

## 2 Amps, 600Volts

## N-CHANNEL MOSFET

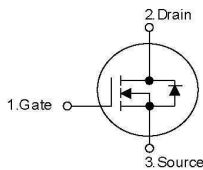
### DESCRIPTION

The SSS2N60 is a high voltage MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies .PWM motor controls, high efficient DC to DC converters and bridge circuits.

### FEATURES

- $R_{DS(ON)}=3.8\ \Omega @V_{GS}=10V$
- Ultra Low gate charge(typical 9.0nC)
- Low reverse transfer capacitance( $Cr_{ss}$ =typical 5.0pF)
- Fast switching capability
- Avalanche energy specified
- Improved dv/dt capability,high ruggedness

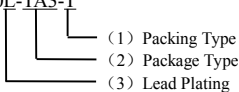
### SYMBOL



### ORDERING INFORMATION

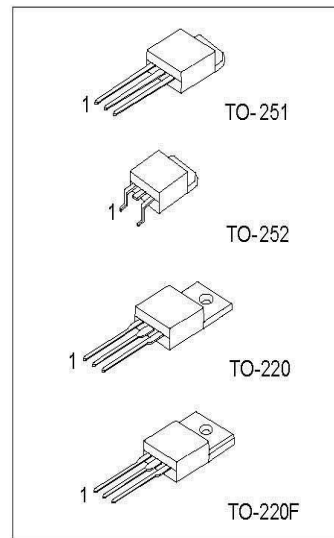
Order Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
2N60-TA3-T	2N60L-TA3-T	TO-220	G	D	S	Tube
2N60-TF3-T	2N60L-TF3-T	TO-220F	G	D	S	Tube
2N60-TM3-T	2N60L-TM3-T	TO-251	G	D	S	Tube
2N60-TN3-R	2N60L-TN3-R	TO-252	G	D	S	Tape Reel
2N60-TN3-T	2N60L-TN3-T	TO-252	G	D	S	Tube

Note:Pin Assignment: G:Gate D:Drain S:Source

<p>2N60L-TA3-T</p>  <p>(1) Packing Type  (2) Package Type  (3) Lead Plating</p>	<p>(1)T:Tube,R:Tape Reel  (2)TA3:TO220,TF3:TO-220F,TM3:TO-251,TN3:TO-252  (3)L:Lead Free Plating Blank: Pb/Sn</p>
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### ABSOLUTE MAXIMUM RATINGS( $T_c=25^\circ C$ , unless otherwise specified)

PARAMETER		SYMBOL	PATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	600	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Avalanche Current(Note 2)		$I_{AP}$	2.0	A
Drain Current	$T_c=25^\circ C$	$I_D$	2.0	A
	Continuous		$T_c=100^\circ C$	1.26
Drain Current Pulsed(Note 2)		$I_{DP}$	8.0	A



\*Pb-free plating product number: 2N60

Avalanche Energy	Repetitive(Note 2)	$E_{AR}$	4.5	mJ
	Single Pulse(Note 3)	$E_{AS}$	120	mJ
Peak Diode Recovery dv/dt(Note 4)		dv/dt	4.5	v/ns
Total Power Dissipation	$T_c=25^\circ\text{C}$	$P_D$	45	W
	Derate above 25°C		0.36	w/°C
Junction Temperature		$T_J$	+150	°C
Storage Temperature		$T_{STG}$	-55~+150	°C

Note:1.Absolute maximum ratings are those values beyond which the device could be permanently damaged

Absolute maximum ratings are stress ratings only and functional device operation is not implied

2.Repetitive Rating:Pulse width limited bu maximum junction temperature

3.L=64mH, $I_{AS}=2.0A$ , $V_{DD}=50V$ , $R_G=25\ \Omega$ ,Starting  $T_J=25^\circ\text{C}$

4.  $I_{SD}\leq 2.4A$ , $di/dt\leq 200A/\mu\text{ s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

## ■ THERMAL DATA

PARAMETER	PACKAGE	SYMBOL	RATINGS	UNIT
Thermal Resistance Junction-Ambient	TO-251	$\theta_{JA}$	112	°C/W
	TO-252		112	
	TO-220		54	
	TO-220F		54	
Thermal Resistance Junction-Case	TO-251	$\theta_{JC}$	12	
	TO-252		12	
	TO-220		4	
	TO-220F		4	

## ■ ELECTRICAL CHARACTERISTICS( $T_J=25^\circ\text{C}$ , unless Otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\ \mu\text{ A}$	600			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=600V, V_{GS}=0V$			10	$\mu\text{ A}$
Gate-Body Leakage Current	Forward	$I_{GSS}$			100	nA
	Reverse				-100	nA
Breakdown Voltage Temperature	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\ \mu\text{ A}$		0.4		V/°C
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\ \mu\text{ A}$	2.0		4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{DS}=10V, I_D=1A$		3.8	5	$\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=50V, I_D=1A$ (Note 1)		2.25		S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$		270	350	pF
Output Capacitance	$C_{OSS}$			40	50	pF
Reverse Transfer Capacitance	$C_{RSS}$			5	7	pF

## ■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
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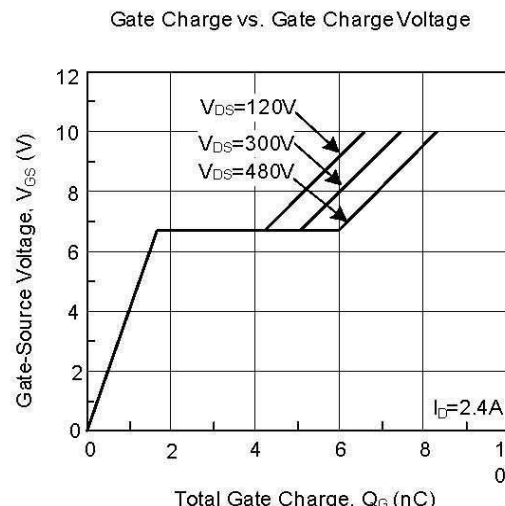
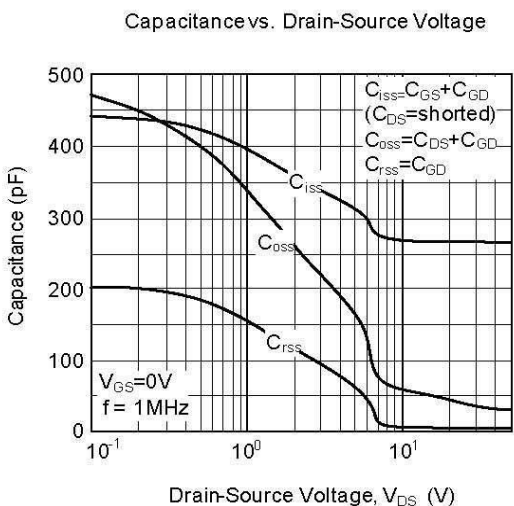
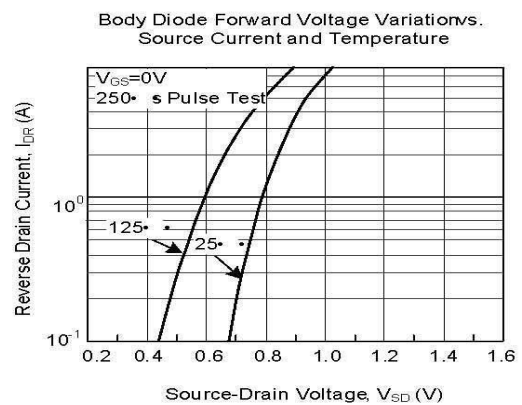
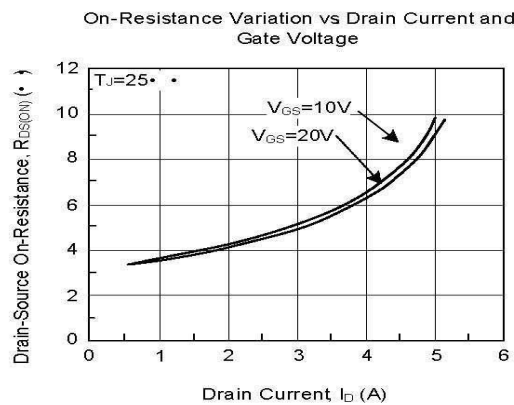
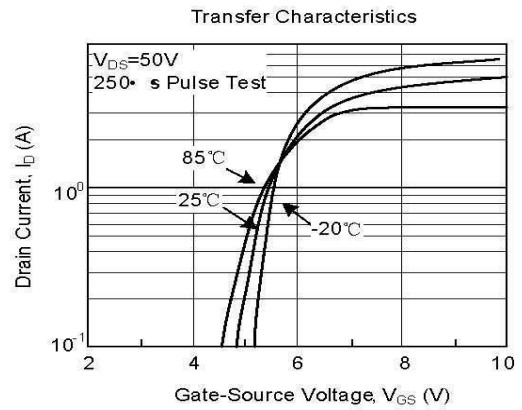
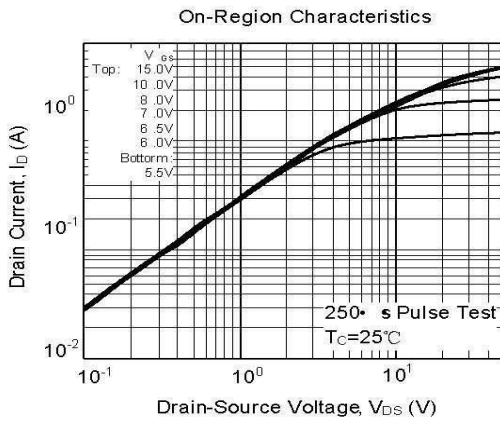


Switching Characteristics					
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=300V, I_D=2.4A, R_G=25\Omega$	10	30	ns
Rise Time	$t_R$		25	60	ns
Turn-Off Delay Time	$t_{D(OFF)}$		20	50	ns
Fall Time	$t_F$		25	60	ns
Total Gate Charge	$Q_G$	$V_{DS}=480V, V_{GS}=10V, I_D=2.4A$	9.0	11	nC
Gate-Source Charge	$Q_{GS}$		1.6		nC
Gate-Drain Charge	$Q_{GD}$		4.3		nC
Drain-Source Diode Characteristics					
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_{SD}=2.0A$		1.4	V
Continuous Drain-Source Current	$I_{SD}$			2.0	A
Pulsed Drain-Source Current	$I_{SM}$			8.0	A
Reverse Recovery Time	$t_{RR}$	$V_{GS}=0V, I_{SD}=2.4A,$	180		ns
Reverse Recovery Charge	$Q_{RR}$	$di/dt=100A/\mu A$	0.72		$\mu C$

Note: 1. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$

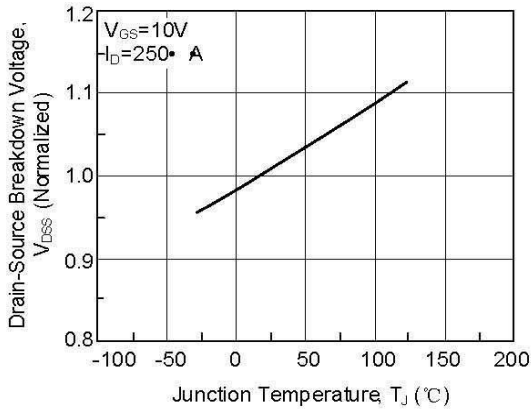
2. Essentially Independent of Operating Temperature

### TYPICAL CHARACTERISTICS

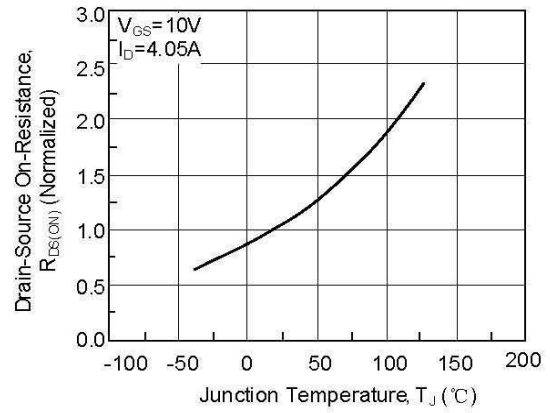


**TYPICAL CHARACTERISTICS(Cont)**

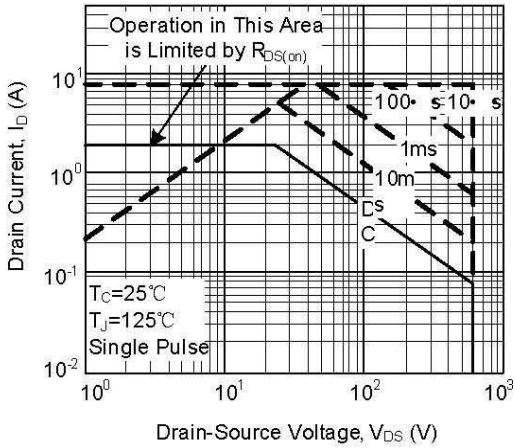
Breakdown Voltage vs Temperature



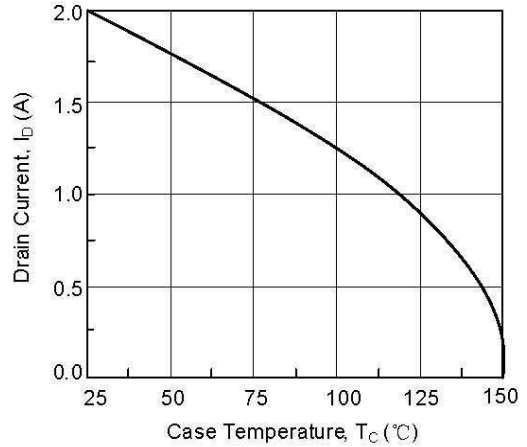
On-Resistance vs Temperature



Max. Safe Operating Area



Max. Drain Current vs. Case Temperature



Thermal Response

