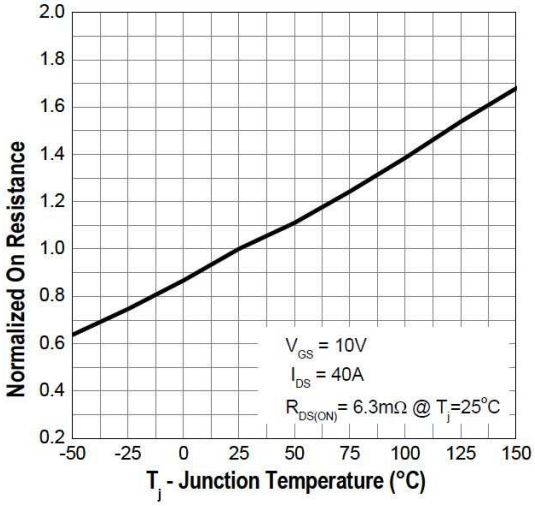
Gate Threshold Voltage



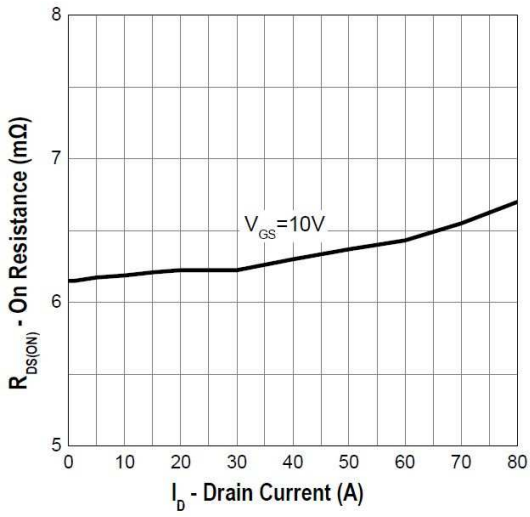
Gate Source On Resistance



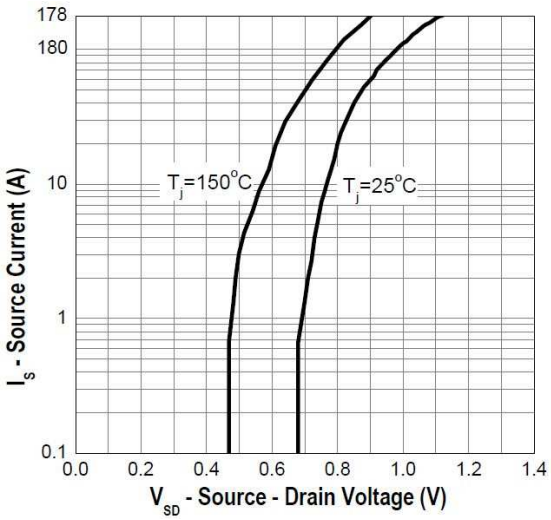
Drain-Source On Resistance



Drain-Source On-Resistance

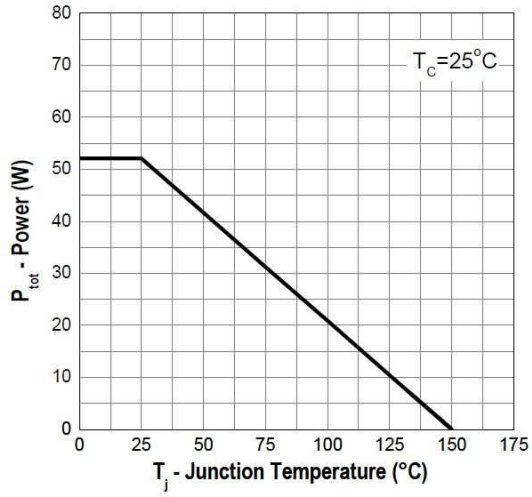


Source-Drain Diode Forward Voltage

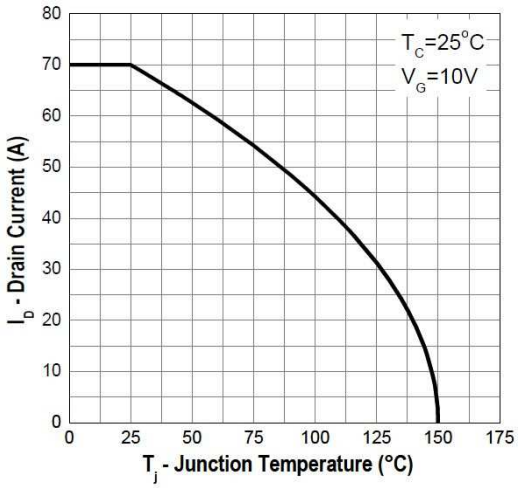


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

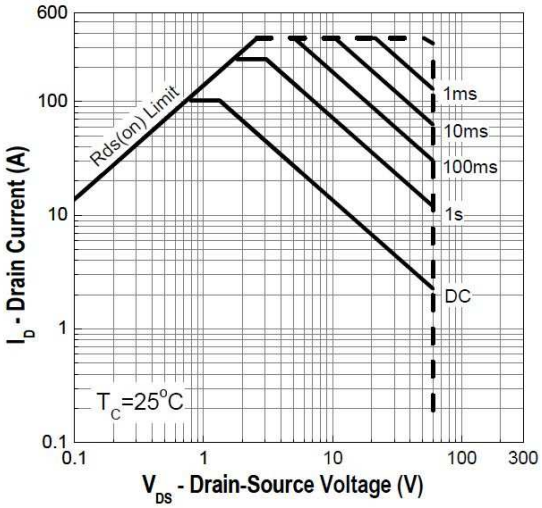
Power Derating



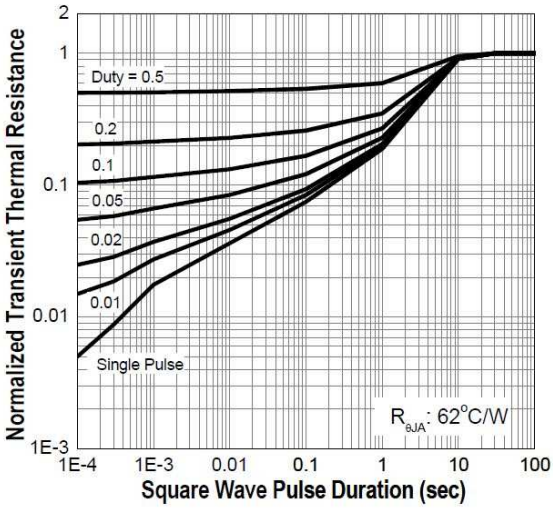
Drain Current vs. Junction Temperature



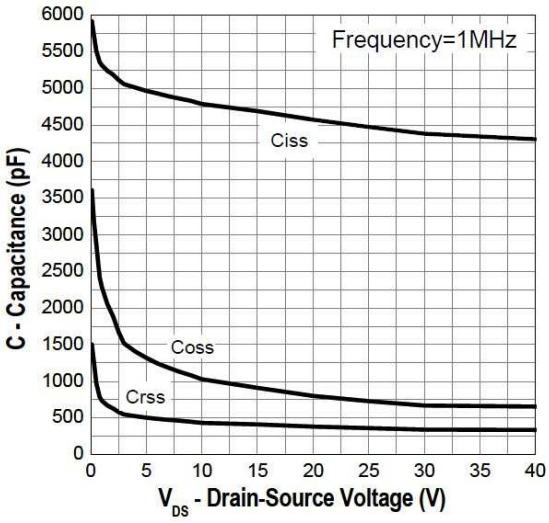
Safe Operation Area



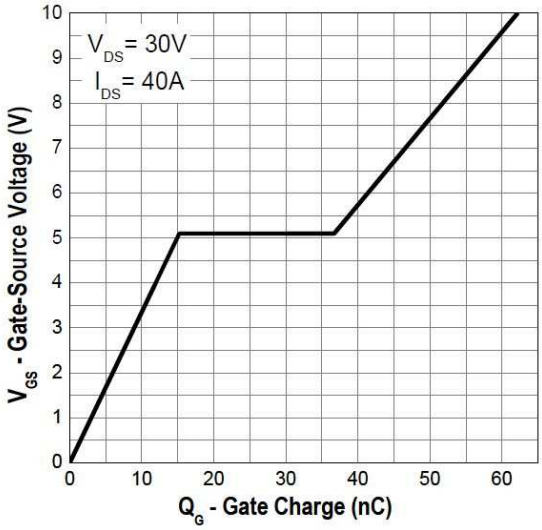
Transient Thermal Impedance



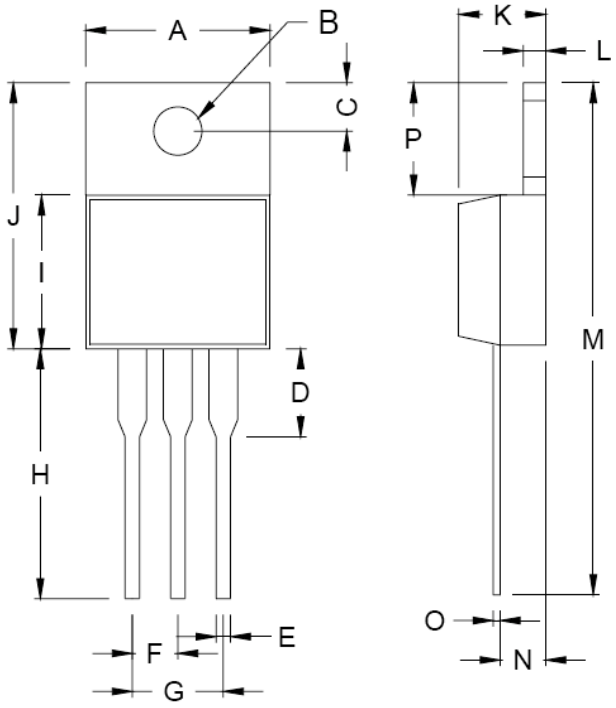
Capacitance



Gate Charge



TO-220 Mechanical Drawing



TO-220 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.000	10.500	0.394	0.413
B	3.740	3.910	0.147	0.154
C	2.440	2.940	0.096	0.116
D	-	6.350	-	0.250
E	0.381	1.106	0.015	0.040
F	2.345	2.715	0.092	0.058
G	4.690	5.430	0.092	0.107
H	12.700	14.732	0.500	0.581
J	14.224	16.510	0.560	0.650
K	3.556	4.826	0.140	0.190
L	0.508	1.397	0.020	0.055
M	27.700	29.620	1.060	1.230
N	2.032	2.921	0.080	0.115
O	0.255	0.610	0.010	0.024
P	5.842	6.858	0.230	0.270

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