

N-Channel Power MOSFET

100V, 81A, 10mΩ

FEATURES

- Advanced Trench Technology
- 100% avalanche tested

APPLICATION

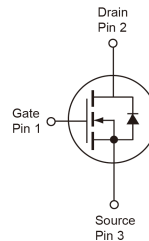
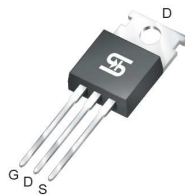
- Synchronous Rectification in SMPS
- High Speed Power Switching

KEY PERFORMANCE PARAMETERS

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



TO-220



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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)	I_D	$T_C = 25^\circ\text{C}$	A
		$T_C = 70^\circ\text{C}$	
		$T_A = 25^\circ\text{C}$	A
		$T_A = 70^\circ\text{C}$	
Pulsed Drain Current (Note 2)	I_{DM}	320	A
Total Power Dissipation	P_{DTOT}	$T_C = 25^\circ\text{C}$	W
		$T_C = 70^\circ\text{C}$	
		$T_A = 25^\circ\text{C}$	W
		$T_A = 70^\circ\text{C}$	
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	$^\circ\text{C}$

THERMAL PERFORMANCE

PARAMETER	SYMBOL	Limit	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	0.6	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	52.5	$^\circ\text{C/W}$

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 ($T_A = 25^\circ\text{C}$ 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:

- Current limited by package
- Pulse width limited by the maximum junction temperature
- $L = 0.3\text{mH}, I_{AS} = 64A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$
- For DESIGN AID ONLY, not subject to production testing.
- Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

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

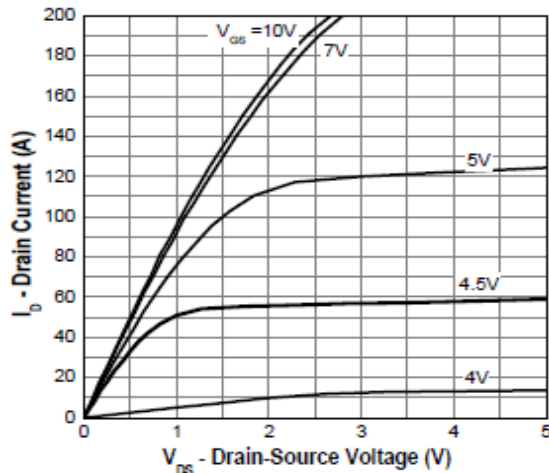
Note:

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

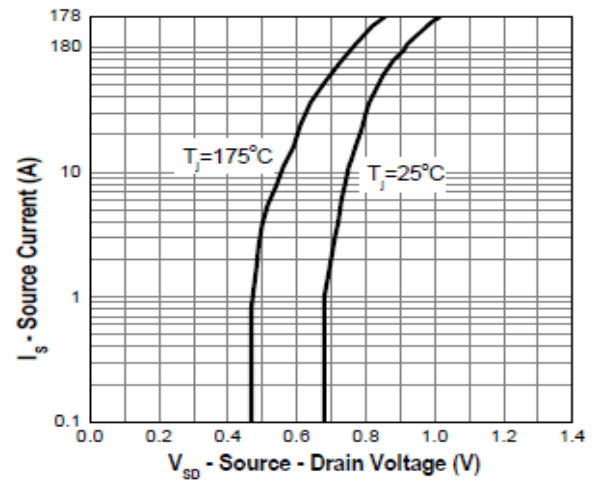
CHARACTERISTICS CURVES

($T_c = 25^\circ\text{C}$ unless otherwise noted)

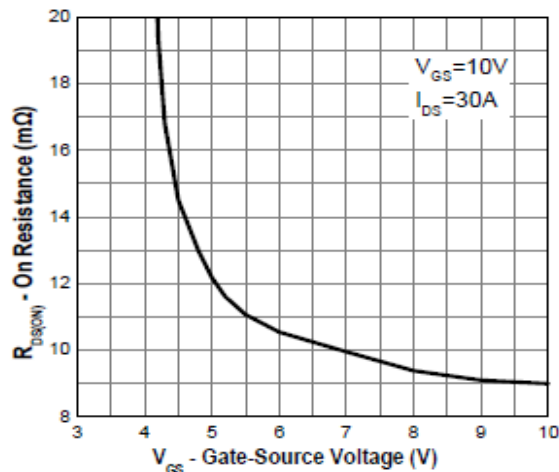
Output Characteristics



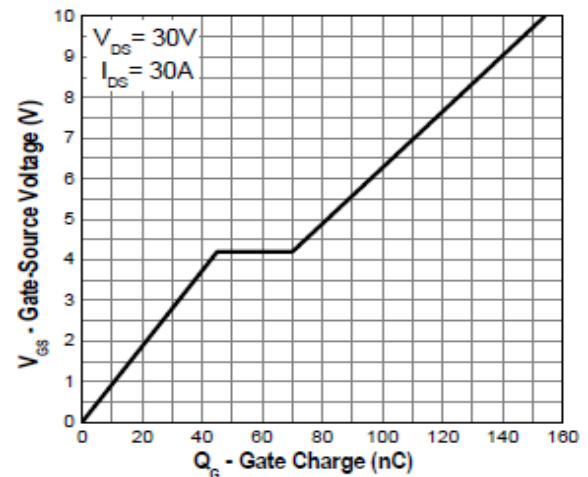
Transfer Characteristics



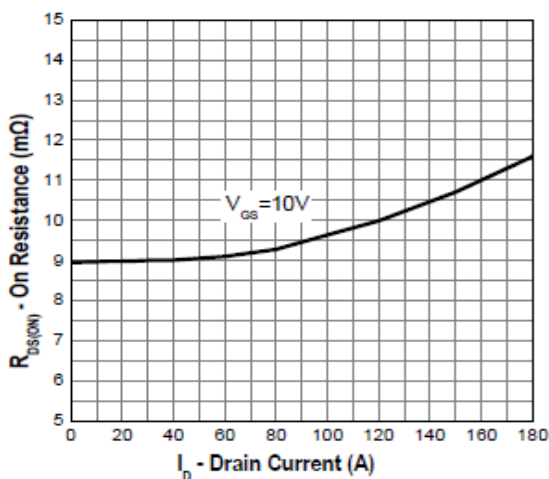
On-Resistance vs. Gate-Source Voltage



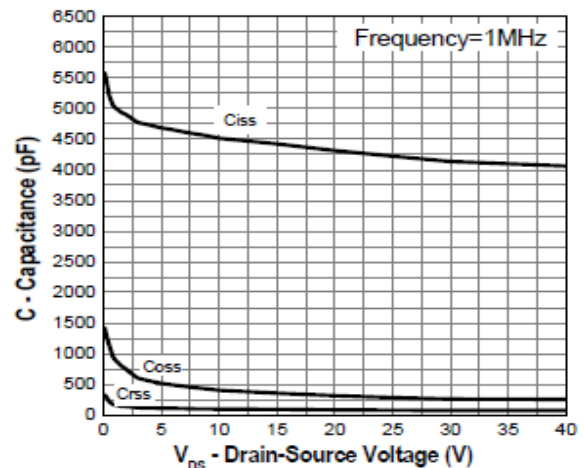
Gate Charge



On-Resistance vs. Junction Temperature



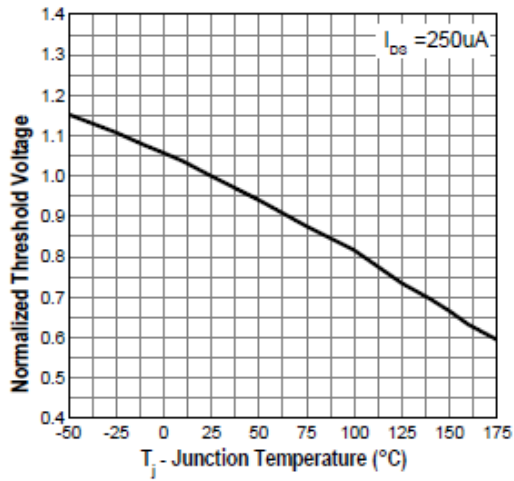
Capacitance



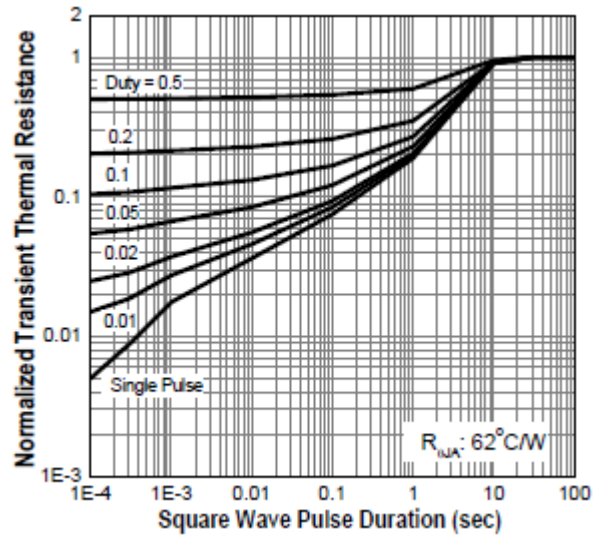
CHARACTERISTICS CURVES

($T_c = 25^\circ\text{C}$ unless otherwise noted)

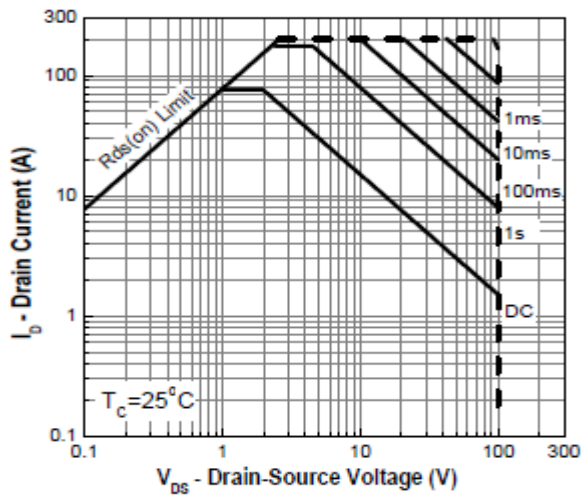
Threshold Voltage vs. Temperature



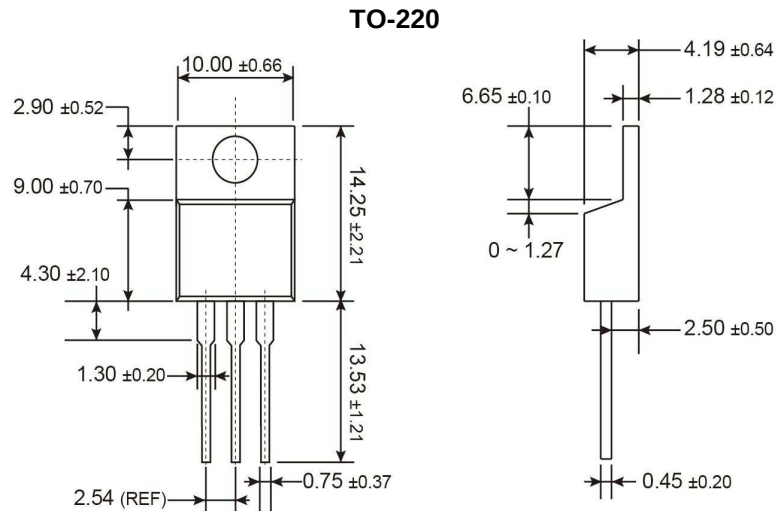
Normalized Thermal Transient Impedance



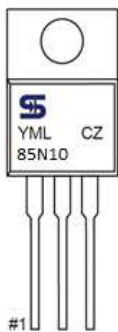
Maximum Safe Operating Area



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)



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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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9