TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

Preliminary

TSM110N06

55V 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)
55	8 @ V_{GS} =10V	62

General Description

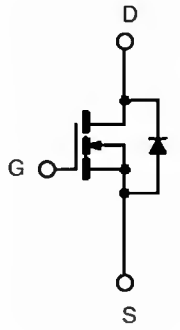
The TSM100N06 N-Channel Power MOSFET utilized advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that Power MOSFETs are well know for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

TO-220 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 watts. The low thermal resistance contribute to its wide acceptance throughout the industry.

Features

- Advanced Process Technology
- Low $R_{DS(ON)}$ 8mΩ (Max.)
- Dynamic dv/dt Rating
- Fast Switching

Block Diagram



N-Channel MOSFET

Ordering Information

Part No.	Package	Packing
TSM110N06CZ C0	TO-220	50pcs / Tube

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

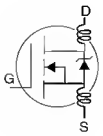
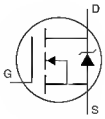
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	55	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current		I_D	110	A
Pulsed Drain Current *		I_{DM}	390	A
Avalanche Current (Repetitive) (Note 1)		I_{AR}	62	A
Repetitive Avalanche Energy (Note 1)		E_{AR}	20	mJ
Maximum Power Dissipation	Tc = 25°C	P_D	175	W
	Derate above 25ºC		1.17	W/ºC
Peak Diode Recovery dv/dt (Note 3)		dv/dt	5	V/nS
Operating Junction Temperature		T_J	150	ºC
Storage Temperature Range		T_{STG}	-55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Case	$R\Theta_{JC}$	0.85	°C/W
Thermal Resistance - Junction to Ambient	$R\Theta_{JA}$	62.5	°C/W

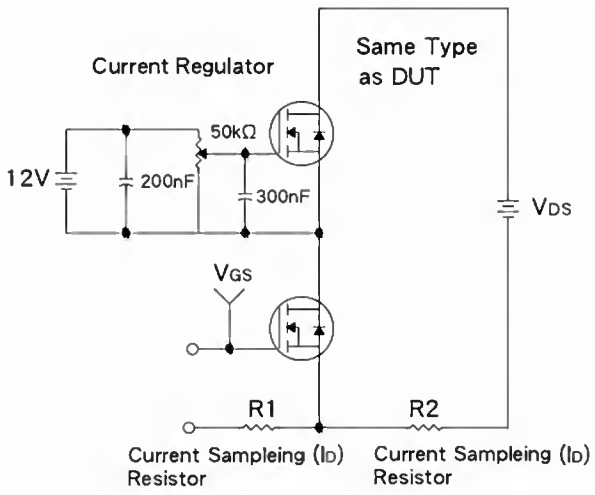
Notes: Surface mounted on FR4 board t ≤ 10sec

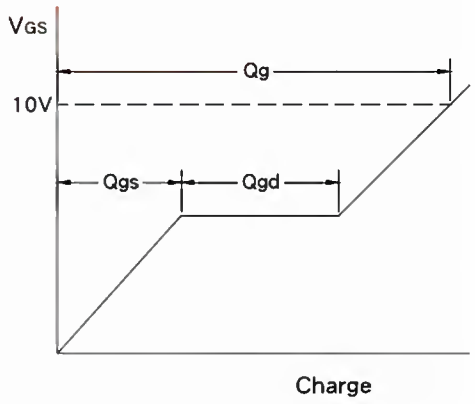
Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	BV_{DSS}	55	--	--	V
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 62A	$R_{DS(ON)}$	--	6.5	8	mΩ
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	$V_{GS(TH)}$	2.0	--	4.0	V
Zero Gate Voltage Drain Current	V_{DS} = 55V, V_{GS} = 0V	I_{DSS}	--	--	25	uA
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Forward Transconductance	V_{DS} = 25V, I_D = 62A	g_{fs}	--	44	--	S
Dynamic [b]						
Total Gate Charge	V_{DS} = 44V, I_D = 62A, V_{GS} = 10V	Q_g	--	87.8	--	nC
Gate-Source Charge		Q_{gs}	--	22.8	--	
Gate-Drain Charge		Q_{gd}	--	28.2	--	
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	4590	--	pF
Output Capacitance		C_{oss}	--	327	--	
Reverse Transfer Capacitance		C_{rss}	--	200	--	
Internal Drain Inductance	Between lead, 6mm (0.25in.) from package and center of die contact 	L_D	--	4.5	--	nH
Internal Source Inductance		L_S	--	7.5	--	
Switching [c]						
Turn-On Delay Time	V_{GS} = 28V, I_D = 62A, V_{DD} = 10V, R_G = 4.5Ω	$t_{d(on)}$	--	32.4	--	nS
Turn-On Rise Time		t_r	--	18.3	--	
Turn-Off Delay Time		$t_{d(off)}$	--	104	--	
Turn-Off Fall Time		t_f	--	18.2	--	
Drain-Source Diode Characteristics and Maximum Rating						
Maximum Continuous Drain-Source Diode Forward Current	MOSFET symbol showing the integral reverse P-N junction diode 	I_S	--	--	110	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}	--	--	390	A
Diode Forward Voltage	I_S = 62A, V_{GS} = 0V	V_{SD}	--	--	1.3	V
Reverse Recovery Time	V_{GS} = 0V, I_S = 62A, dI_F/dt = 100A/uS	T_{rr}	--	110	--	nS
Reverse Recovery Charge		Q_{rr}	--	450	--	uC

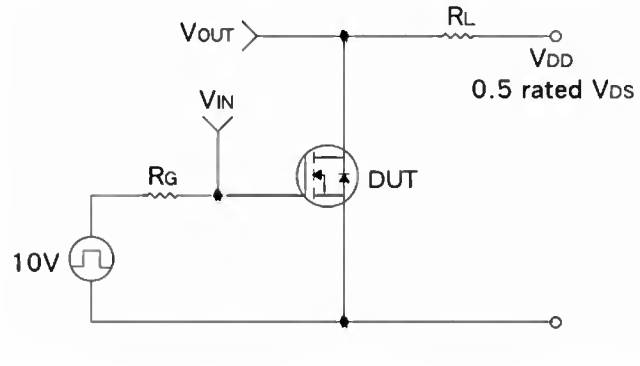
Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Starting TJ=25ºC, I_{AS}=62A, L=138uH, R_G=25Ω
3. I_{SD}≤62A, di/dt≤207A/uS, V_{DD}≤$V_{(BR)DSS}$, T_J≤150ºC
4. Pulse test: pulse width ≤400uS, duty cycle ≤2%
5. Essentially Independent of Operating Temperature
6. For design reference only, not subject to production testing.
7. Switching time is essentially independent of operating temperature.

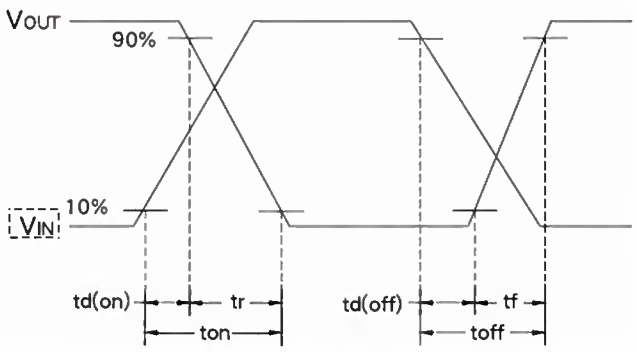
Gate Charge Test Circuit & Waveform



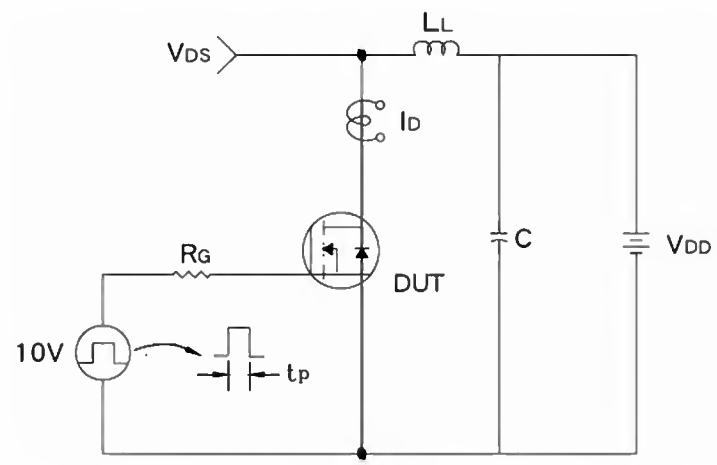


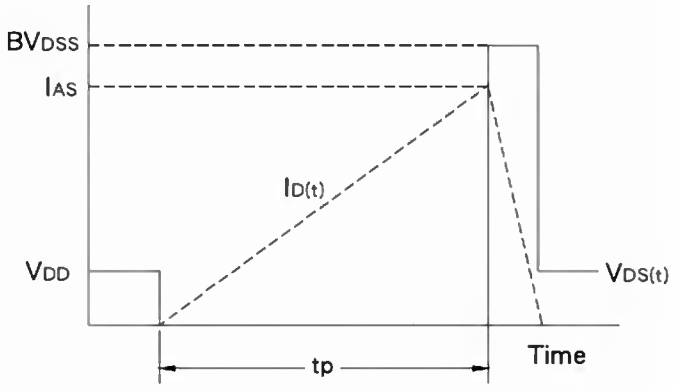
Resistive Switching Test Circuit & Waveform



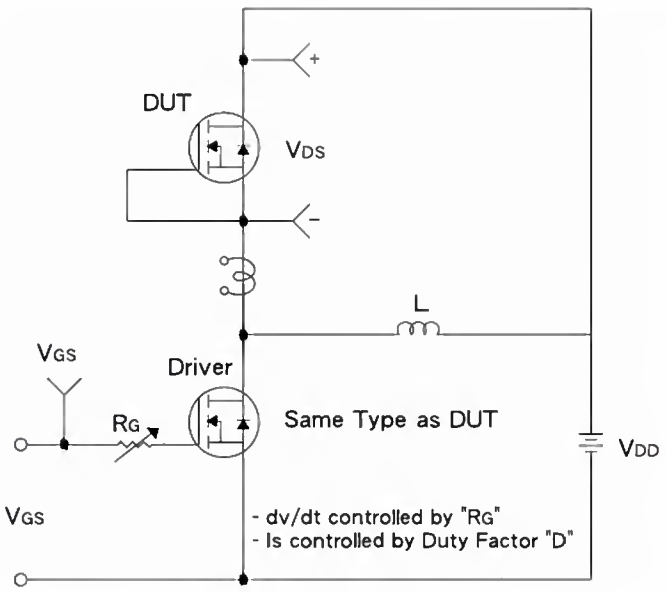


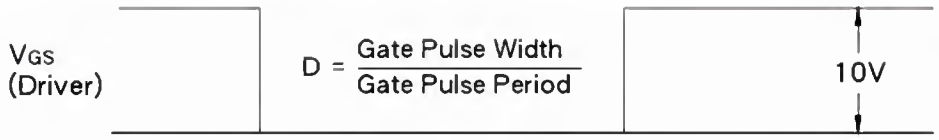
E_{AS} Test Circuit & Waveform

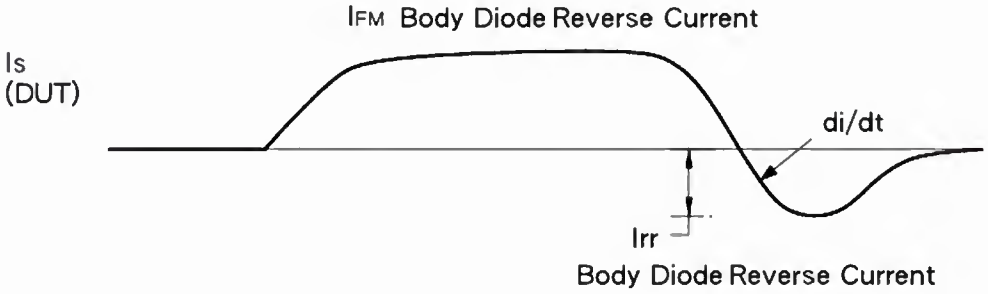


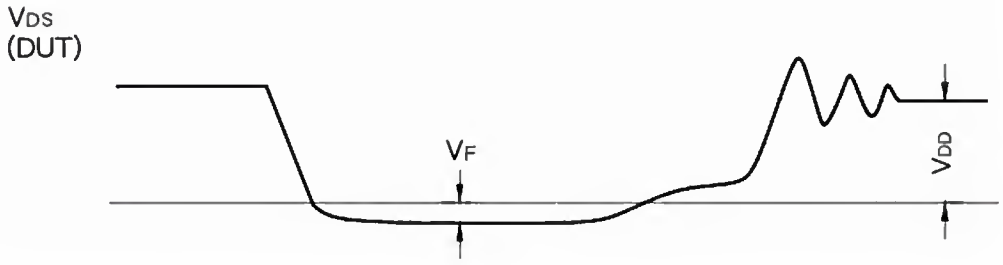


Diode Reverse Recovery Time Test Circuit & Waveform

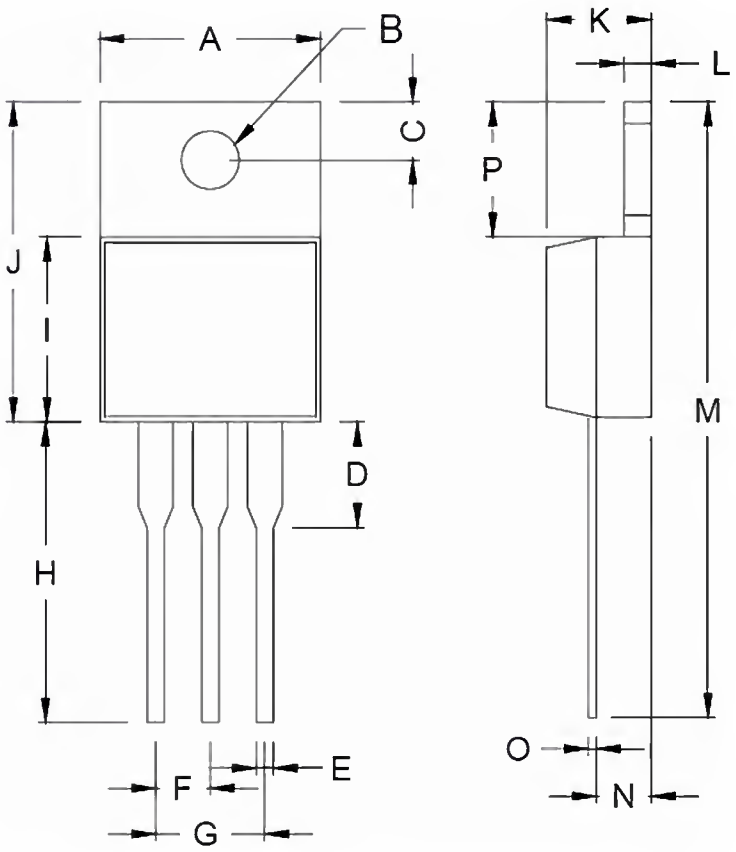






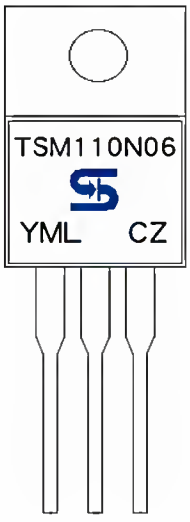


TO-220 Mechanical Drawing



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

Marking Diagram



Y = Year Code
M = Month Code
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apl, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
L = Lot Code

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