

N-Channel Power MOSFET

800V, 8A, 1.4Ω

Features

- Low $R_{DS(ON)}$ 1.4Ω (Max.)
- Low gate charge typical @ 41nC (Typ.)
- Improve dV/dt capability

APPLICATION

- Power Supply
- Lighting.

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
V_{DS}	800	V
$R_{DS(on)}$ (max)	1.4	Ω
Q_g	41	nC



Notes: Moisture sensitivity level: level 3. Per J-STD-020

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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)	I_D	8		A
		4.9		
Pulsed Drain Current (Note 2)	I_{DM}	32		A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_{DTOT}	250	40.3	W
Single Pulsed Avalanche Energy (Note 3)	E_{AS}	160		mJ
Single Pulsed Avalanche Current (Note 3)	I_{AS}	8		A
Repetitive Avalanche Energy	E_{AR}	25		mJ
Peak Diode Recovery (Note 7)	dV/dt	4.5		V
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	$R_{\theta JC}$	0.5	3.1	°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 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}	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} = ±30V, 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 = 4.0A	R _{DS(ON)}	--	1.1	1.4	Ω
Forward Transconductance	V _{DS} = 30V, I _D = 4.0A	g _{fs}	--	7	--	S
Diode Forward Voltage	I _S = 8A, V _{GS} = 0V	V _{SD}	--	--	1.5	V
Dynamic (Note 5)						
Total Gate Charge	V _{DS} = 640V, I _D = 8.0A, V _{GS} = 10V	Q _g	--	41	--	nC
Gate-Source Charge		Q _{gs}	--	10	--	
Gate-Drain Charge		Q _{gd}	--	11	--	
Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	1921	--	pF
Output Capacitance		C _{oss}	--	146	--	
Reverse Transfer Capacitance		C _{rss}	--	12	--	
Gate Resistance	F = 1MHz, open drain	R _g	--	2.9	--	Ω
Switching (Note 6)						
Turn-On Delay Time	V _{DD} = 400V, R _{GEN} = 25Ω, I _D = 8.0A, V _{GS} = 10V,	t _{d(on)}	--	133	--	ns
Turn-On Rise Time		t _r	--	30	--	
Turn-Off Delay Time		t _{d(off)}	--	172	--	
Turn-Off Fall Time		t _f	--	37	--	
Source-Drain Diode (Note 4)						
Forward On Voltage	I _S = 8.0A, V _{GS} = 0V	V _{SD}	--	--	1.5	V
Reverse Recovery Time	V _{GS} =0V, I _S = 8A	t _{rr}	--	479	--	ns
Reverse Recovery Charge	dl _F /dt = 100A/μs	Q _{rr}	--	5.5	--	μC

Notes:

- Current limited by package.
- Pulse width limited by the maximum junction temperature.
- $L = 5mH, I_{AS} = 8A, V_{DD} = 50V, R_G = 25\Omega$, 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.
- $I_{SD} \leq 8A, dI/dt \leq 200A/\mu s, V_{dd} \leq BV$, Starting $T_J = 25^\circ\text{C}$.

ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM8N80CZ C0G	TO-220	50pcs / Tube
TSM8N80CI C0G	ITO-220	50pcs / Tube

Note:

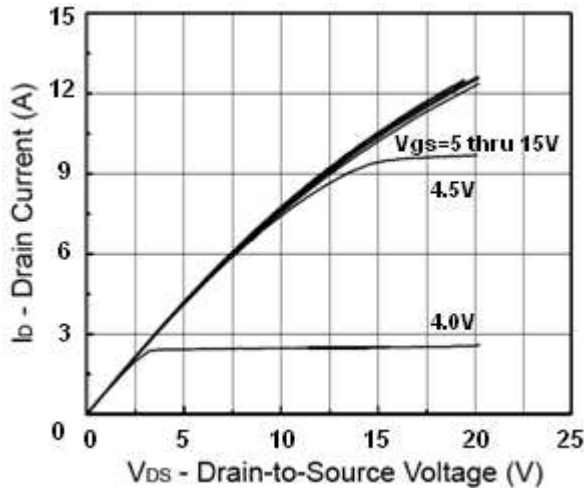
1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

Not Recommended

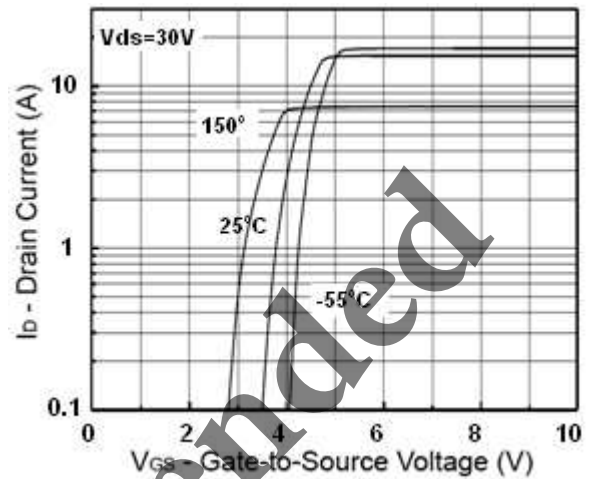
CHARACTERISTICS CURVES

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

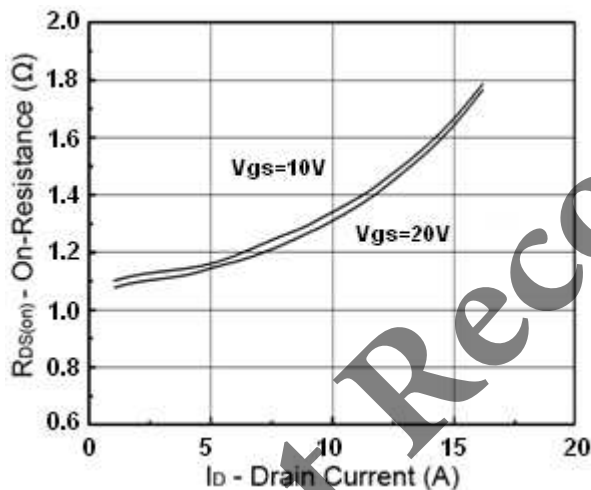
Output Characteristics



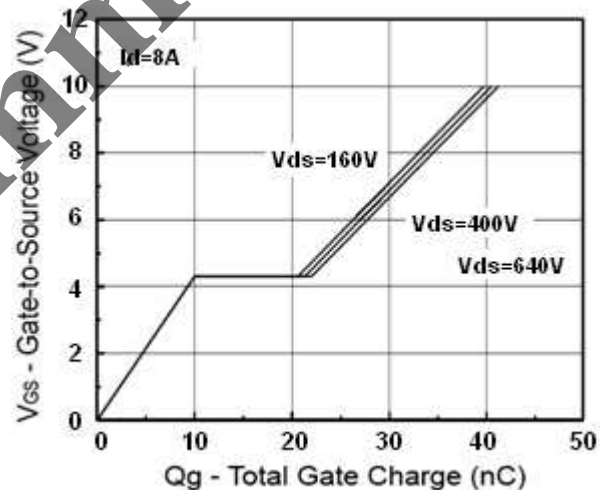
Transfer Characteristics



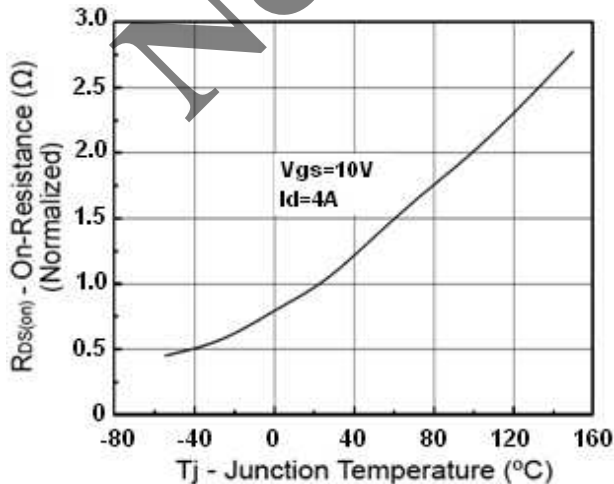
On-Resistance vs. Drain Current



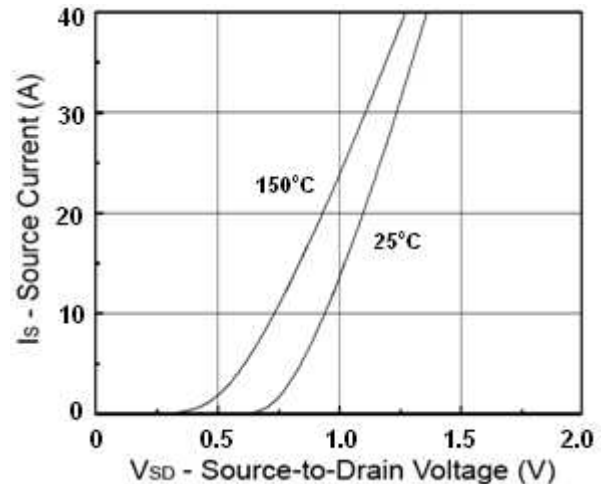
Gate Charge



On-Resistance vs. Junction Temperature



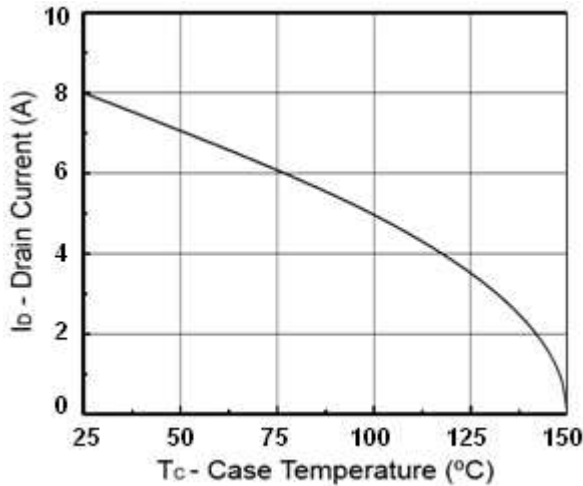
Source-Drain Diode Forward Voltage



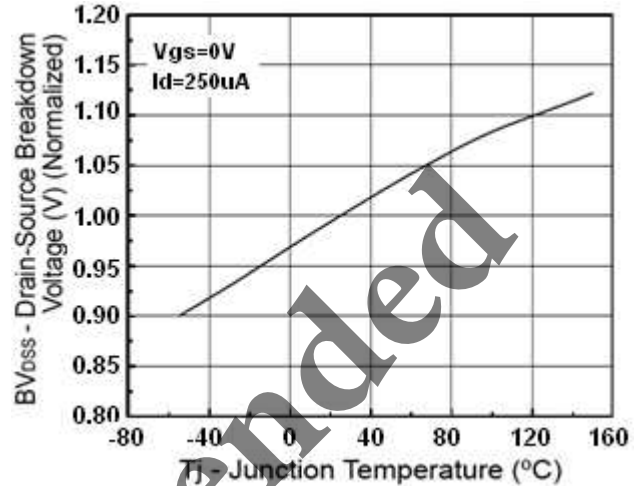
CHARACTERISTICS CURVES

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

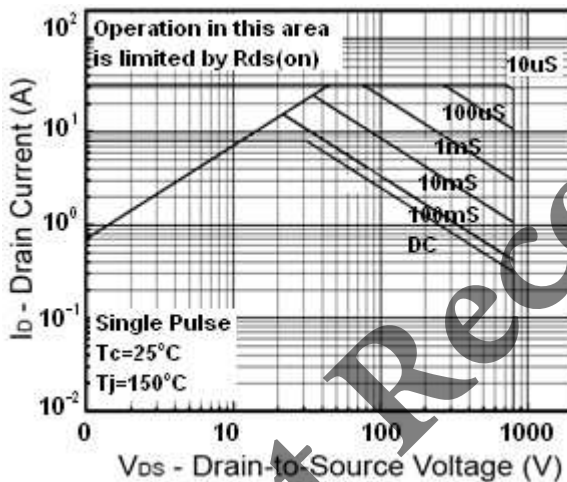
Drain Current vs. Case Temperature



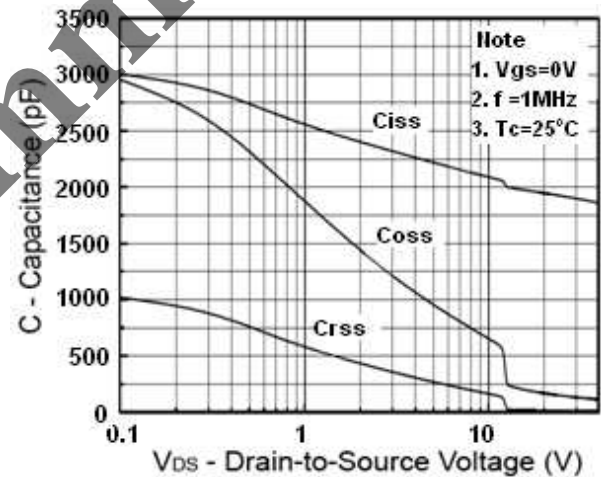
BV_{DSS} vs. Junction Temperature



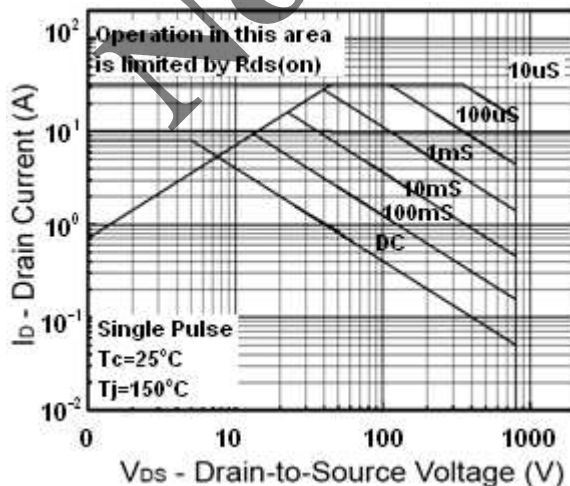
Maximum Safe Operating Area(TO-220)



Capacitance vs. Drain-Source Voltage



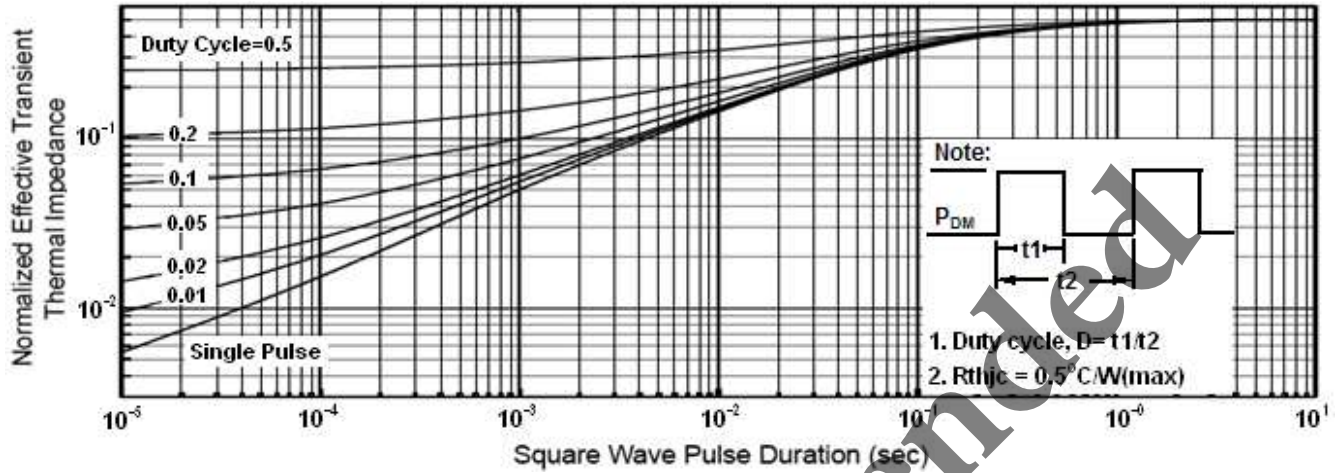
Maximum Safe Operating Area (ITO-220)



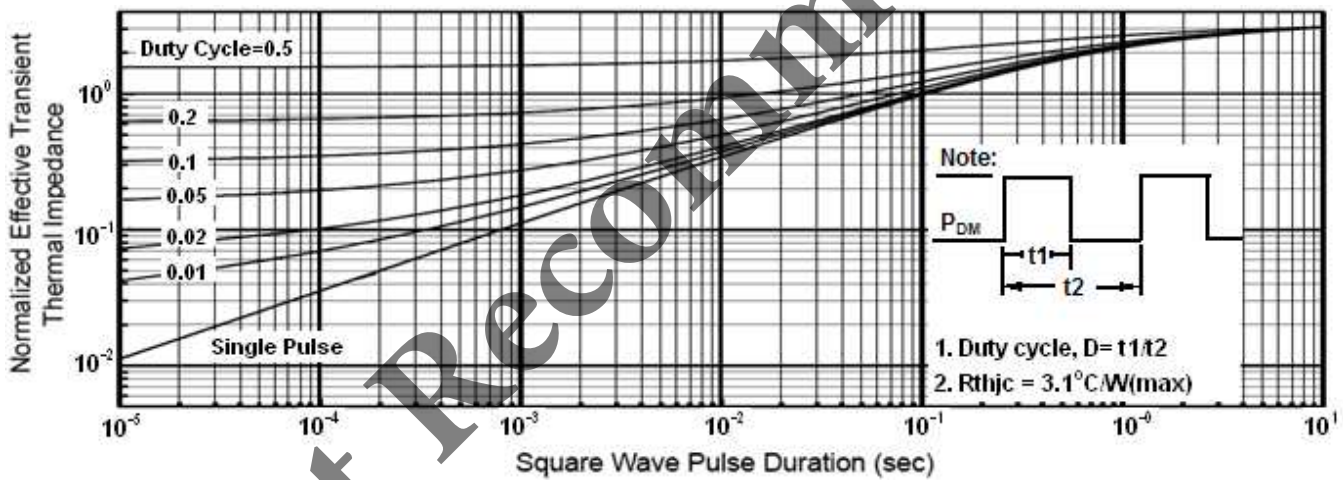
ELECTRICAL CHARACTERISTICS CURVES

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

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

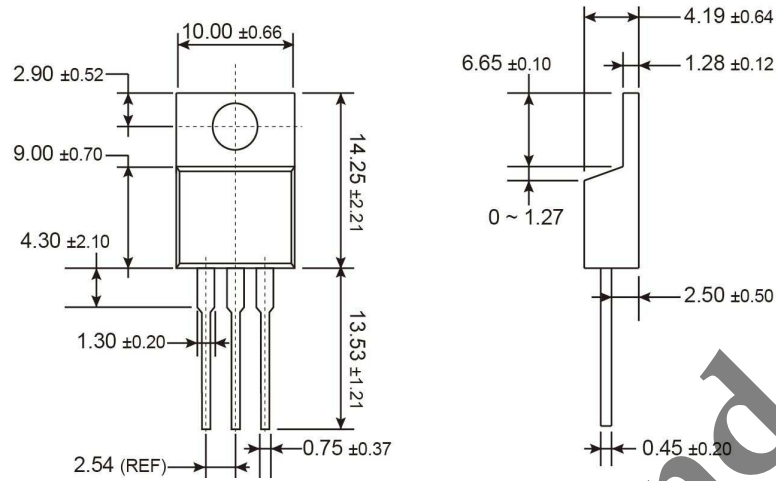


Normalized Thermal Transient Impedance, Junction-to-Ambient (ITO-220)

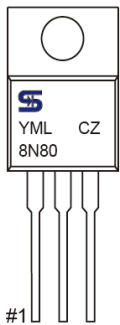


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-220

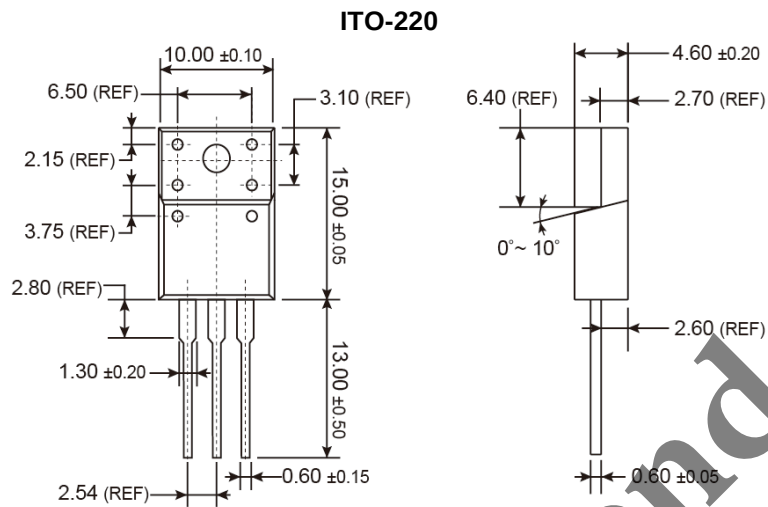


MARKING DIAGRAM

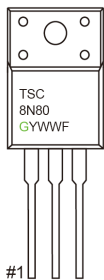


Y = Year Code
M = Month Code for Halogen Free Product
O = Jan **P** = Feb **Q** = Mar **R** = Apr
S = May **T** = Jun **U** = Jul **V** = Aug
W = Sep **X** = Oct **Y** = Nov **Z** = Dec
L = Lot Code (1~9, A~Z)

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)



MARKING DIAGRAM



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

Not Recommended

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