



# **N-Channel Power MOSFET**

800V, 5.5A, 1.2Ω

## **FEATURES**

- Super-Junction technology
- High performance due to small figure-of-merit
- High ruggedness performance
- High commutation performance
- 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

KEY PERFORMANCE PARAMETERS			
PARAMETER VALUE UNIT			
$V_{DS}$	800	V	
R <sub>DS(on)</sub> (max)	1.2	Ω	
$Q_{g}$	19.4	nC	







## **APPLICATIONS**

- Power Supply
- Lighting



ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25°C unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V <sub>DS</sub>	800	V
Gate-Source Voltage		V <sub>GS</sub>	±30	V
Continuous Drain Current (Note 1)	$T_C = 25^{\circ}C$		5.5	А
	T <sub>C</sub> = 100°C	- I <sub>D</sub>	3.4	А
Pulsed Drain Current (Note 2)		I <sub>DM</sub>	16.5	А
Total Power Dissipation @ T <sub>C</sub> = 25°C	;	P <sub>DTOT</sub>	25	W
Single Pulse Avalanche Energy (Note 3	3)	E <sub>AS</sub>	121	mJ
Single Pulse Avalanche Current (Note	3)	I <sub>AS</sub>	2.2	А
Operating Junction and Storage Tem	perature Range	T <sub>J</sub> , T <sub>STG</sub>	- 55 to +150	°C

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THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	R <sub>eJC</sub>	5	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	62	°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.

<b>ELECTRICAL SPECIFICATIONS</b> (T <sub>A</sub> = 25°C unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static	Static					
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV <sub>DSS</sub>	800			V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	$V_{GS(TH)}$	2		4	V
Gate Body Leakage	$V_{GS} = \pm 30 V, V_{DS} = 0 V$	I <sub>GSS</sub>			±100	nA
Zero Gate Voltage Drain Current	$V_{DS} = 800V, V_{GS} = 0V$	I <sub>DSS</sub>			1	μA
Drain-Source On-State Resistance (Note 4)	$V_{GS} = 10V, I_D = 1.8A$	R <sub>DS(on)</sub>		0.9	1.2	Ω
Dynamic (Note 5)				•		
Total Gate Charge		$Q_g$		19.4		
Gate-Source Charge	$V_{DS} = 380V, I_D = 5.5A,$	$Q_{gs}$		3.4		nC
Gate-Drain Charge	$V_{GS} = 10V$	$Q_{gd}$		9.6		
Input Capacitance	$V_{DS} = 100V, V_{GS} = 0V,$	C <sub>iss</sub>		685		F
Output Capacitance	f = 1.0MHz	C <sub>oss</sub>		62		pF
Gate Resistance	F = 1MHz, open drain	$R_g$		3.4		Ω
Switching (Note 6)						
Turn-On Delay Time		t <sub>d(on)</sub>		22		
Turn-On Rise Time	$V_{DD} = 380V,$ $R_{GEN} = 25\Omega,$ $I_{D} = 5.5A, V_{GS} = 10V,$	t <sub>r</sub>		11		
Turn-Off Delay Time		t <sub>d(off)</sub>		55		ns
Turn-Off Fall Time	10 – 3.3A, VGS – 10V,	t <sub>f</sub>		10		
Source-Drain Diode						
Forward On Voltage (Note 4)	$I_S = 5.5A, V_{GS} = 0V$	$V_{SD}$	1		1.4	V
Reverse Recovery Time	$V_R = 100V, I_S = 5.5A$	t <sub>rr</sub>	-	240		ns
Reverse Recovery Charge	$dI_F/dt = 100A/\mu s$	Q <sub>rr</sub>		2.5		μC

#### Notes:

- 1. Current limited by package.
- 2. Pulse width limited by the maximum junction temperature.
- 3. L = 50mH,  $I_{AS}$  = 2.2A,  $V_{DD}$  = 50V,  $R_{G}$  = 25 $\Omega$ , Starting  $T_{J}$  = 25 $^{\circ}$ C
- 4. Pulse test: PW  $\leq$  300 $\mu$ s, duty cycle  $\leq$  2%.
- 5. For DESIGN AID ONLY, not subject to production testing.
- 6. Switching time is essentially independent of operating temperature.



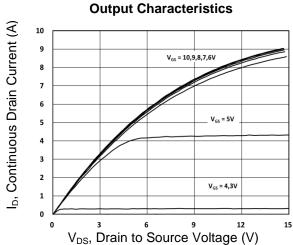
# **ORDERING INFORMATION**

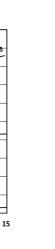
PART NO.	PACKAGE	PACKING
TSM80N1R2CI C0G	ITO-220	50pcs / Tube

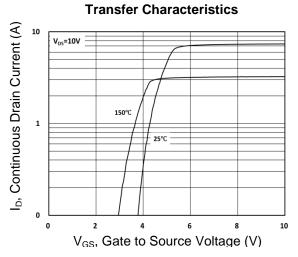


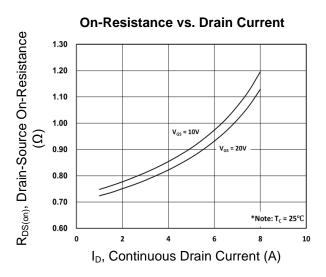
## **CHARACTERISTICS CURVES**

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

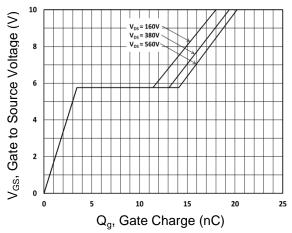


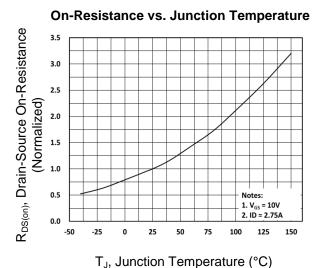


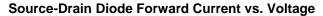


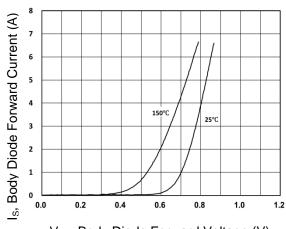












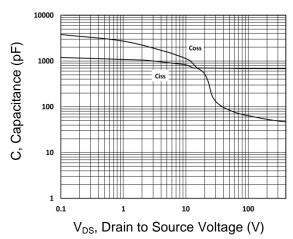
V<sub>SD</sub>, Body Diode Forward Voltage (V)



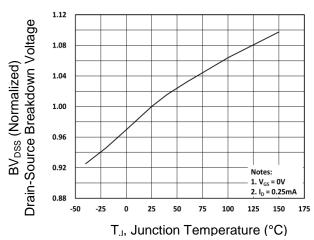
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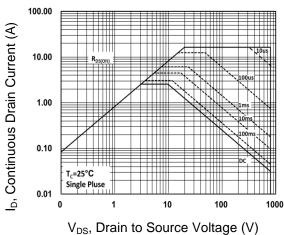
# Capacitance vs. Drain-Source Voltage



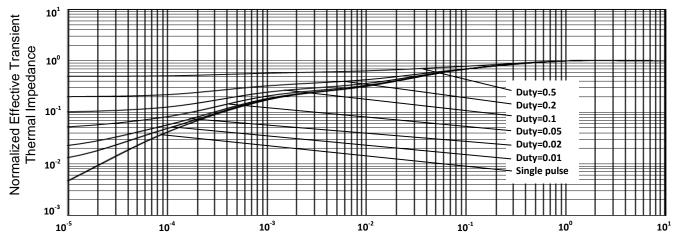
# BV<sub>DSS</sub> vs. Junction Temperature



## **Maximum Safe Operating Area**



## Normalized Thermal Transient Impedance, Junction-to-Case



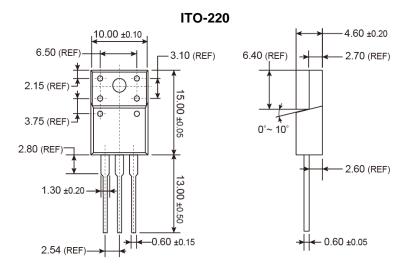
Square Wave Pulse Duration (s)

5

Version: A1604



# PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)



# **MARKING DIAGRAM**



**G** = Halogen Free

Y = Year Code

**WW** = Week Code (01~52)

F = Factory Code



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