

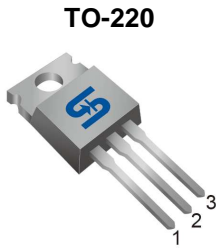


**THE DATASHEET OF  
TSM100N06CZ C0G**



# TSM100N06

## 60V N-Channel Power MOSFET



### Pin Definition:

1. Gate
2. Drain
3. Source

### PRODUCT SUMMARY

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

### Features

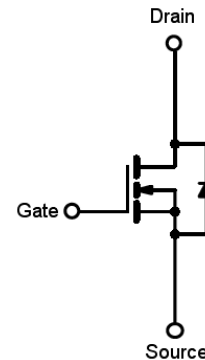
- Advanced Trench Technology
- Low  $R_{DS(ON)}$  6.7m $\Omega$  (Max.)
- Low gate charge typical @ 81nC (Typ.)
- Low  $C_{rss}$  typical @ 339pF (Typ.)

### Ordering Information

Part No.	Package	Packing
TSM100N06CZ C0G	TO-220	50pcs / Tube

Note: "G" denote for Halogen Free Product

### Block Diagram



N-Channel MOSFET

### Absolute Maximum Rating ( $T_a = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	60	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V	
Continuous Drain Current	$I_D$	$T_C=25^\circ C$	100 <sup>(3)</sup>	A
		$T_C=70^\circ C$	80	
		$T_A=25^\circ C$	14	
		$T_A=70^\circ C$	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	$P_D$	$T_C=25^\circ C$	167	W
		$T_C=70^\circ C$	107	
		$T_A=25^\circ C$	2	
		$T_A=70^\circ C$	1.3	
Storage Temperature Range	$T_{STG}$	-55 to +150	$^\circ C$	
Operating Junction Temperature Range	$T_J$	-55 to +150	$^\circ C$	

\* Limited by maximum junction temperature

### Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R_{\theta_{JC}}$	0.8	$^\circ C/W$
Thermal Resistance - Junction to Ambient	$R_{\theta_{JA}}$	62.5	$^\circ C/W$

Notes: Surface mounted on FR4 board  $t \leq 10sec$

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

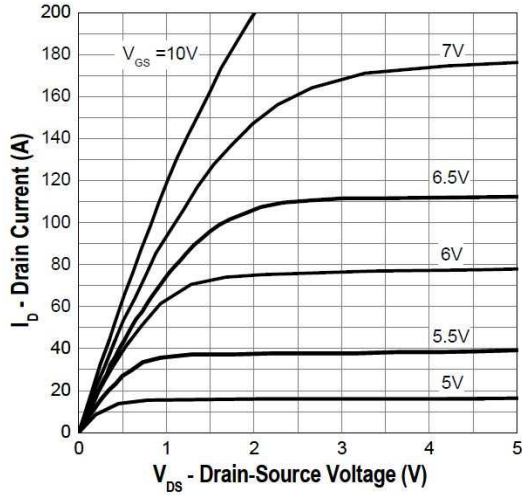
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	BV <sub>DSS</sub>	60	--	--	V
Drain-Source On-State Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A	R <sub>DS(ON)</sub>	--	5.7	6.7	mΩ
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	V <sub>GS(TH)</sub>	2	3	4	V
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V	I <sub>DSS</sub>	--	--	1	uA
Gate Body Leakage	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	±100	nA
<b>Dynamic</b>						
Total Gate Charge	V <sub>DS</sub> = 30V, I <sub>D</sub> = 30A, V <sub>GS</sub> = 10V	Q <sub>g</sub>	--	81	--	nC
Gate-Source Charge		Q <sub>gs</sub>	--	23	--	
Gate-Drain Charge		Q <sub>gd</sub>	--	24	--	
Input Capacitance	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	4382	--	pF
Output Capacitance		C <sub>oss</sub>	--	668	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	339	--	
<b>Switching</b>						
Turn-On Delay Time	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 30V, R <sub>G</sub> = 3.3Ω	t <sub>d(on)</sub>	--	25	--	nS
Turn-On Rise Time		t <sub>r</sub>	--	19	--	
Turn-Off Delay Time		t <sub>d(off)</sub>	--	85	--	
Turn-Off Fall Time		t <sub>f</sub>	--	43	--	
<b>Drain-Source Diode Characteristics and Maximum Rating</b>						
Drain-Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	V <sub>SD</sub>	-	0.8	1.3	V
Reverse Recovery Time	I <sub>S</sub> = 30A, T <sub>J</sub> =25°C di/dt = 100A/us	t <sub>fr</sub>		36		nS
Reverse Recovery Charge		Q <sub>fr</sub>		53		nC

**Notes:**

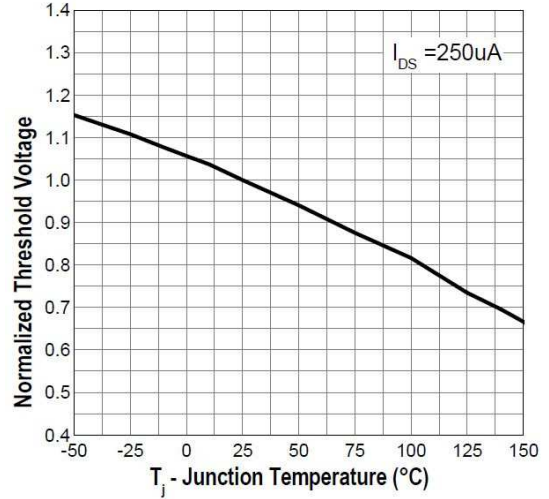
- Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- R<sub>θJA</sub> is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R<sub>θJC</sub> is guaranteed by design while R<sub>θCA</sub> is determined by the user's board design. R<sub>θJA</sub> shown below for single device operation on FR-4 in still air
- Calculated continuous current based on maximum allowable junction temperature, Package limitation current is 75A

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

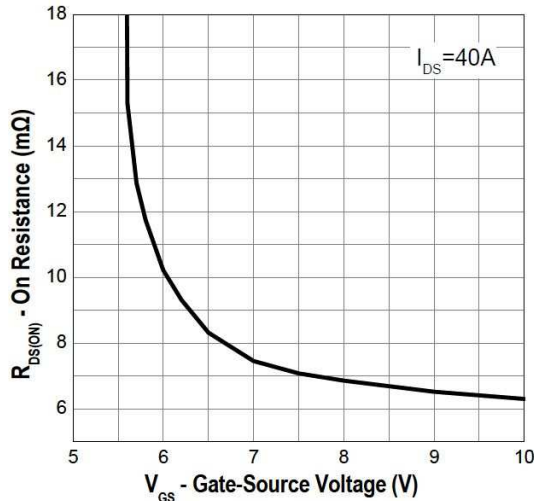
**Output Characteristics**



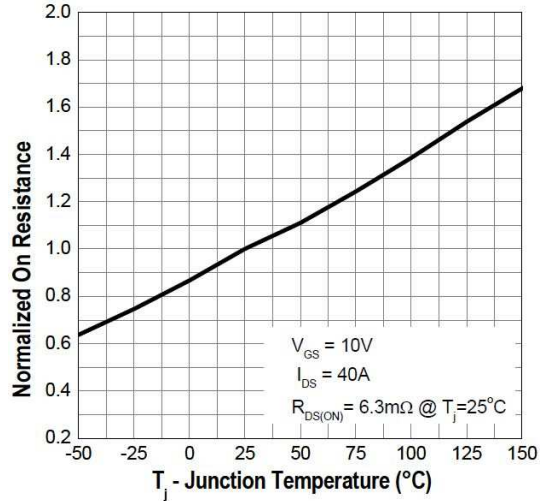
**Gate Threshold Voltage**



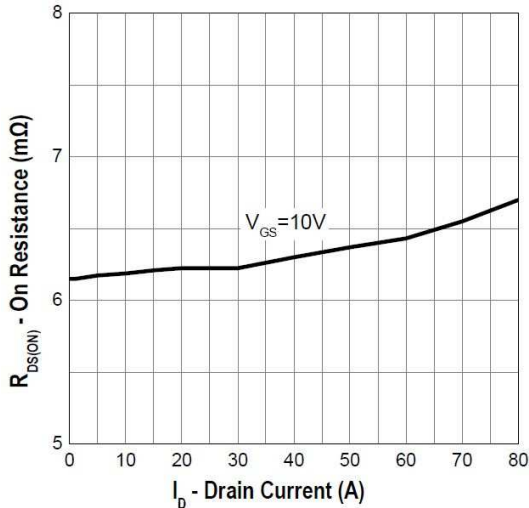
**Gate Source On Resistance**



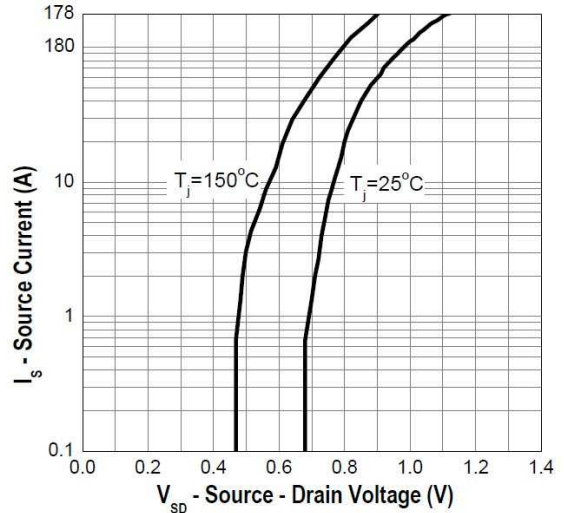
**Drain-Source On Resistance**



**Drain-Source On-Resistance**

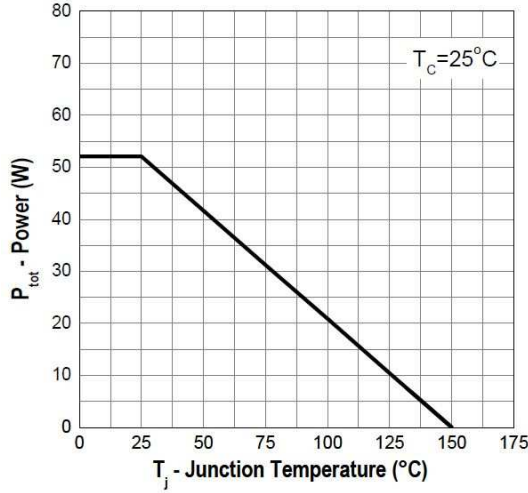


**Source-Drain Diode Forward Voltage**

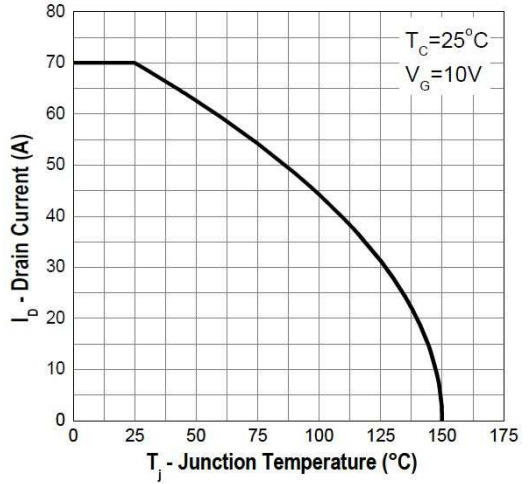


**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

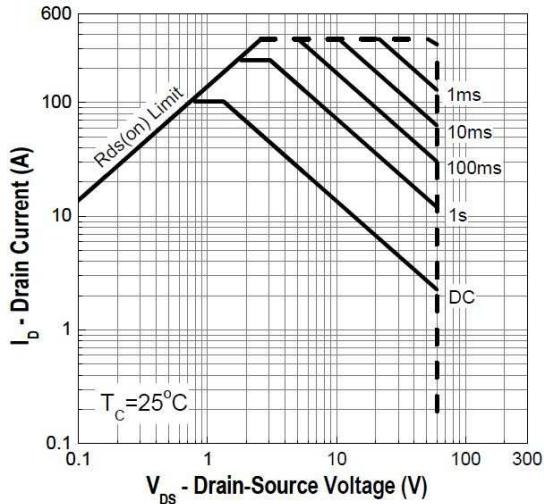
**Power Derating**



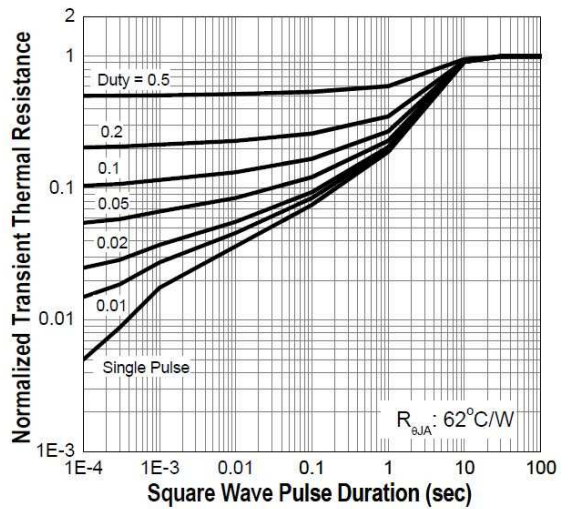
**Drain Current vs. Junction Temperature**



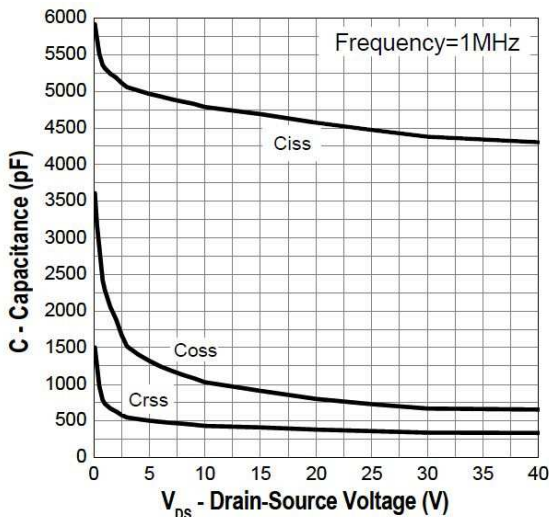
**Safe Operation Area**



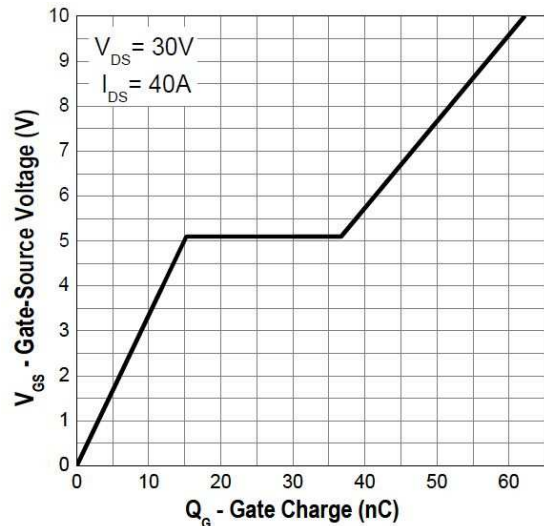
**Transient Thermal Impedance**



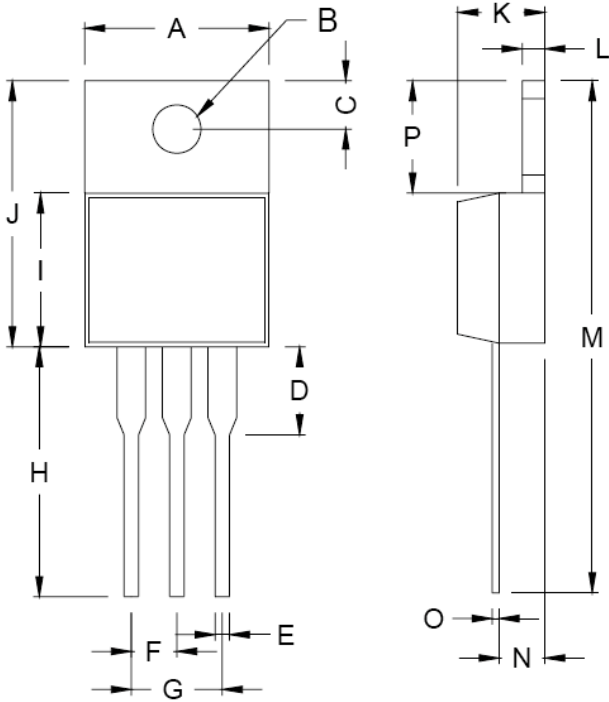
**Capacitance**



**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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