N-Channel Power MOSFET

800V, 9.5A, 1.05Ω

FEATURES

- Low $R_{DS(ON)}$ 1.05Ω (Max.)
- Low gate charge typical @ 53nC (Typ.)
- Improve dV/dt capability
- Pb-free plating
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

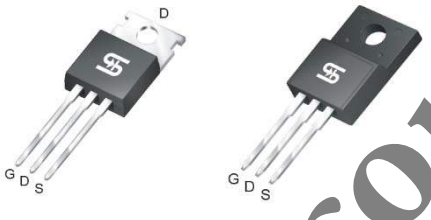
APPLICATION

- Power Supply
- Lighting

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
V_{DS}	800	V
$R_{DS(on)}$ (max)	1.05	Ω
Q_g	53	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

TO-220 **ITO-220**



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)					
PARAMETER		SYMBOL	TO-220	ITO-220	UNIT
Drain-Source Voltage		V_{DS}	800		V
Gate-Source Voltage		V_{GS}	±30		V
Continuous Drain Current (Note 1)	T_C = 25°C	I_D	9.5		A
	T_C = 100°C		5.7		
Pulsed Drain Current (Note 2)		I_{DM}	38		A
Total Power Dissipation @ T_C = 25°C		P_{DTOT}	290	48	W
Single Pulsed Avalanche Energy		E_{AS}	267		mJ
Single Pulsed Avalanche Current		I_{AS}	10		A
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150		°C

THERMAL PERFORMANCE				
PARAMETER	SYMBOL	TO-220	ITO-220	UNIT
Junction to Case Thermal Resistance	$R_{\Theta JC}$	0.43	2.6	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	62.5		°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 with minimum recommended footprint in still air.

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static (Note 3)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	800	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	2.0	--	4.0	V
Gate Body Leakage	V_{GS} = ±30, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 800V, V_{GS} = 0V	I_{DSS}	--	--	10	μA
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 4.75A	$R_{DS(on)}$	--	0.9	1.05	Ω
Forward Transconductance	V_{DS} = 30V, I_D = 4.75A	g_{fs}	--	6.3	--	S
Dynamic (Note 4)						
Total Gate Charge	V_{DS} = 640V, I_D =9.5A, V_{GS} = 10V	Q_g	--	53	--	nC
Gate-Source Charge		Q_{gs}	--	10	--	
Gate-Drain Charge		Q_{gd}	--	23	--	
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	2336	--	pF
Output Capacitance		C_{oss}	--	214	--	
Reverse Transfer Capacitance		C_{rss}		29		
Switching (Note 5)						
Turn-On Delay Time	V_{DS} = 400V, V_{GS} = 10V, R_G = 25Ω, I_D = 9.5A	$t_{d(on)}$	--	63	--	ns
Turn-On Rise Time		t_r	--	62	--	
Turn-Off Delay Time		$t_{d(off)}$	--	256	--	
Turn-Off Fall Time		t_f	--	72	--	
Source-Drain Diode (Note 3)						
Forward On Voltage	I_S = 9.5A, V_{GS} = 0V	V_{SD}	--	--	1.5	V
Reverse Recovery Time	I_S = 9.5A, V_{GS} = 0V, dI_F/dt = 100A/μs	t_{rr}	--	450	--	ns
Reverse Recovery Charge		Q_{rr}	--	5.3	--	μC

Notes:

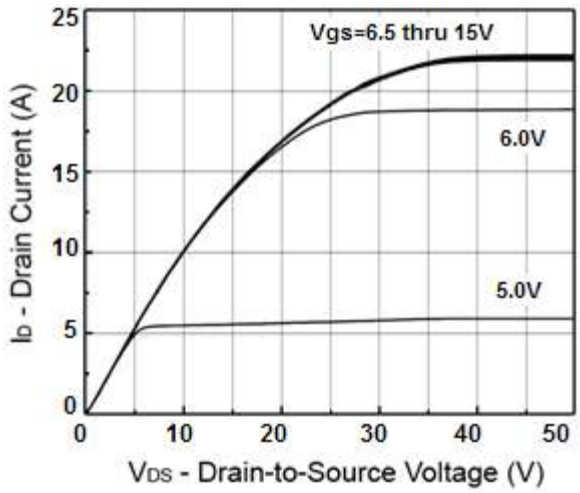
1. Current limited by package.
2. Pulse width limited by the maximum junction temperature.
3. L = 5mH, I_{AS} = 10A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
   100% Eas Test Condition: L = 5mH, I_{AS} = 5A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
4. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%.
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

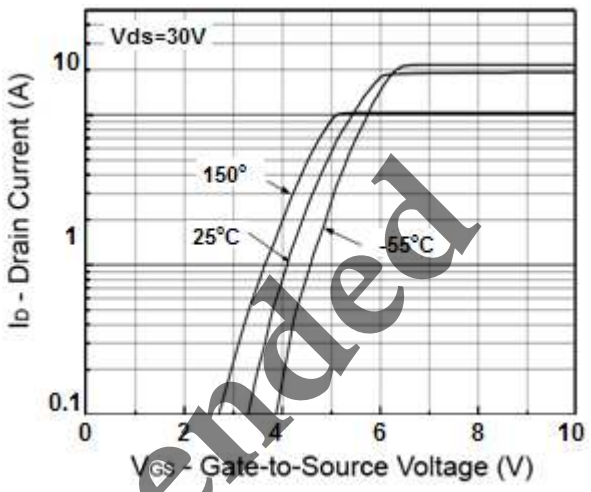
PART NO.	PACKAGE	PACKING
TSM10N80CZ C0G	TO-220	50pcs / Tube
TSM10N80CI C0G	ITO-220	50pcs / Tube

CHARACTERISTICS CURVES
(T_C = 25°C unless otherwise noted)

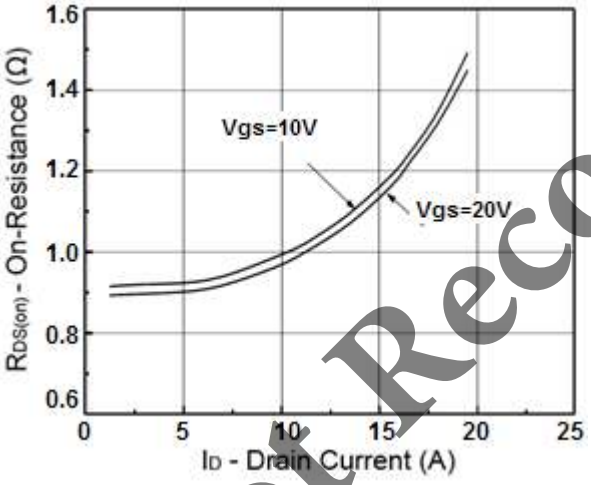
Output Characteristics



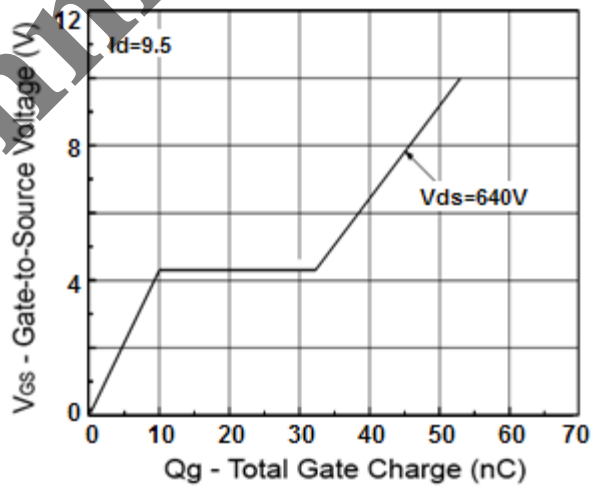
Transfer Characteristics



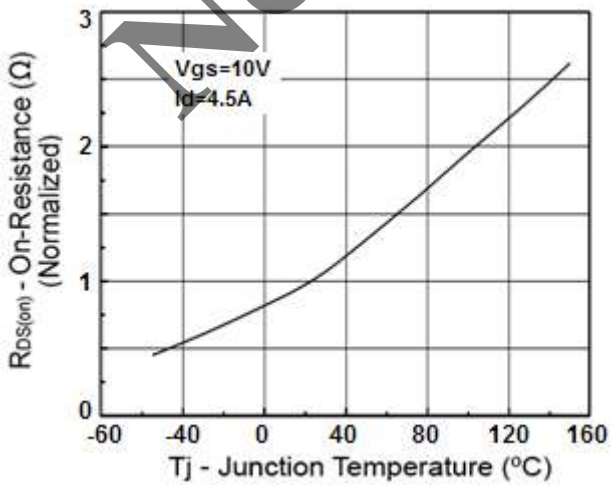
On-Resistance vs. Drain Current



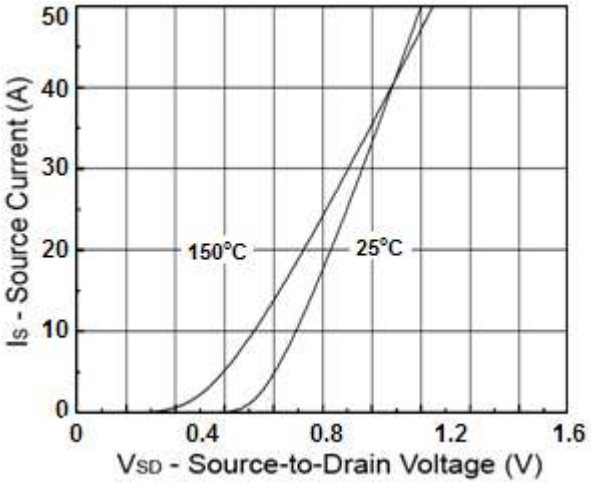
Gate Charge



On-Resistance vs. Junction Temperature

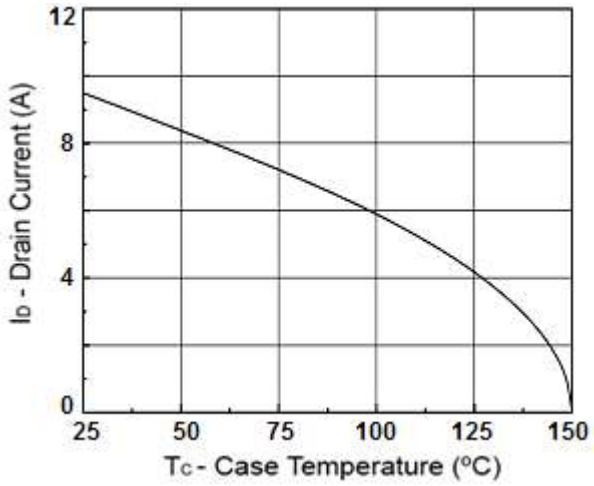


Source-Drain Diode Forward Voltage

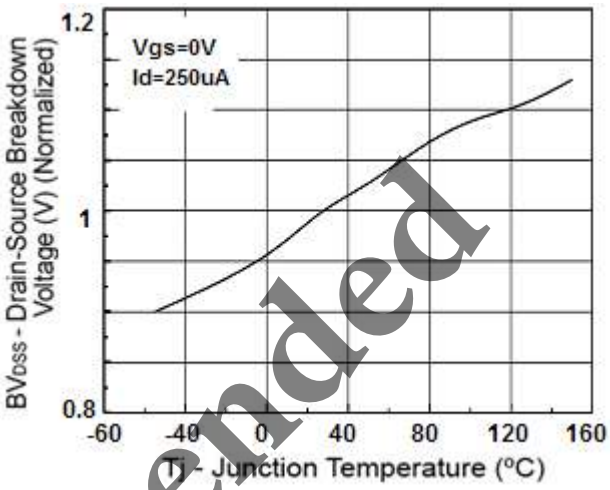


CHARACTERISTICS CURVES
(T_C = 25°C unless otherwise noted)

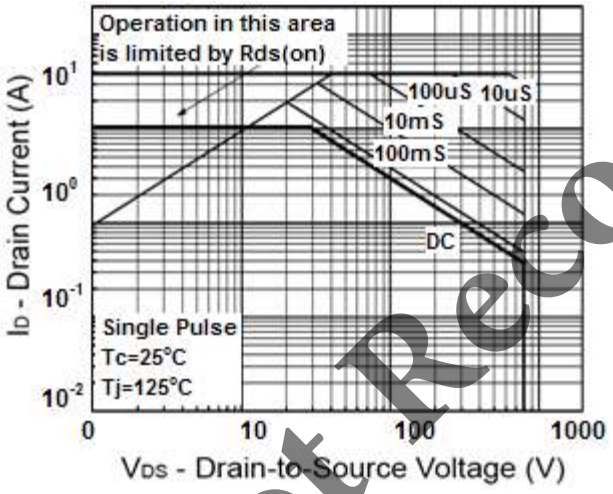
Drain Current vs. Case Temperature



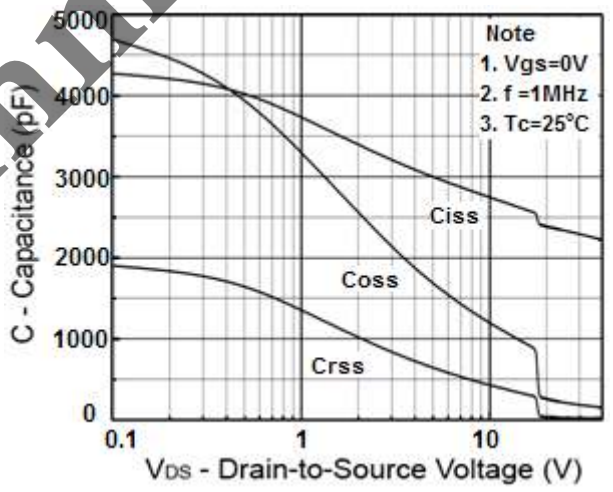
BV_{DSS} vs. Junction Temperature



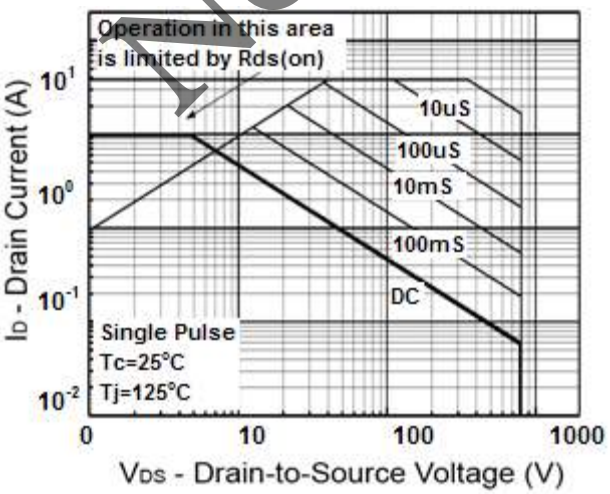
Maximum Safe Operating Area



Capacitance vs. Drain-Source Voltage

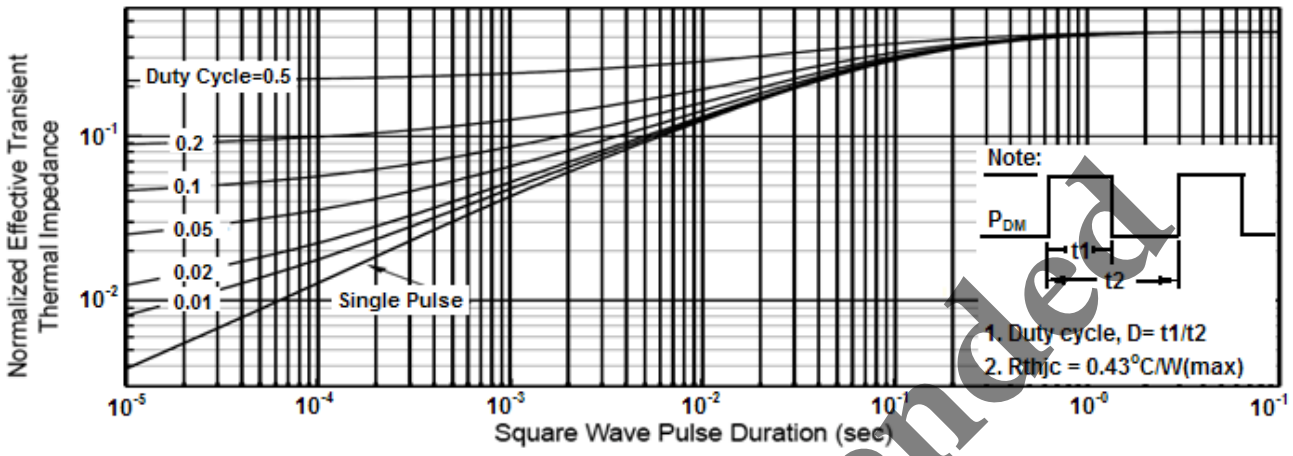


Maximum Safe Operating Area (ITO-220)

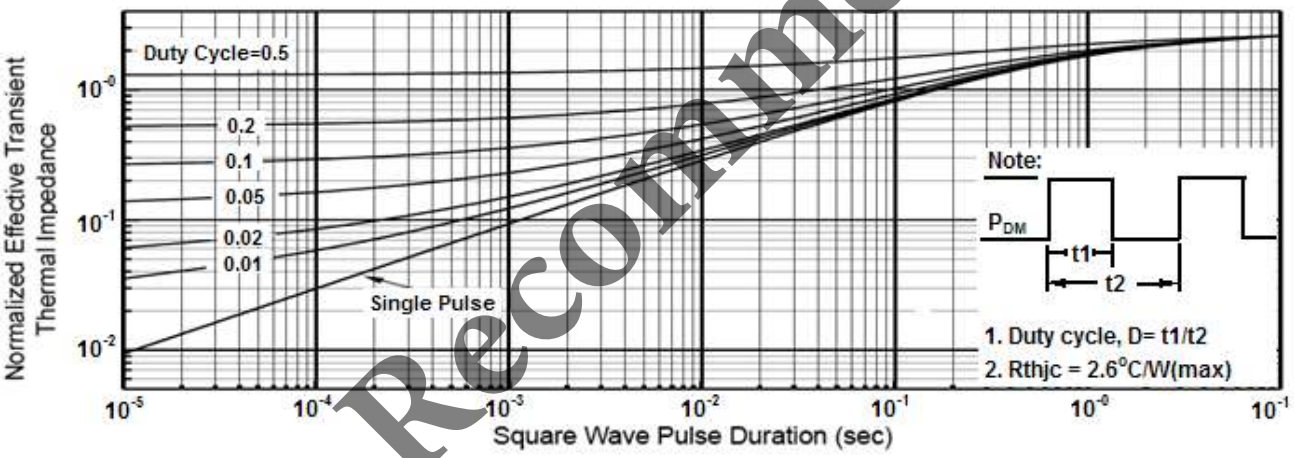


CHARACTERISTICS CURVES
(T_C = 25°C unless otherwise noted)

Normalized Thermal Transient Impedance, Junction-to-Ambient

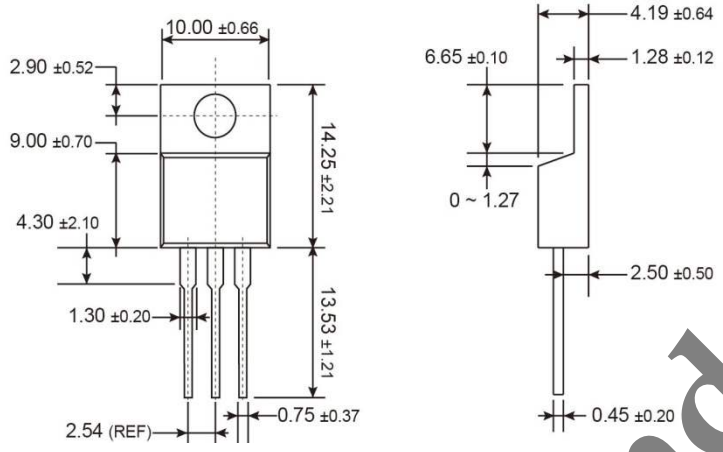


Normalized Thermal Transient Impedance, Junction-to-Ambient(ITO-220)

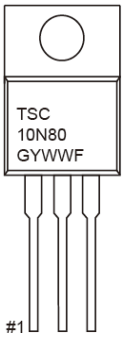


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-220



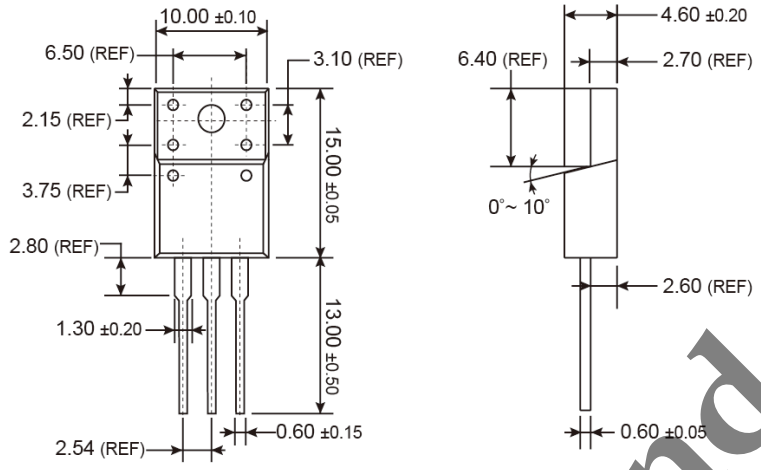
MARKING DIAGRAM



G = Halogen Free Product
Y = Year Code
WW = Week Code (01~52)
F = Factory Code

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

ITO-220



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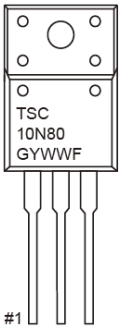

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