

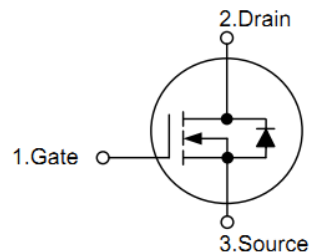


60N03

主要参数

Main Characteristics

I_D	60 A
V_{DS}	30 V
$R_{DS(on)}$ (@ $V_{GS}=10V$)	5.5 m Ω
$R_{DS(on)}$ (@ $V_{GS}=4.5V$)	7.0 m Ω



用途

开关电源
电子镇流器
功率电机控制
转换器

Applications

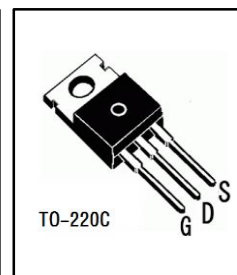
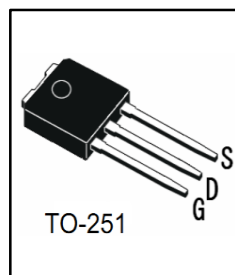
Power supplies
Electronic lamp ballasts
Power motor control
Converters

产品特性

低栅极电荷
低 C_{rss} (典型值90pF)
开关速度快
产品全部经过雪崩测试
高抗 dv/dt 能力
RoHS 产品

Features

Low gate charge
Low C_{rss} (typical 90 pF)
Fast switching
100% avalanche tested
Improved dv/dt capability
RoHS product



产品中有害有毒物质或元素的名称及含量

部件名称 含量要求	有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
	≤0.1%	≤0.1%	≤0.01%	≤0.1%	≤0.1%	≤0.1%
引线框	○	○	○	○	○	○
塑封树脂	○	○	○	○	○	○
管 芯	○	○	○	○	○	○
内引线	○	○	○	○	○	○
焊 料	×	○	○	○	○	○
说 明	○：表示该元素的含量在 SJ/T11363-2006 标准的限量要求以下。 ×：表示该元素的含量超出 SJ/T11363-2006 标准的限量要求。 目前产品的焊料中含有铅 (Pb) 成分，但属于欧盟 RoHS 指令豁免范围。					

绝对最大额定值 **Absolute Ratings** ($T_c=25^{\circ}\text{C}$)

项 目 Parameter	符 号 Symbol	数 值 Value	单位 Unit
最高漏极—源极直流电压 Drain-Source Voltage	V_{DS}	30	V
连续漏极电流 Drain Current -continuous	I_D	60	A
最高栅源电压 Gate-Source Voltage	V_{GS}	± 20	V
单脉冲雪崩能量 Single Pulsed Avalanche Energy	E_{AS}	732	mJ
雪崩电流 Avalanche Current	I_{AR}	60	A
耗散功率 Power Dissipation	P_D	TO-220C: 60	W
		TO-251: 45	
最高结温 Operating Junction Temperature	T_J	+150	$^{\circ}\text{C}$
存储温度 Storage Temperature Range	T_{STG}	-55~+150	$^{\circ}\text{C}$
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_L	300	$^{\circ}\text{C}$

*漏极电流由最高结温限制 *Drain current limited by maximum junction temperature

电特性 Electrical Characteristics

项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off –Characteristics						
漏－源击穿电压 Drain-Source Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	30	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} / ΔT _J	I _D =250μA, referenced to 25℃	-	0.99	-	V/℃
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =25V, V _{GS} =0V, TC=25℃	-	-	1	μA
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, TC=125℃	-	-	100	μA
正向栅极体漏电流 Forward Gate-body leakage current	I _{GSSF}	V _{DS} =0V, V _{GS} =+20V	-	-	+100	nA
反向栅极体漏电流 Reverse Gate-body leakage current	I _{GSSR}	V _{DS} =0V, V _{GS} =-20V	-	-	-100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1.0	-	3.0	V
静态导通电阻 Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =20A V _{GS} =4.5V , I _D =20A	-	4.0 5.5	5.5 7.0	mΩ
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C _{iss}	V _{DS} =15, V _{GS} =0V f=1.0MHz	-	900	-	pF
输出电容 Output capacitance	C _{oss}		-	210	-	pF
反向传输电容 Reverse transfer capacitance	C _{rss}		-	90	-	pF
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	t _{d(on)}	V _{DD} =15V I _D =7.9A V _G =10V R _G =18Ω	-	6	-	ns
上升时间 Turn-On rise time	t _r		-	26	-	ns
延迟时间 Turn-Off delay time	t _{d(off)}		-	52	-	ns
下降时间 Turn-Off Fall time	t _f		-	28	-	ns

栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =15V ,I _D =19A V _{GS} =0-10V	-	9.6	14	nC
栅—源电荷 Gate-Source charge	Q _{gs}		-	3.4	-	nC
栅—漏电荷 Gate-Drain charge	Q _{gd}		-	3.4	-	nC
漏—源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings						
正向最大连续电流 Maximum Continuous Drain	IS		-	-	60	A
正向最大脉冲电流 Maximum Pulsed Drain-Source	ISM		-	-	120	A
正向压降 Drain-Source Diode Forward	VFSD	VGS=0V,I _S =19A	-	-	1.25	V
反向恢复时间 Reverse recovery time	trr	VGS=0V, IS=9A dIF/dt=100A/μs	-	58	-	ns

热特性 Thermal Characteristics

项 目 Parameter	符 号 Symbol	最大 Max	单 位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	1.65	$^{\circ}C/W$

注释:

1: 脉冲宽度由最高结温限制

Pulse width limited by maximum junction temperature

2: $L=14.5mH, I_{AS}=19A, V_{DD}=25V, R_G=25\Omega$,
起始结温 $T_J=25^{\circ}C$ $L=14.5mH, I_{AS}=19A, V_{DD}=25V, R_G=25\Omega$, Starting $T_J=25^{\circ}C$ 3: $I_{SD} \leq 19A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$,
起始结温 $T_J=25^{\circ}C$ $I_{SD} \leq 19A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$, Starting $T_J=25^{\circ}C$ 4: 脉冲测试: 脉冲宽度 $\leq 300\mu s$, 占空比 $\leq 2\%$ Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycles $\leq 2\%$

5: 基本与工作温度无关

Essentially independent of operating temperature

特征曲线 Typical Characteristics (curves)

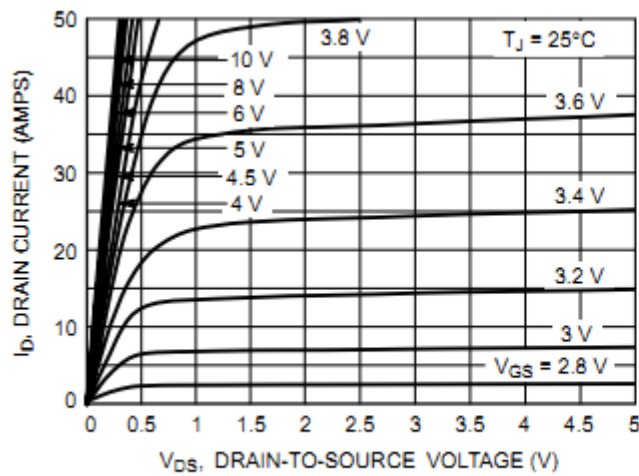


Figure 1. On-Region Characteristics

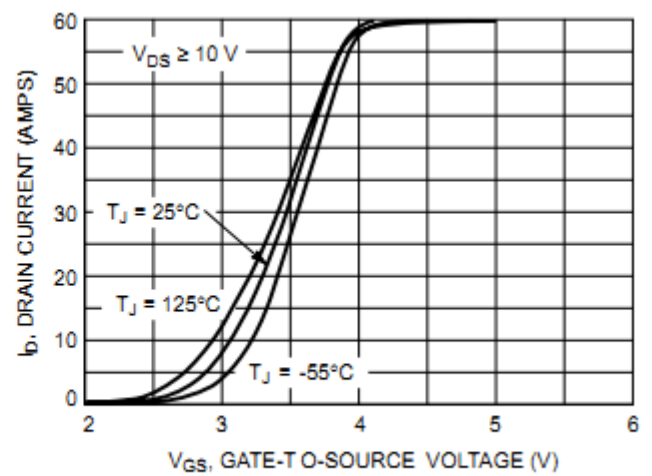


Figure 2. Transfer Characteristics

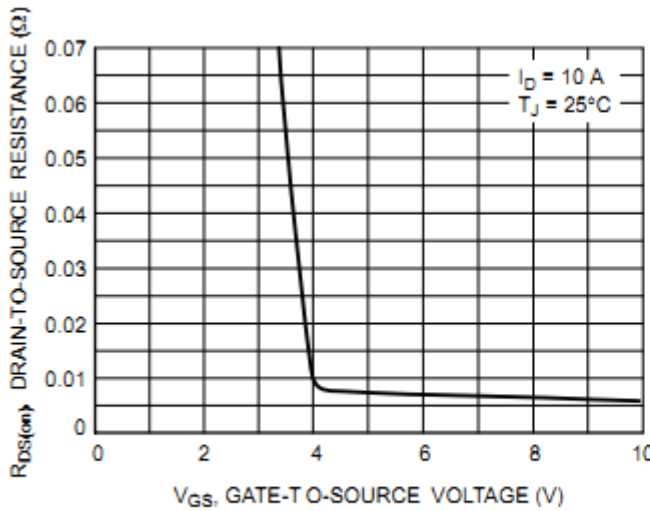


Figure 3. On-Resistance versus Gate-to-Source Voltage

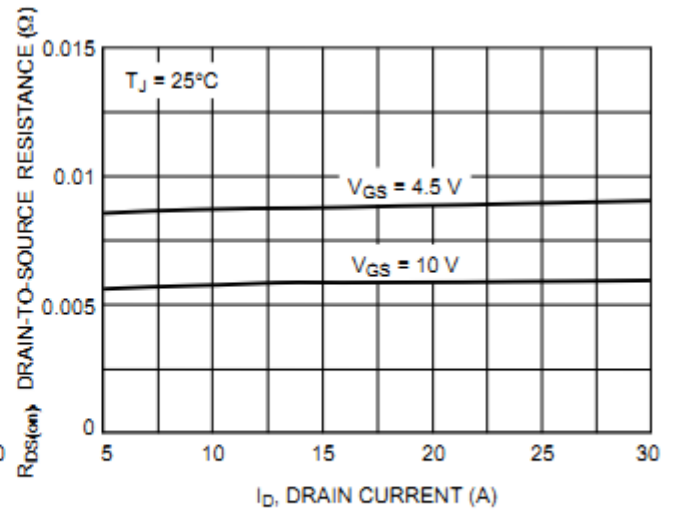


Figure 4. On-Resistance versus Drain Current and Gate Voltage

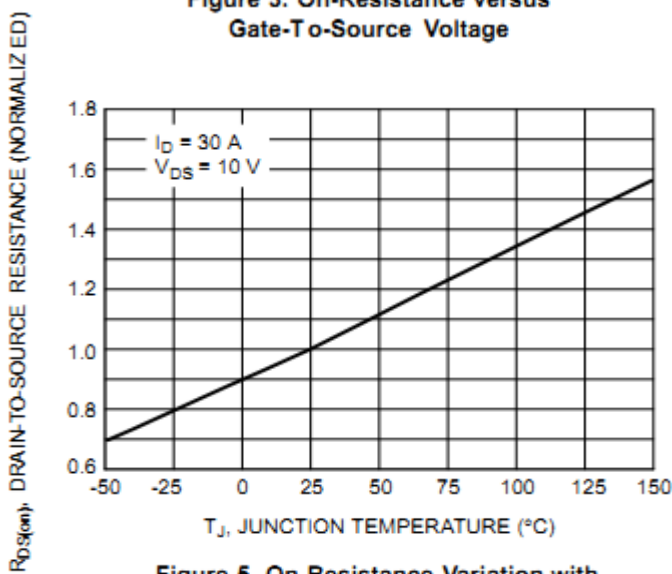


Figure 5. On-Resistance Variation with Temperature

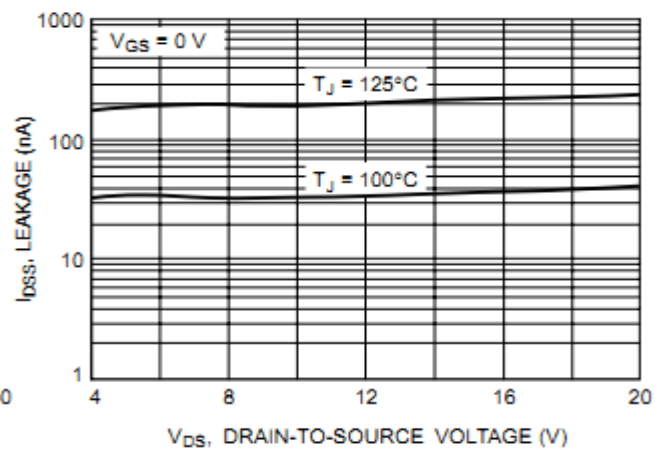


Figure 6. Drain-to-Source Leakage Current versus Voltage

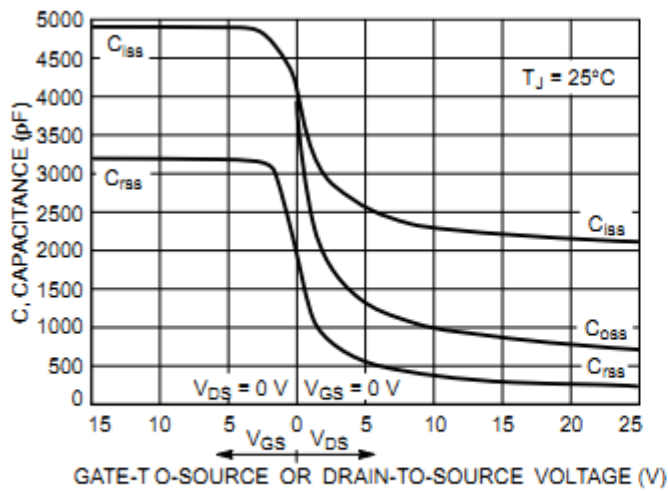


Figure 7. Capacitance Variation

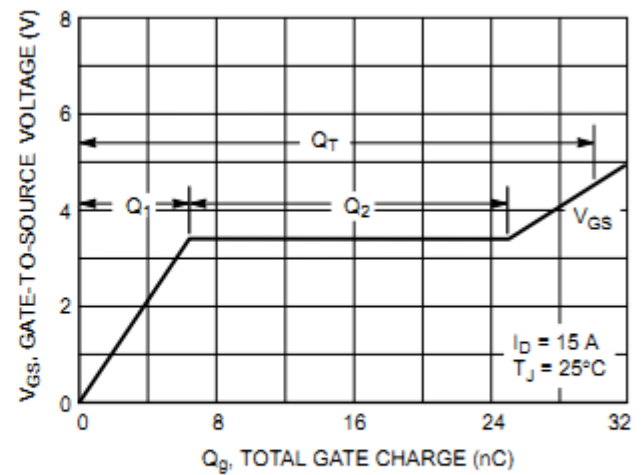


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

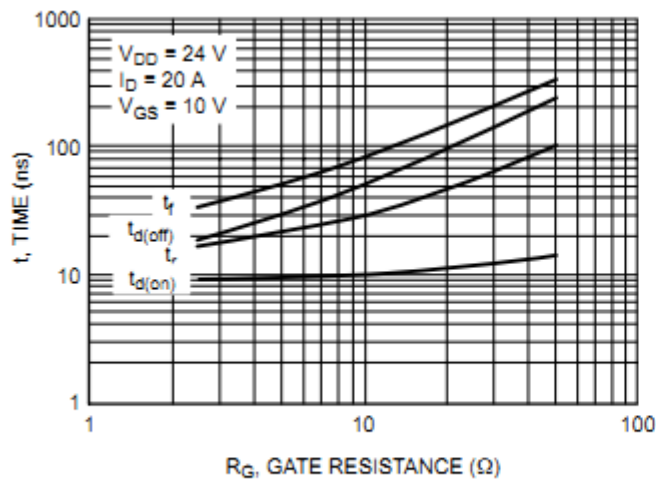


Figure 9. Resistive Switching Time Variation versus Gate Resistance

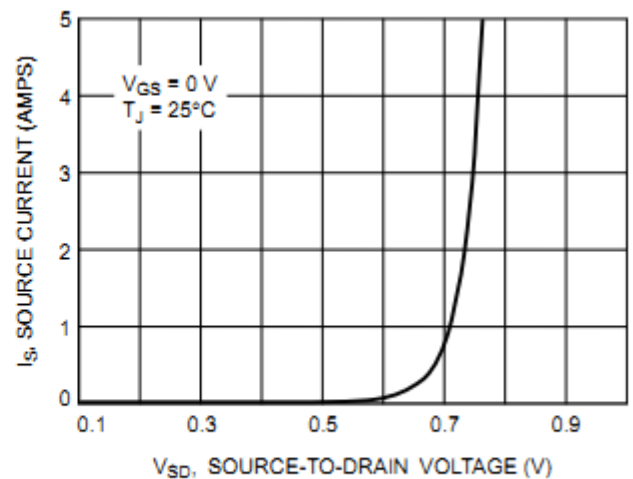


Figure 10. Diode Forward Voltage versus Current

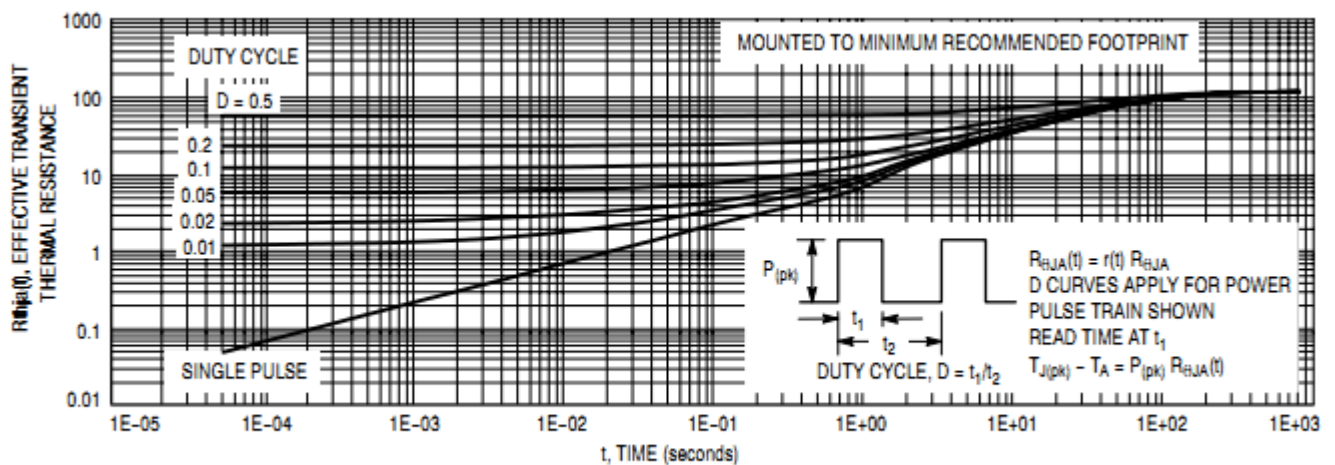


Figure 11. Thermal Response - Various Duty Cycles