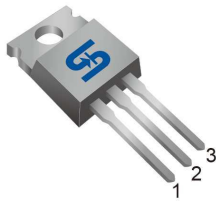


TO-220



**Pin Definition:**

1. Gate
2. Drain
3. Source

**PRODUCT SUMMARY**

V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (mΩ)	I <sub>D</sub> (A)
60	6.7 @ V <sub>GS</sub> =10V	100

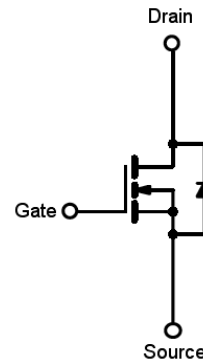
**Features**

- Advanced Trench Technology
- Low R<sub>DS(ON)</sub> 6.7mΩ (Max.)
- Low gate charge typical @ 81nC (Typ.)
- Low Crss typical @ 339pF (Typ.)

**Ordering Information**

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

**Block Diagram**



N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	60	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	T <sub>C</sub> =25°C	100 <sup>(3)</sup>
		T <sub>C</sub> =70°C	80
		T <sub>A</sub> =25°C	14
		T <sub>A</sub> =70°C	11
Drain Current-Pulsed Note 1	I <sub>DM</sub>	400	A
Avalanche Current, L=0.1mH	I <sub>AS</sub>	71	A
Avalanche Energy, L=0.1mH	E <sub>AS</sub> , E <sub>AR</sub>	400	mJ
Maximum Power Dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C	167
		T <sub>C</sub> =70°C	107
		T <sub>A</sub> =25°C	2
		T <sub>A</sub> =70°C	1.3
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C
Operating Junction Temperature Range	T <sub>J</sub>	-55 to +150	°C

\* Limited by maximum junction temperature

**Thermal Performance**

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	Rθ <sub>JC</sub>	0.8	°C/W
Thermal Resistance - Junction to Ambient	Rθ <sub>JA</sub>	62.5	°C/W

Notes: Surface mounted on FR4 board t ≤ 10sec

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

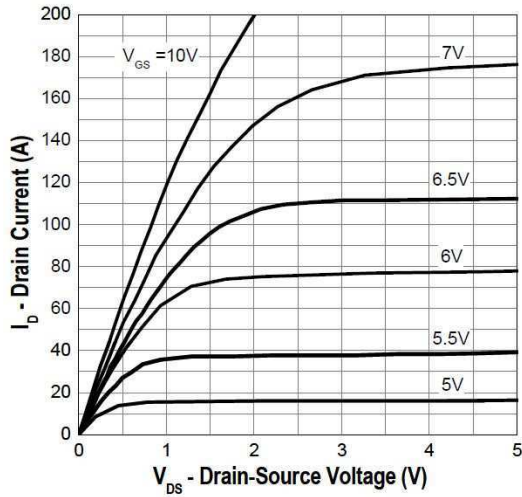
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	60	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 30A$	$R_{DS(ON)}$	--	5.7	6.7	mΩ
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	2	3	4	V
Zero Gate Voltage Drain Current	$V_{DS} = 48V, V_{GS} = 0V$	$I_{DSS}$	--	--	1	μA
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	$I_{GSS}$	--	--	±100	nA
<b>Dynamic</b>						
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	--	
<b>Switching</b>						
Turn-On Delay Time	$V_{GS} = 10V, V_{DS} = 30V,$ $R_G = 3.3\Omega$	$t_{d(on)}$	--	25	--	nS
Turn-On Rise Time		$t_r$	--	19	--	
Turn-Off Delay Time		$t_{d(off)}$	--	85	--	
Turn-Off Fall Time		$t_f$	--	43	--	
<b>Drain-Source Diode Characteristics and Maximum Rating</b>						
Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=20A$	$V_{SD}$	-	0.8	1.3	V
Reverse Recovery Time	$I_S = 30A, T_J=25^\circ C$ $di/dt = 100A/\mu s$	$t_{fr}$		36		nS
Reverse Recovery Charge		$Q_{fr}$		53		nC

#### Notes:

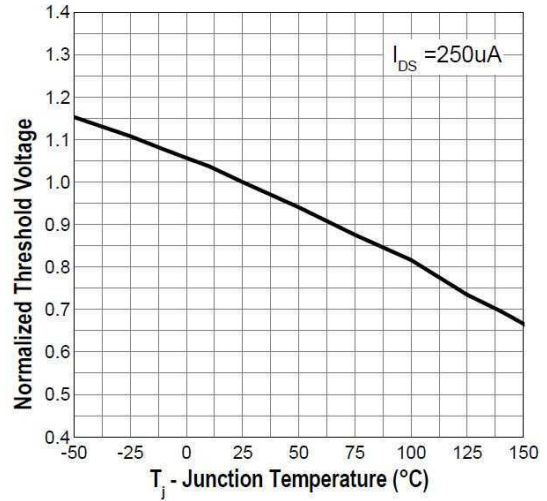
1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2.  $R\theta_{JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R\theta_{JC}$  is guaranteed by design while  $R\theta_{CA}$  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

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

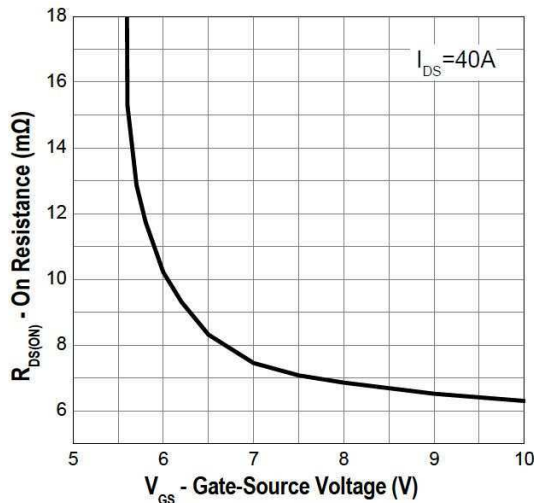
**Output Characteristics**



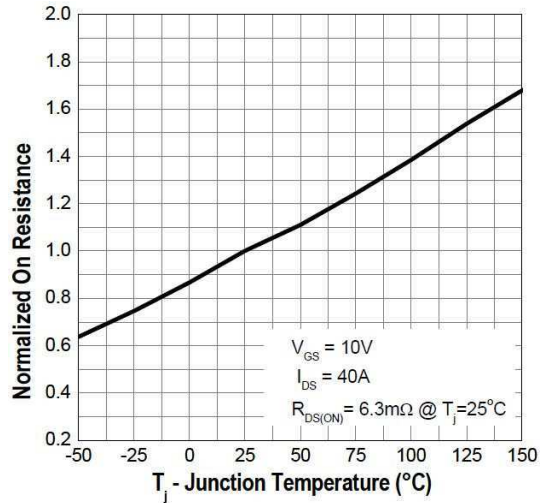
**Gate Threshold Voltage**



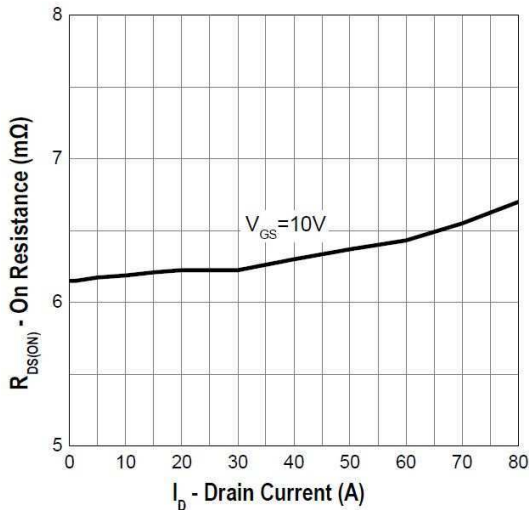
**Gate Source On Resistance**



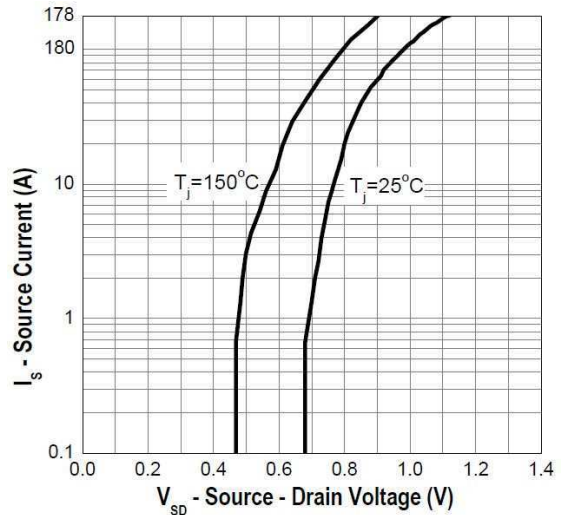
**Drain-Source On Resistance**



**Drain-Source On-Resistance**

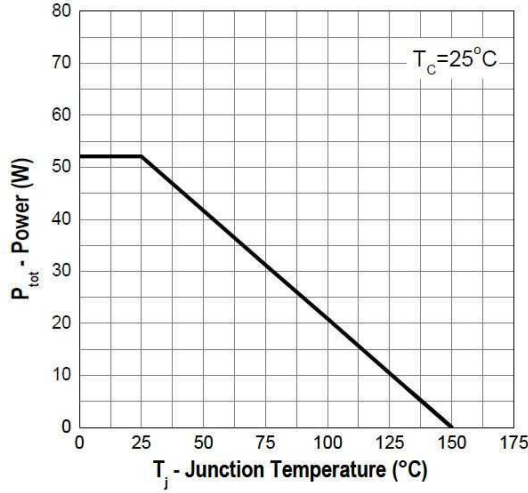


**Source-Drain Diode Forward Voltage**

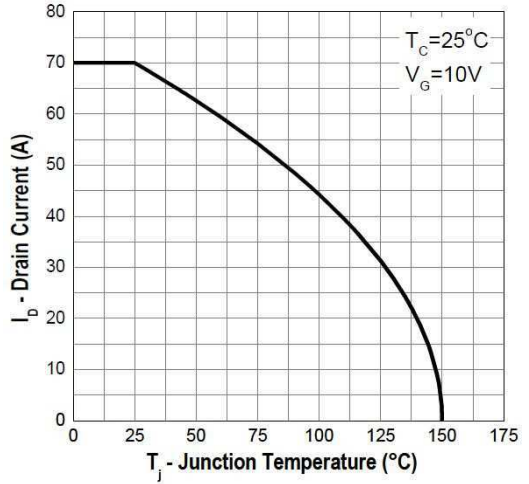


**Electrical Characteristics Curve** ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

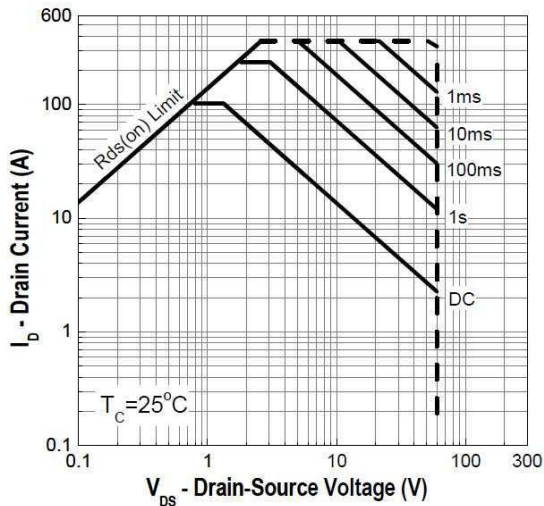
**Power Derating**



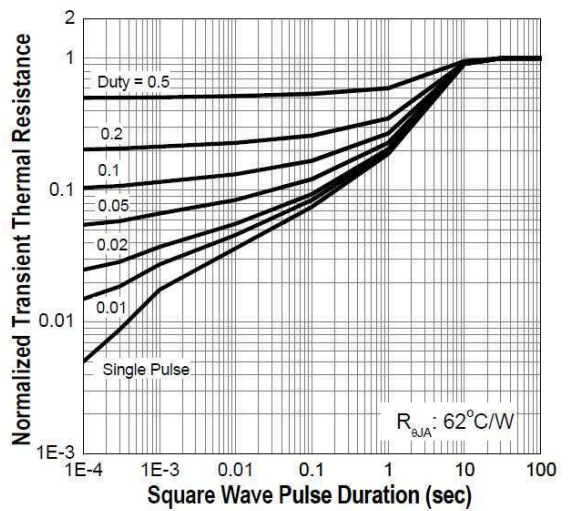
**Drain Current vs. Junction Temperature**



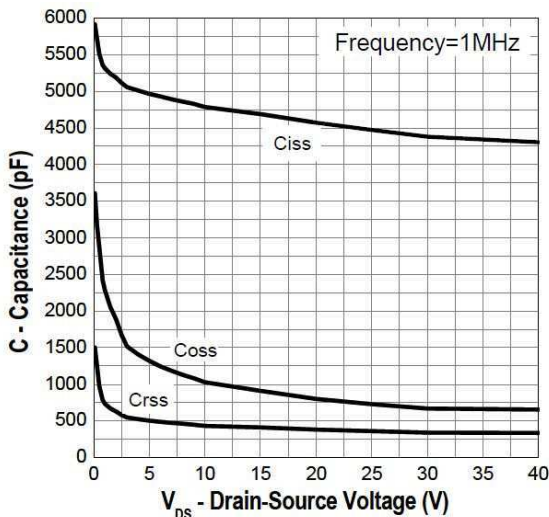
**Safe Operation Area**



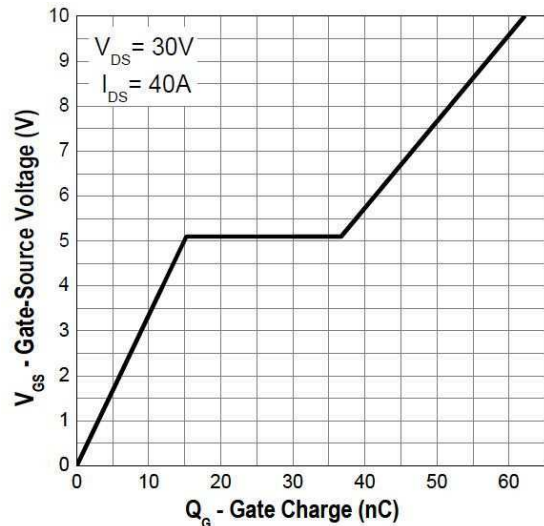
**Transient Thermal Impedance**



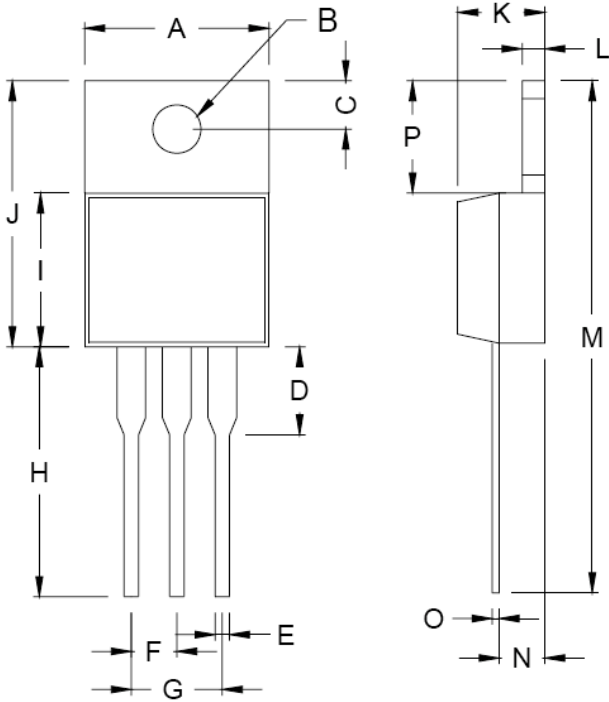
**Capacitance**



**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

### Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.