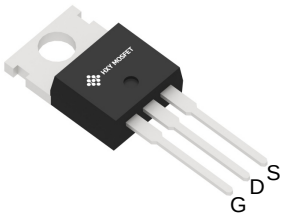
Description

The TSM5NC50CZ C0G can be used in various power swithching circuit for system miniaturization and higher efficiency.The package form is TO-220C, which accords with the RoHS standard.



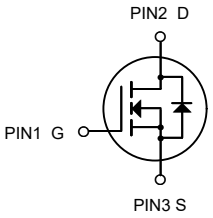
TO-220C

General Features

V_{DS} = 500V,I_D = 4.5A
$R_{DS(ON)}$ < 1.5Ω@ V_{GS}=10V

Application

● Power switch circuit of adaptor and charger.



N-Channel MOSFET

Ordering Information

Product ID	Pack	Brand	Units Tube
TSM5NC50CZ C0G	TO-220C	HXY MOSFET	50

Absolute Maximum Ratings@T=25°C (unless otherwise specified)

Symbol	Parameter	Limit	Unit
V_{DSS}	Drain-to-Source Voltage	500	V
V_{GSS}	Gate-to-Source Voltage	±30	
I_D	Continuous Drain Current [1]	4.5	A
$I_{D\ @\ Tc=100°C}$	Continuous Drain Current @ Tc=100°C	2.6	
I_{DM}	Pulsed Drain Current at V_{GS}=10V [1] [2]	16	
E_{AS}	Single Pulse Avalanche Energy [3]	315	mJ
P_D	Power Dissipation [1]	139	W
T_J& T_{STG}	Operating and Storage Temperature Range	-55 to 150	°C
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case [1]	0.9	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient [6]	77	

Electrical Characteristics T_J=25°C unless otherwise specified

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Off characteristics							
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =1mA		500	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=500V, V_{GS}=0V	T_J=25°C	-	-	1.0	μA
			T_J=125°C	-	-	100	
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±30V		-	-	±100	nA
On characteristics [4]							
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA		2.0	3.0	4.0	V
Static drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =2A		-	1.2	1.5	Ω
Dynamic characteristics [5]							
Input capacitance	C_{iss}	V_{DS} =50V,V_{GS} =0V,f =1MHz		-	639	-	pF
Output capacitance	C_{oss}			-	41	-	
Reverse transfer capacitance	C_{rss}			-	2	-	
Gate resistance	R_g	f =1MHz		-	2.8	-	Ω
Switching characteristics [5]							
Total gate charge	Q_g	V_{DS} =50V,V_{GS} =10V,I_D =4A		-	10	-	nC
Gate-source charge	Q_{gs}			-	3	-	
Gate-drain charge	Q_{gd}			-	2	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=250V, V_{GS}=10V, R_G=10Ω, I_D =10A		-	7	-	ns
Turn-on rise time	t_r			-	5	-	
Turn-off delay time	$t_{d(off)}$			-	13	-	
Turn-off fall time	t_f			-	5	-	
Drain-Source Diode Characteristics							
Drain-source diode forward voltage[4]	V_{SD}	V_{GS} =0V,I_S =4A		-	-	1.2	V
Maximum continuous drain-source diode forward current [1]	I_S			-	-	4	A
Maximum pulsed drain-source diode forward current [1][2]	I_{SM}			-	-	16	A
Reverse recovery time	trr	dIF/dt = 100A/μs, I_S =10A, V_{DD} = 50V		-	196	-	ns
Reverse recovery charge	Qrr			-	1131	-	nC

Notes :

1.T_C=25°C Limited only by maximum temperature allowed.

2.P_W≤10μs, Duty cycle≤1%.

3.EAS condition: VDD=50V,VGS=10V, L=10mH, Rg=25Ω,Starting T_J = 25°C.

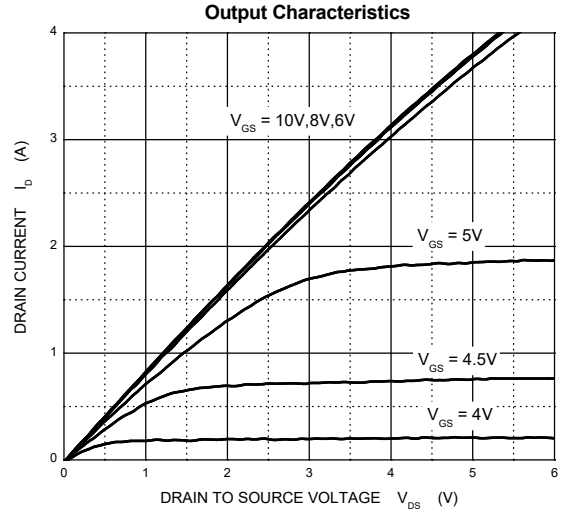
4.Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.

5.Guaranteed by design, not subject to production.

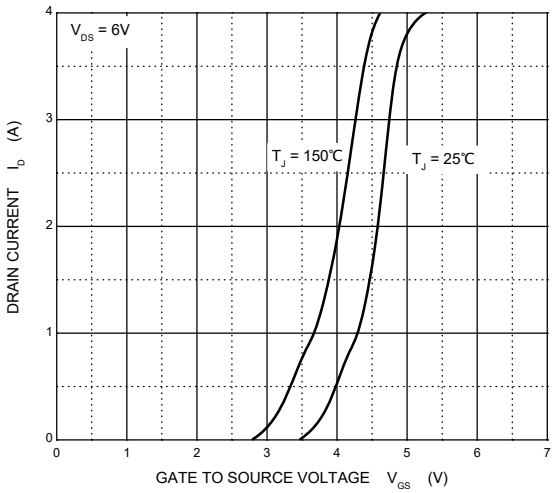
6.The value of $R_{\theta JA}$ is measured with the device in a still air environment with T_a=25°C.

Typical Characteristics

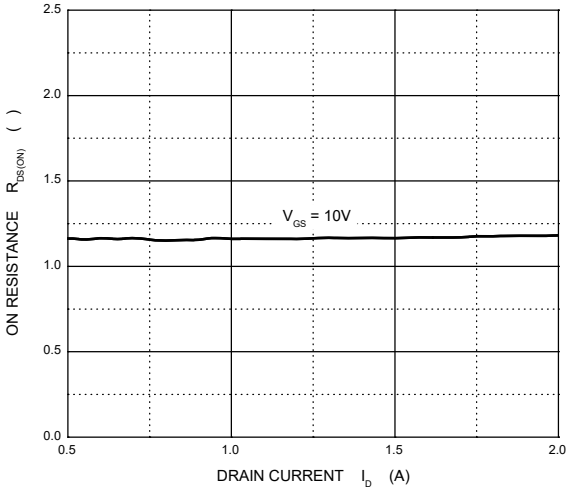
Output Characteristics



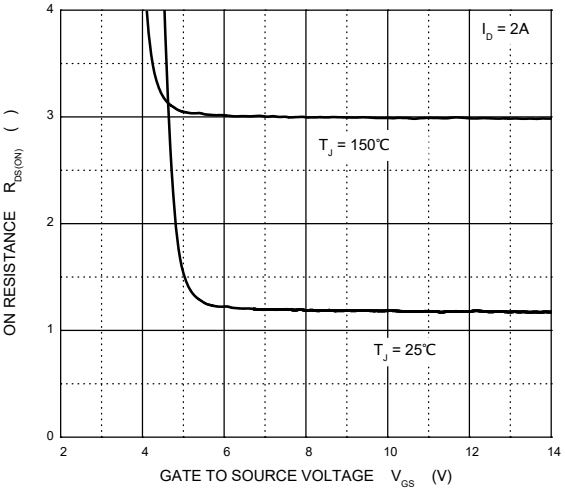
Transfer Characteristics



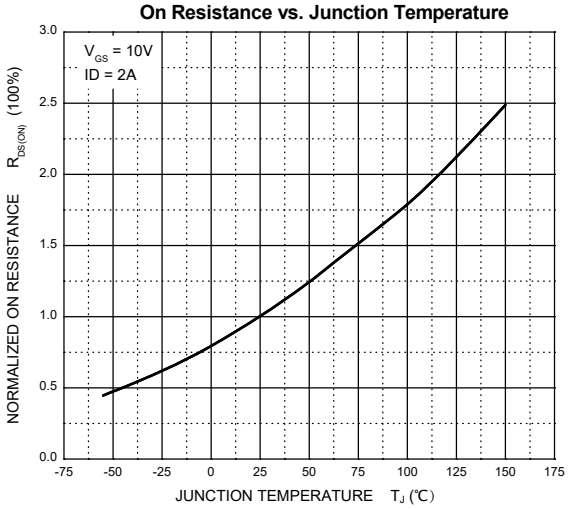
On Resistance vs. Drain Current



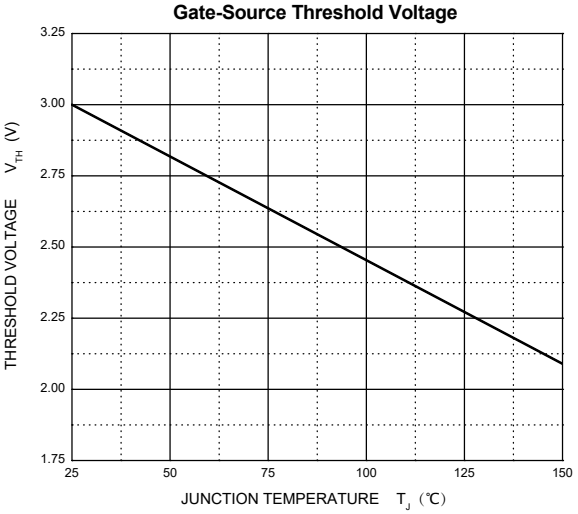
On Resistance vs. Gate-Source Bias



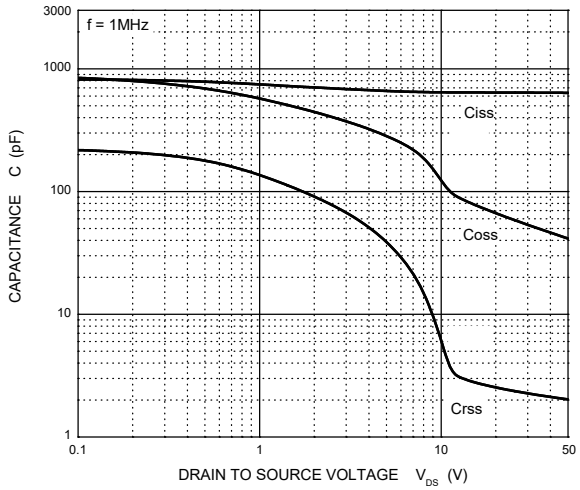
On Resistance vs. Junction Temperature



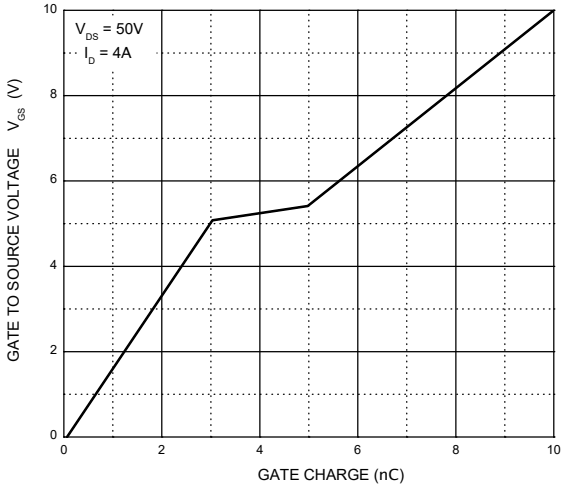
Gate-Source Threshold Voltage



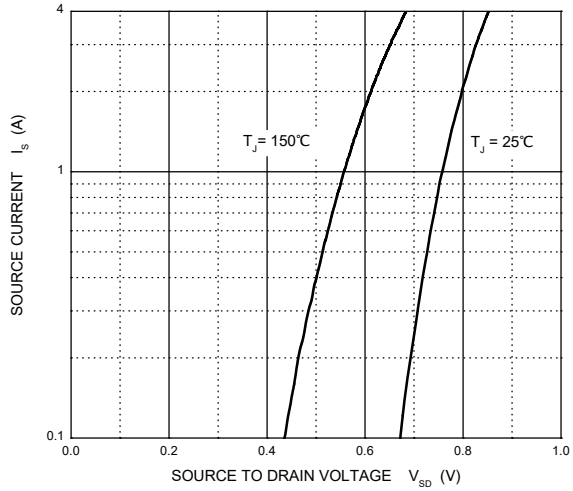
Typical Capacitances



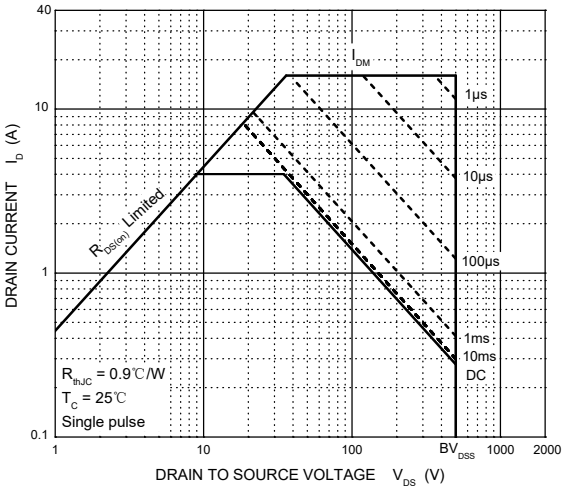
Gate Charge



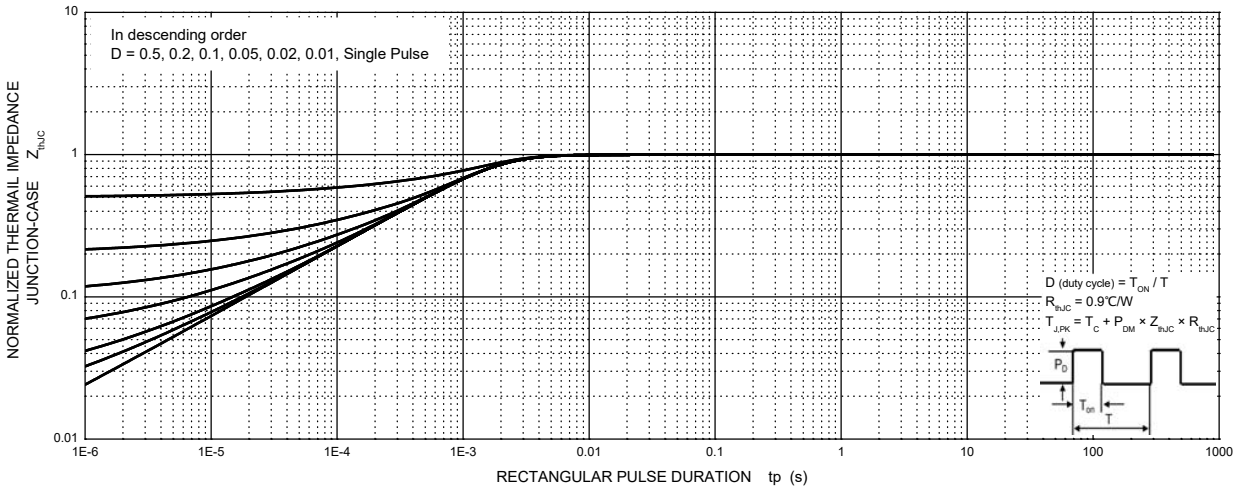
Source-Drain Diode Forward Characteristics



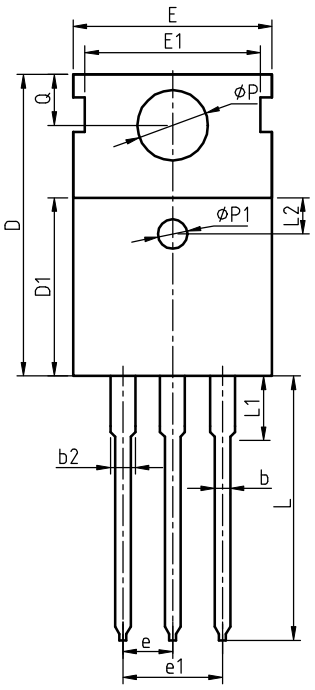
Maximum Safe Operating Area

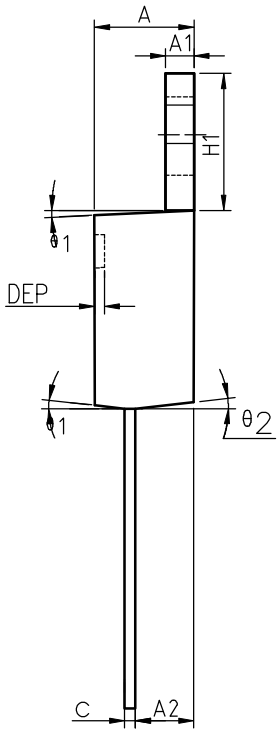


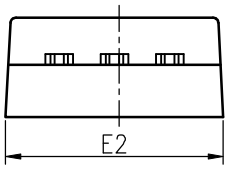
Transient Thermal Impedance, Junction-Case



Package Information
TO-220C







COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.27	1.30	1.33	0.050	0.051	0.052
A2	2.35	2.40	2.50	0.093	0.094	0.098
b	0.77	0.80	0.90	0.030	0.031	0.035
b2	1.17	1.27	1.36	0.046	0.050	0.054
c	0.48	0.50	0.56	0.019	0.020	0.022
D	15.40	15.60	15.80	0.606	0.614	0.622
D1	9.00	9.10	9.20	0.354	0.358	0.362
DEP	0.05	0.10	0.20	0.002	0.004	0.008
E	9.80	10.00	10.20	0.386	0.394	0.402
E1	-	8.70	-	-	0.343	-
E2	9.80	10.00	10.20	0.386	0.394	0.402
e		2.54	BSC		0.100	BSC
e1		5.08	BSC		0.200	BSC
H1	6.40	6.50	6.60	0.252	0.256	0.260
L	12.75	13.50	13.65	0.502	0.531	0.537
L1	-	3.10	3.30	-	0.122	0.130
L2		2.50	REF		0.098	REF
P	3.50	3.60	3.63	0.138	0.142	0.143
P1	3.50	3.60	3.63	0.138	0.142	0.143
Q	2.73	2.80	2.87	0.107	0.110	0.113
θ 1	5°	7°	9°	5°	7°	9°
θ 2	1°	3°	5°	1°	3°	5°
θ 3	1°	3°	5°	1°	3°	5°

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