

N-Channel Power MOSFET

600V, 0.6A, 5Ω

FEATURES

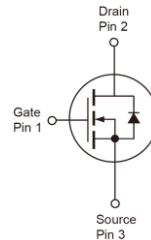
- Robust high voltage termination
- Avalanche energy specified
- Diode is characterized for use in bridge circuits
- Source to Drain diode recovery time comparable to a discrete fast recovery diode.

KEY PERFORMANCE PARAMETERS

PARAMETER	VALUE	UNIT
V_{DS}	600	V
$R_{DS(on)}$ (max)	5	Ω
Q_g	13	nC

APPLICATION

- Power Supply
- Lighting
- Charger


SOT-223

Notes: MSL 3 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	± 30	V
Continuous Drain Current ^(Note 1)	$T_C = 25^\circ\text{C}$	I_D	0.6	A
	$T_C = 100^\circ\text{C}$		0.36	
Pulsed Drain Current ^(Note 2)		I_{DM}	1.5	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$		P_{DTOT}	2.5	W
Single Pulsed Avalanche Energy ^(Note 3)		E_{AS}	62	mJ
Single Pulsed Avalanche Current ^(Note 3)		I_{AS}	2.5	A
Operating Junction Temperature		T_J	150	$^\circ\text{C}$
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	$R_{\theta JC}$	15	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	55.8	$^\circ\text{C/W}$

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 with minimum recommended footprint 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}	600	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V _{GS(TH)}	2	--	4	V
Gate Body Leakage	V _{GS} =±30V, V _{DS} =0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} =600V, V _{GS} =0V	I _{DSS}	--	--	1	μA
Drain-Source On-State Resistance	V _{GS} =10V, I _D =0.6A	R _{DS(ON)}	--	3.6	5	Ω
Forward Transconductance	V _{DS} = 10V, I _D = 0.2A	g _{fs}	--	0.8	--	S
Dynamic ^(Note 5)						
Total Gate Charge	V _{DS} =400V, I _D =0.6A, V _{GS} = 10V	Q _g	--	13	--	nC
Gate-Source Charge		Q _{gs}	--	2	--	
Gate-Drain Charge		Q _{gd}	--	6	--	
Input Capacitance	V _{DS} =25V, V _{GS} =0V, f =1.0MHz	C _{iss}	--	435	--	pF
Output Capacitance		C _{oss}	--	56	--	
Reverse Transfer Capacitance		C _{rss}	--	9.2	--	
Switching ^(Note 6)						
Turn-On Delay Time	V _{GS} =10V, I _D =0.6A, V _{DD} =300V, R _G =18Ω,	t _{d(on)}	--	12	--	ns
Turn-On Rise Time		t _r	--	21	--	
Turn-Off Delay Time		t _{d(off)}	--	30	--	
Turn-Off Fall Time		t _f	--	24	--	
Source-Drain Diode ^(Note 4)						
Forward On Voltage	I _S = 0.6A, V _{GS} = 0V	V _{SD}	--	0.85	1.15	V

Notes:

- Current limited by package
- Pulse width limited by the maximum junction temperature
- $L = 20mH, I_{AS} = 2.5A, V_{DD} = 50V, R_G = 25\Omega$, 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
TSM2N60SCW RPG	SOT-223	2,500pcs / 13" Reel

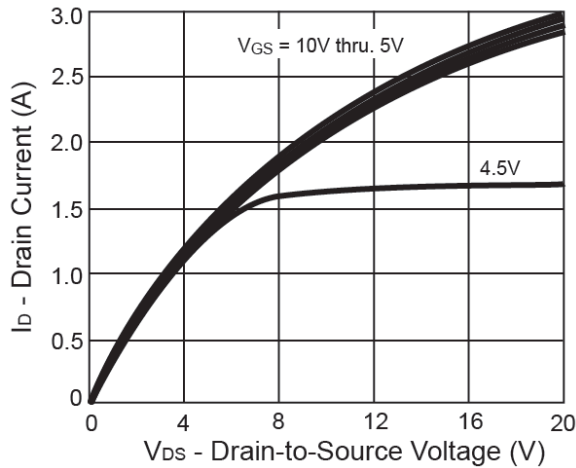
Note:

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

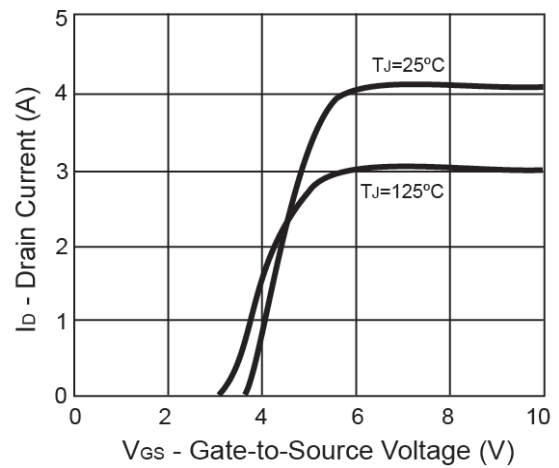
CHARACTERISTICS CURVES

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

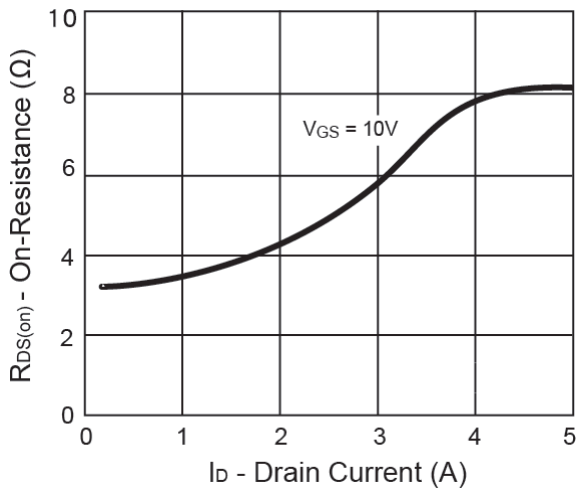
Output Characteristics



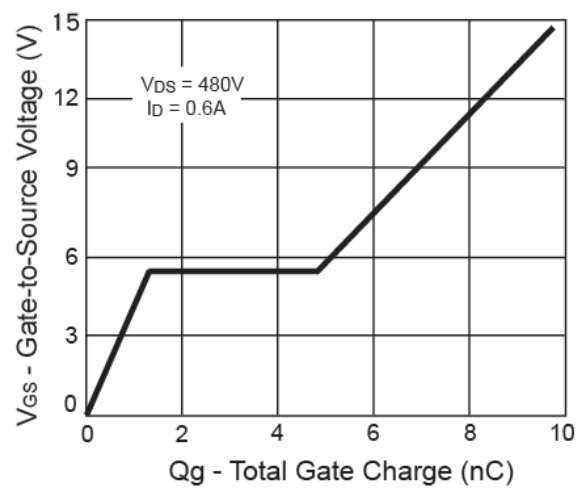
Transfer Characteristics



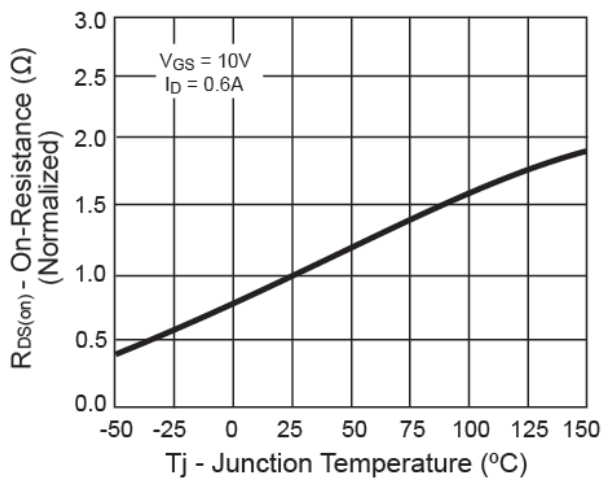
On-Resistance vs. Drain Current



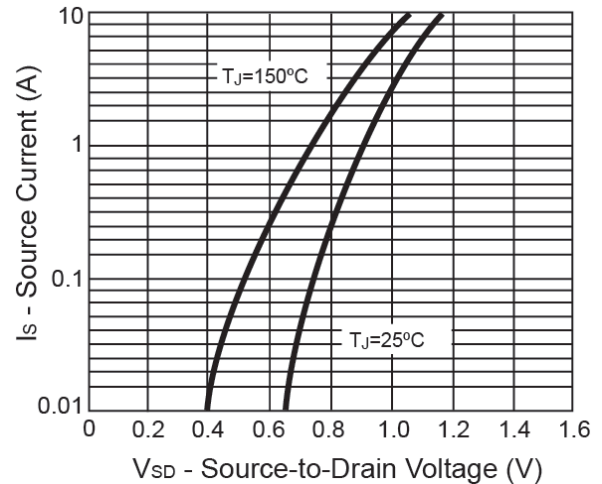
Gate Charge



On-Resistance vs. Junction Temperature



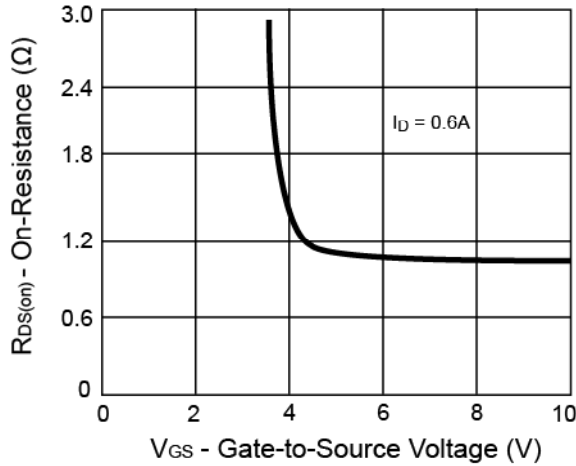
Source-Drain Diode Forward Voltage



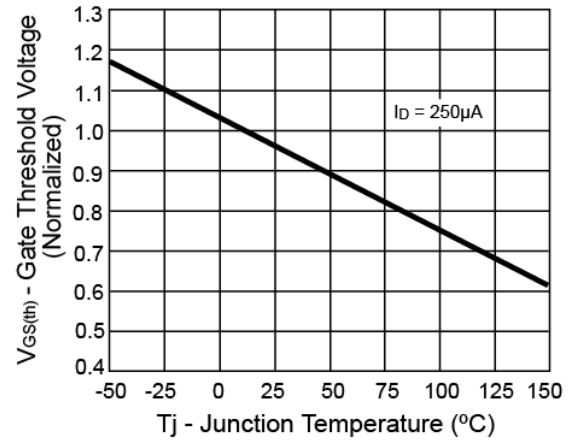
CHARACTERISTICS CURVES

(Tc = 25°C unless otherwise noted)

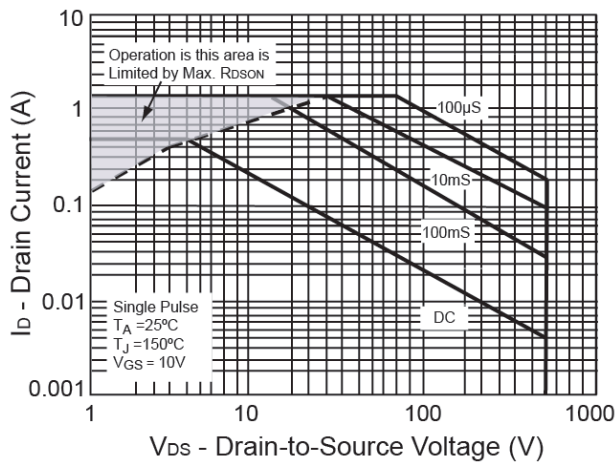
On-Resistance vs. Gate-Source Voltage



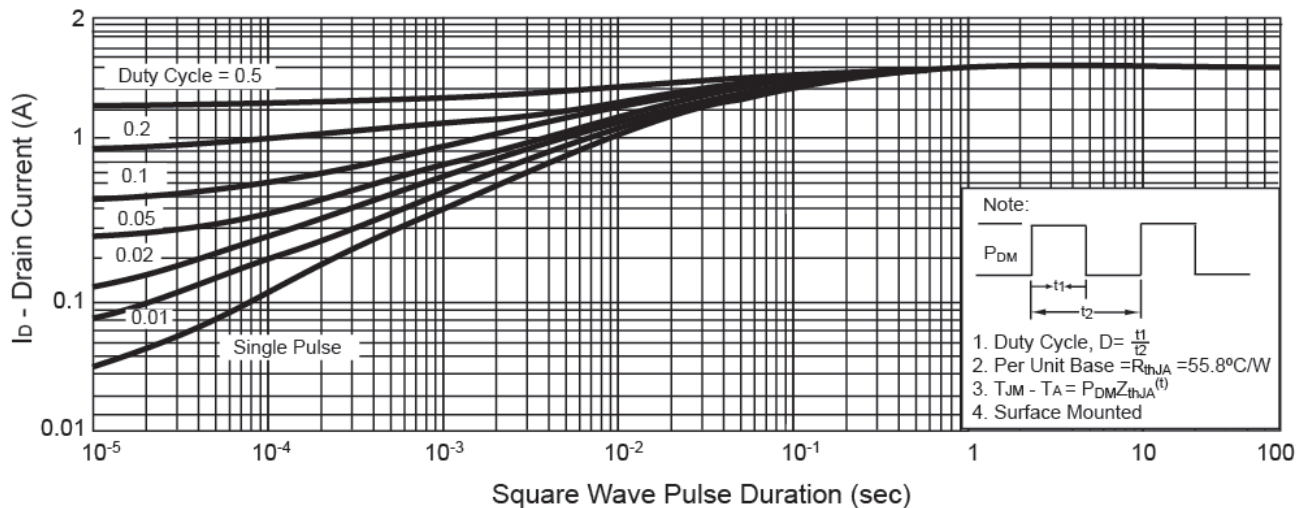
Threshold Voltage



Maximum Safe Operating Area

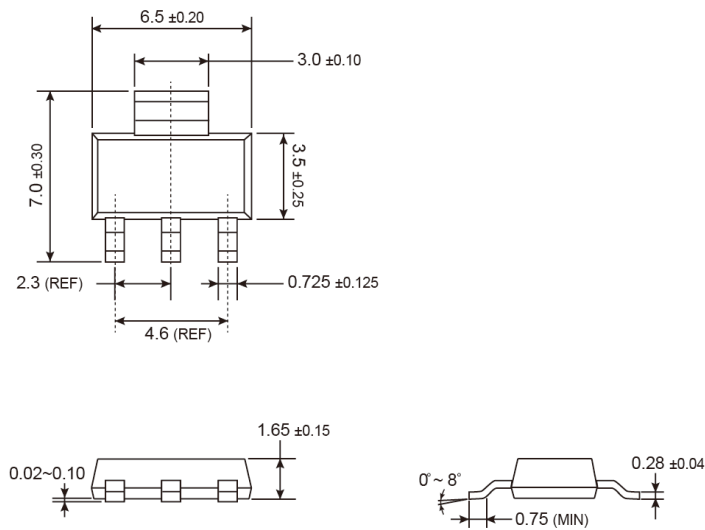


Normalized Thermal Transient Impedance, Junction-to-Ambient

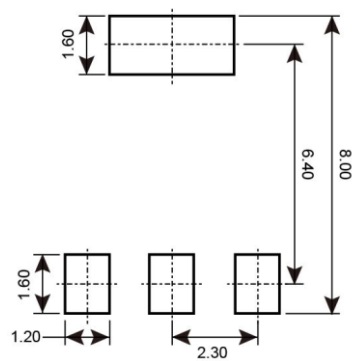


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

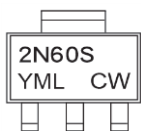
SOT-223



SUGGESTED PAD LAYOUT



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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