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.

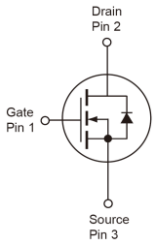
KEY PERFORMANCE PARAMETERS		
PARAMETER	**VALUE**	**UNIT**
V_{DS}	600	V
$R_{DS(on)}$ (max)	5	Ω
Q_g	13	nC

APPLICATION

- Power Supply
- Lighting
- Charger

Pb-Free RoHS COMPLIANT HALOGEN FREE

SOT-223



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

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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°C	I_D	0.6	A
	T_C = 100°C		0.36	
Pulsed Drain Current (Note 2)		I_{DM}	1.5	A
Total Power Dissipation @ T_C = 25°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	°C
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE

PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\Theta JC}$	15	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	55.8	°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 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:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. L = 20mH, I_{AS} = 2.5A, 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
TSM2N60SCW RPG	SOT-223	2,500pcs / 13” Reel

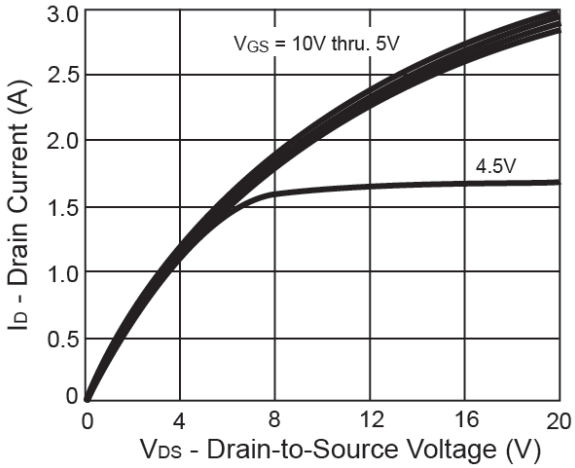
Note:

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

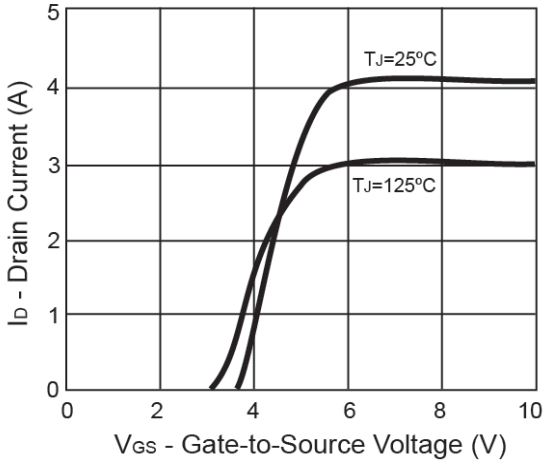
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

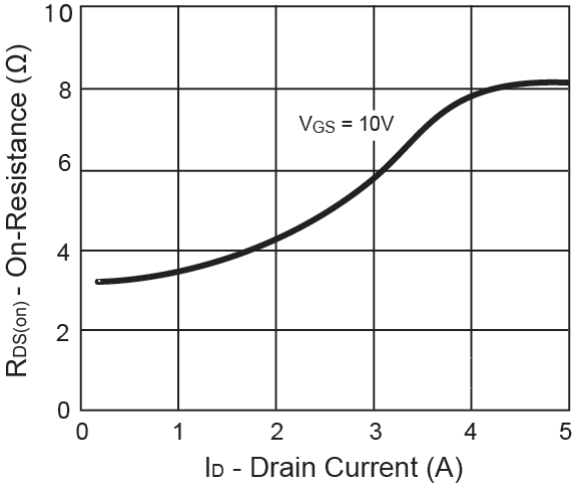
Output Characteristics



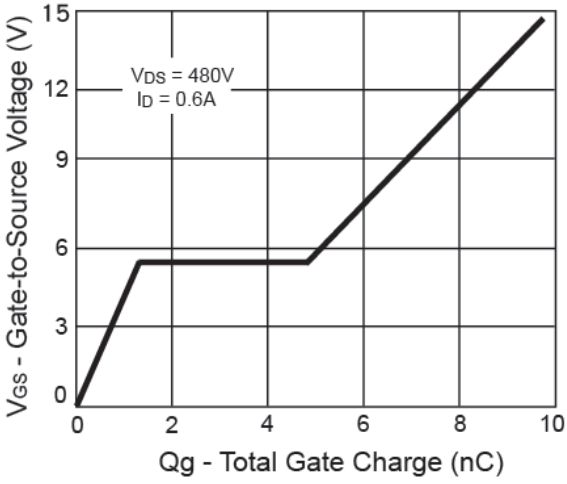
Transfer Characteristics



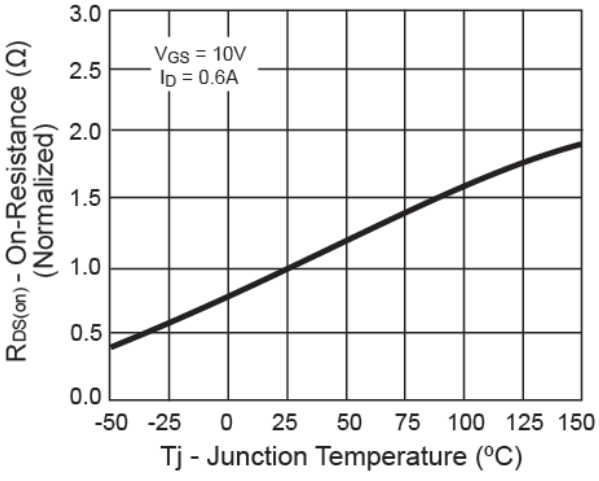
On-Resistance vs. Drain Current



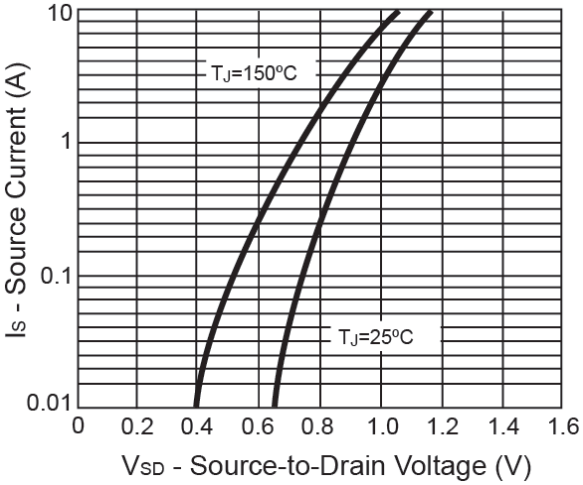
Gate Charge



On-Resistance vs. Junction Temperature



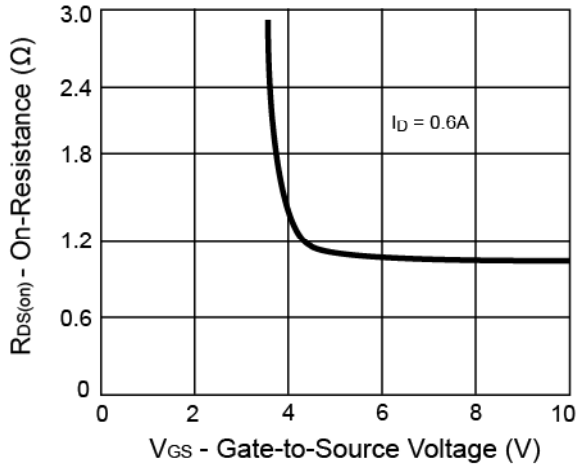
Source-Drain Diode Forward Voltage



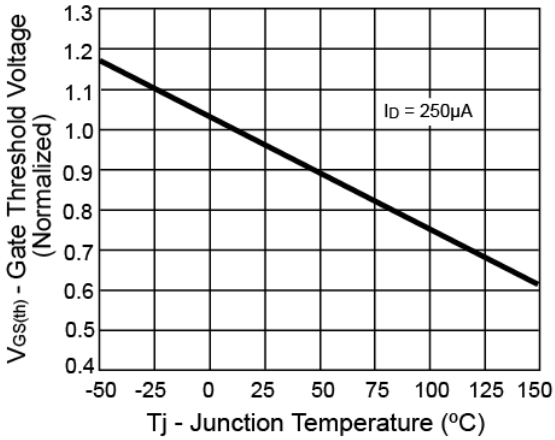
CHARACTERISTICS CURVES

(Tc = 25°C unless otherwise noted)

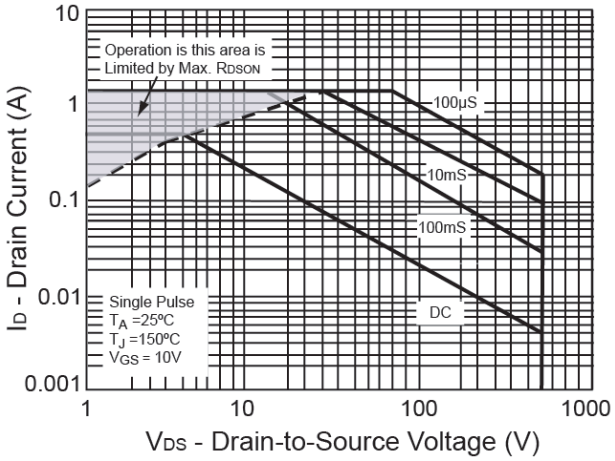
On-Resistance vs. Gate-Source Voltage



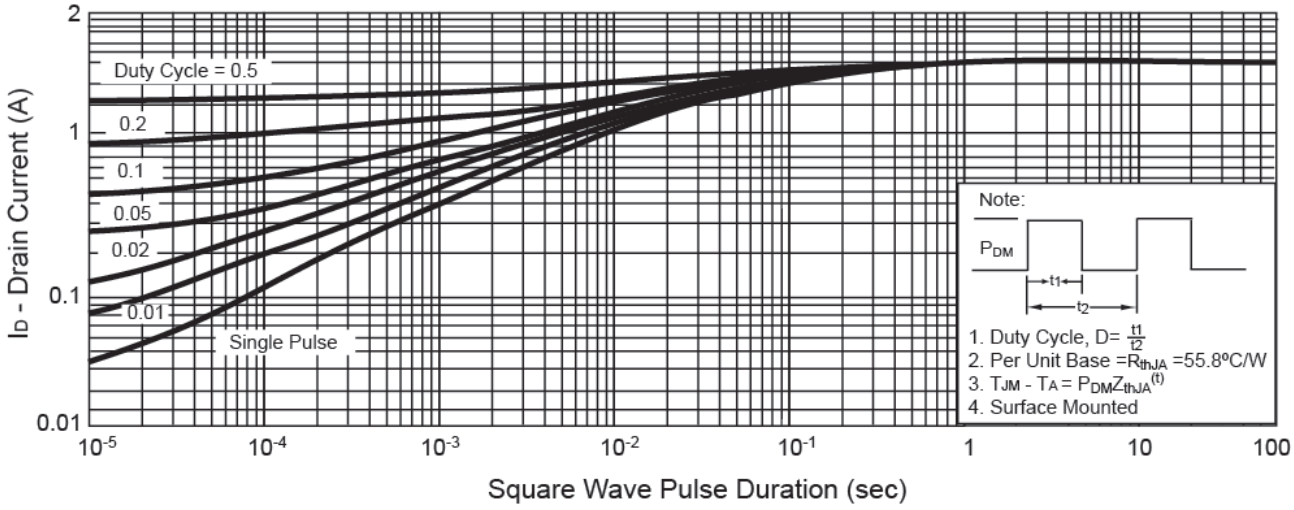
Threshold Voltage



Maximum Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

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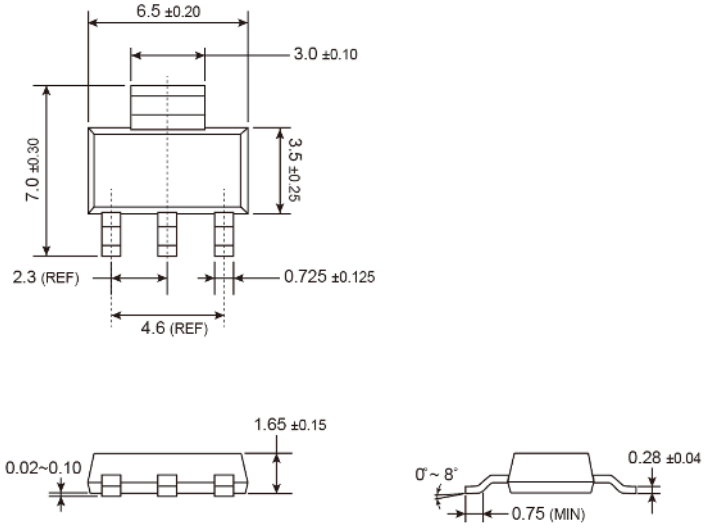
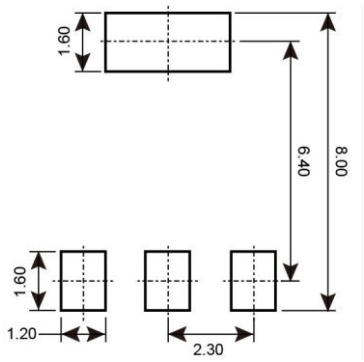
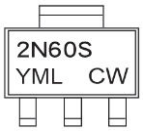


SUGGESTED PAD LAYOUT



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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