N-Channel Power MOSFET

100V, 81A, 10mΩ

FEATURES

- Advanced Trench Technology
- 100% avalanche tested

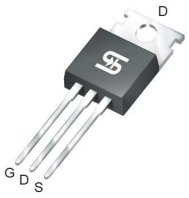
APPLICATION

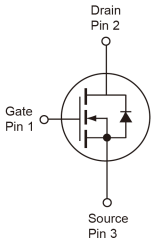
- Synchronous Rectification in SMPS
- High Speed Power Switching

KEY PERFORMANCE PARAMETERS		
PARAMETER	**VALUE**	**UNIT**
V_{DS}	100	V
$R_{DS(on)}$ (max)	10	mΩ
Q_g	154	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

TO-220





ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)				
PARAMETER		**SYMBOL**	**Limit**	**UNIT**
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current (Note 1)	T_C = 25°C	I_D	81	A
	T_C = 70°C		65	
	T_A = 25°C		8.7	A
	T_A = 70°C		7	
Pulsed Drain Current (Note 2)		I_{DM}	320	A
Total Power Dissipation	T_C = 25°C	P_{DTOT}	210	W
	T_C = 70°C		130	
	T_A = 25°C		2.4	W
	T_A = 70°C		1.5	
Single Pulsed Avalanche Energy (Note 3)		E_{AS}, E_{AR}	620	mJ
Single Pulsed Avalanche Current (Note 3)		I_{AS}, I_{AR}	64	A
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	**SYMBOL**	**Limit**	**UNIT**
Junction to Case Thermal Resistance	$R_{\Theta JC}$	0.6	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	52.5	°C/W

Notes: $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case thermal reference is defined at the solder mounting surface of the drain pins. $R_{\Theta JA}$ 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 PCB in still air.

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static (Note 4)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	100	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	2	3	4	V
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 80V, V_{GS} = 0V	I_{DSS}	--	--	1	μA
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 40A	$R_{DS(ON)}$	--	9	10	mΩ
Dynamic (Note 5)						
Total Gate Charge	V_{DS} = 30V, I_D = 40A, V_{GS} = 10V	Q_g	--	154	--	nC
Gate-Source Charge		Q_{gs}	--	4	--	
Gate-Drain Charge		Q_{gd}	--	45	--	
Input Capacitance	V_{DS} = 30V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	3900	--	pF
Output Capacitance		C_{oss}	--	300	--	
Reverse Transfer Capacitance		C_{rss}	--	170	--	
Gate Resistance	F = 1MHz, open drain	R_g	--	1.2	--	Ω
Switching (Note 6)						
Turn-On Delay Time	V_{DS} = 30V, R_{GEN} = 6Ω, I_D = 1A, V_{GS} = 10V	$t_{d(on)}$	--	38	--	ns
Turn-On Rise Time		t_r	--	65	--	
Turn-Off Delay Time		$t_{d(off)}$	--	218	--	
Turn-Off Fall Time		t_f	--	72	--	
Source-Drain Diode (Note 4)						
Forward Voltage	I_S = 20A, V_{GS} = 0V	V_{SD}	--	0.8	1.2	V
Reverse Recovery Time	I_S = 40A , T_J = 25°C dI_F/dt = 100A/μs	t_{rr}	--	62	--	ns
Reverse Recovery Charge		Q_{rr}	--	130	--	nC

Notes:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. L = 0.3mH, I_{AS} = 64A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
4. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM85N10CZ C0G	TO-220	50pcs / Tube

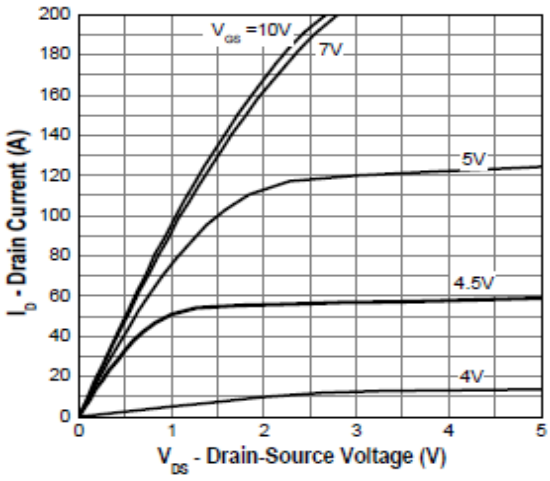
Note:

1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

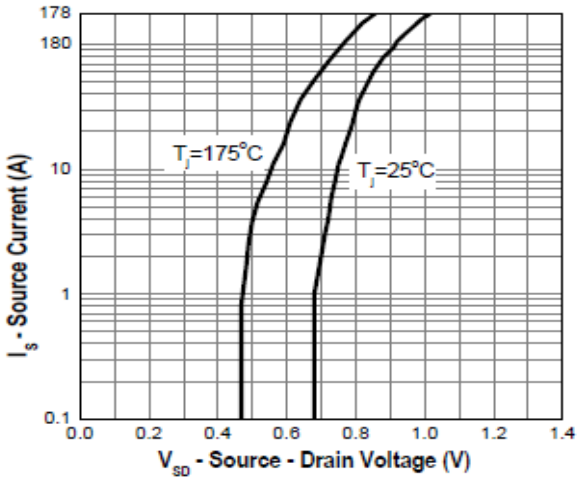
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

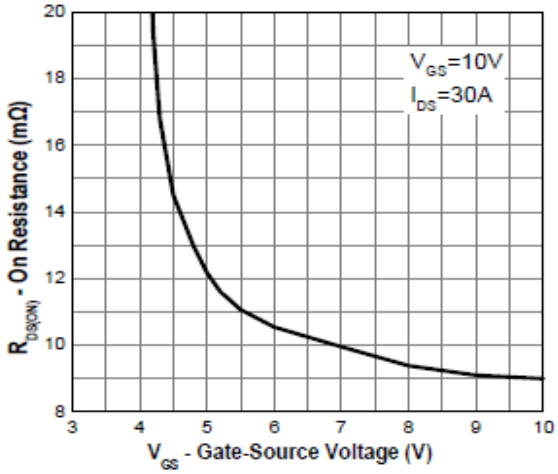
Output Characteristics



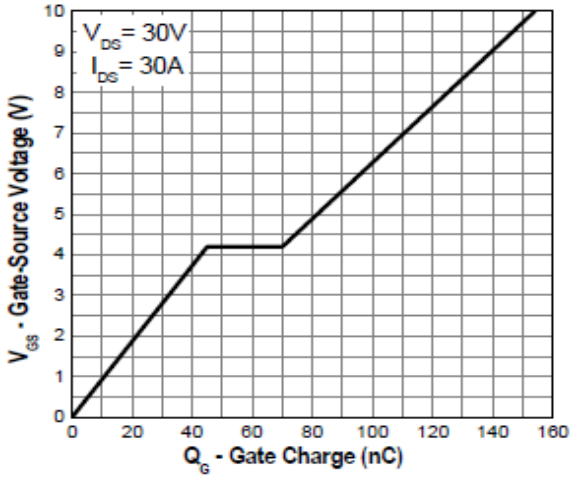
Transfer Characteristics



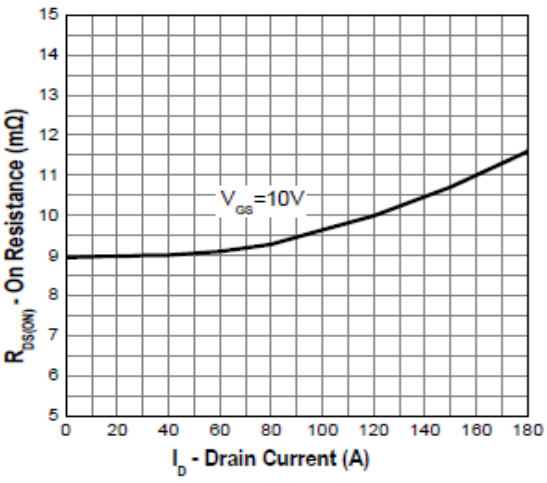
On-Resistance vs. Gate-Source Voltage



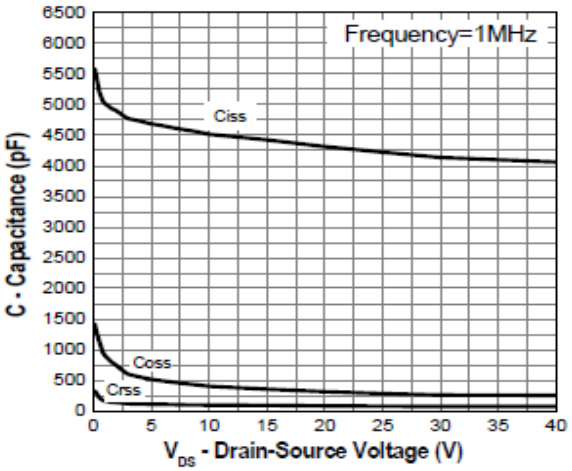
Gate Charge



On-Resistance vs. Junction Temperature



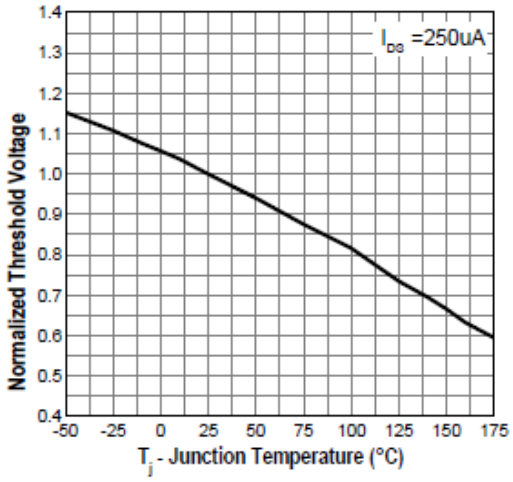
Capacitance



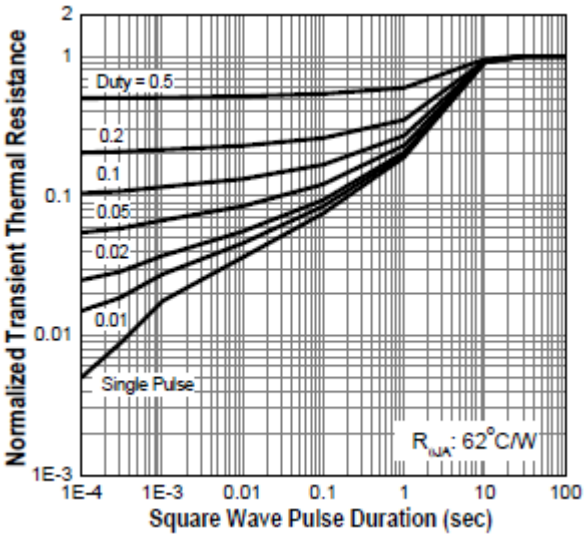
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

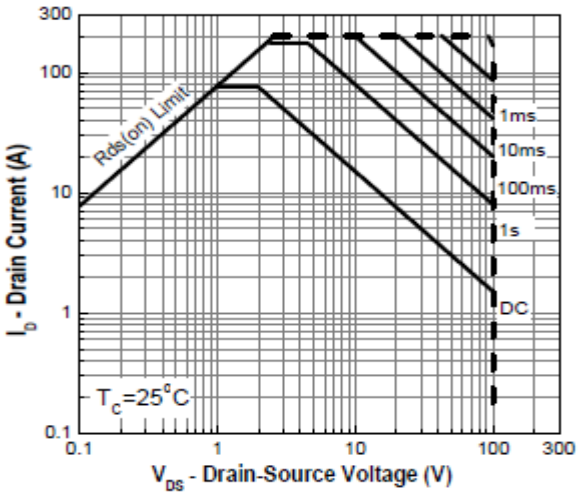
Threshold Voltage vs. Temperature



Normalized Thermal Transient Impedance

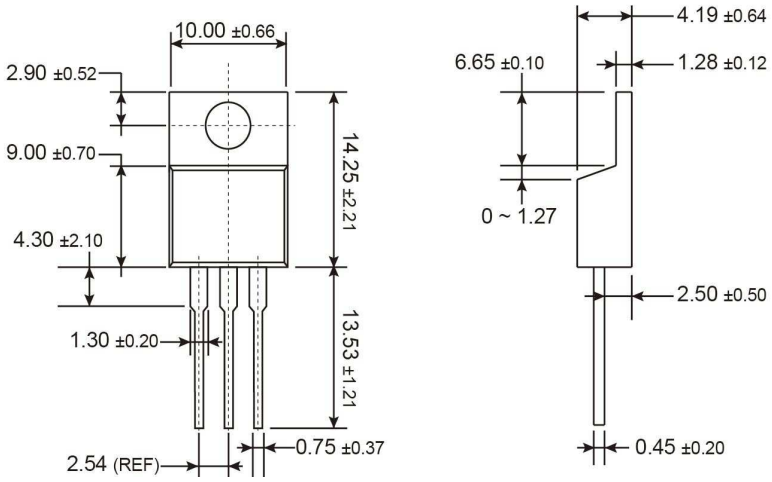


Maximum Safe Operating Area

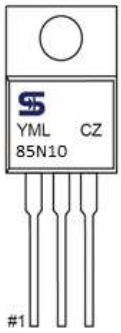


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-220



MARKING DIAGRAM



Y = Year Code

M = Month Code for Halogen Free Product

O	=Jan	**P**	=Feb	**Q**	=Mar	**R**	=Apr
S	=May	**T**	=Jun	**U**	=Jul	**V**	=Aug
W	=Sep	**X**	=Oct	**Y**	=Nov	**Z**	=Dec

L = Lot Code (1~9, A~Z)

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