



40N60

主要参数 MAIN CHARACTERISTICS

Id	40A
Vdss	600V
Rdson (Vgs=10V)	138mΩ

用途

- 负载开关
- 脉宽调制
- 电源管理

APPLICATIONS

- Load Switch
- PWM Application
- Power Management

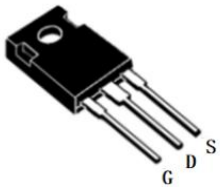
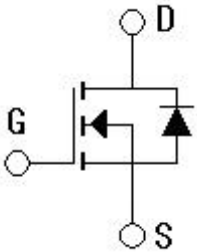
产品特性

- 先进沟槽技术
- 符合环保标准
- 产品无卤素
- 湿敏等级3级

FEATURES

- Advanced Trench Technology
- RoHS and Reach Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

封装 Package



TO-247

产品中有害有毒物质或元素的名称及含量

部件名称	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}	600	V
连续漏极电流 Drain Current-continuous	I_D $T=25^{\circ}\text{C}$ $T=100^{\circ}\text{C}$	40 24	A
最大脉冲漏极电流 Drain Current – pulse ^{Note 1}	I_{DM}	160	A
最高栅源电压 Gate-Source Voltage	V_{GS}	± 30	V
单脉冲雪崩能量 Single Pulsed Avalanche Energy ^{Note 1}	E_{AS}	1180	mJ
耗散功率 Power Dissipation	P_D $T_c=25^{\circ}\text{C}$	400	W
最高结温及存储温度 Operating and Storage Temperature Range	T_J, T_{STG}	$-55\sim+150$	$^{\circ}\text{C}$

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}	$I_D=250\mu A, V_{GS}=0V, T_J=25^\circ C$	600	-	-	V
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V, T_C=25^\circ C$	-	-	10	μA
正向栅极体漏电流 Gate-body leakage current, forward	I_{GSSF}	$V_{DS}=0V, V_{GS}=30V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GSSR}	$V_{DS}=0V, V_{GS}=-30V$	-	-	-100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	2.1	-	4.1	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	-	138	157	m Ω
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{iss}	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1MHz$	-	6.5	-	nF
输出电容 Output capacitance	C_{oss}		-	639	-	pF
反向传输电容 Reverse transfer capacitance	C_{rss}		-	50	-	pF

电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{DD}=300V, I_D=20A, R_G=25\Omega$ $V_{GS}=10V$	-	30	-	ns
上升时间 Turn-On rise time	t_r		-	25	-	ns
延迟时间 Turn-Off delay time	$t_{d(off)}$		-	85	-	ns
下降时间 Turn-Off Fall time	t_f		-	21	-	ns
栅极电荷总量 Total Gate Charge	Q_g	$V_{DS}=300V,$ $I_D=20A$ $V_{GS}=10V$	-	139	-	nC
栅-源电荷 Gate-Source charge	Q_{gs}		-	31	-	nC
栅-漏电荷 Gate-Drain charge	Q_{gd}		-	55	-	nC
栅极电阻 Gate Resistance	R_g	$f=1MHz$	-	0.8	-	Ω
漏-源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings						
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=40A$	-	-	1.4	V
反向恢复时间 Reverse Recovery Time	T_{RR}	$V_{GS}=0V, I_S=20A,$ $di_F/dt=100A/\mu s$	-	620	-	ns
反向恢复电荷 Reverse Recovery Charge	Q_{RR}		-	14	-	μC

热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符号 Symbol	值 Value	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	0.31	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction-to-Ambient	$R_{th(j-A)}$	40	$^{\circ}C/W$

NOTES:

1. L = 1mH, VDD = 50V, RG=25 Ω , Starting at TJ = 25 $^{\circ}C$

特征曲线 ELECTRICAL CHARACTERISTICS

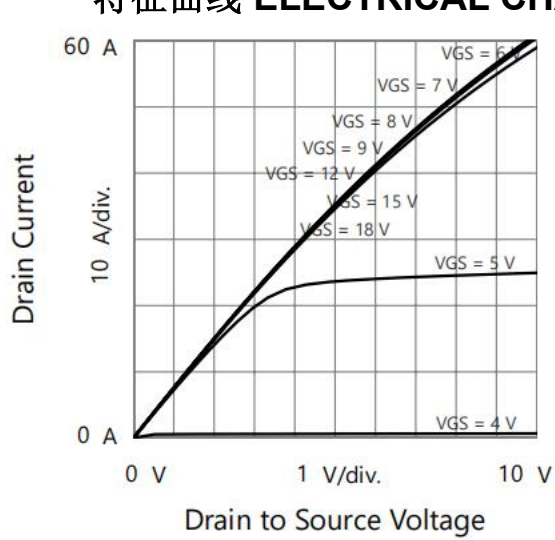
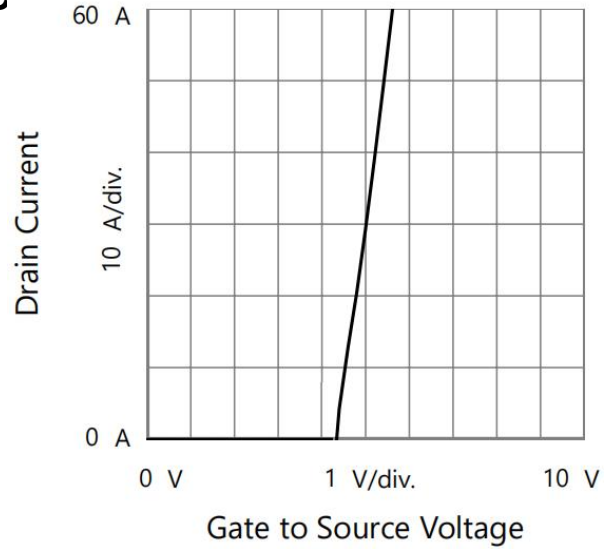
Fig1. Output characteristics $T_J = 25^\circ\text{C}$ 

Fig2. Transfer characteristics

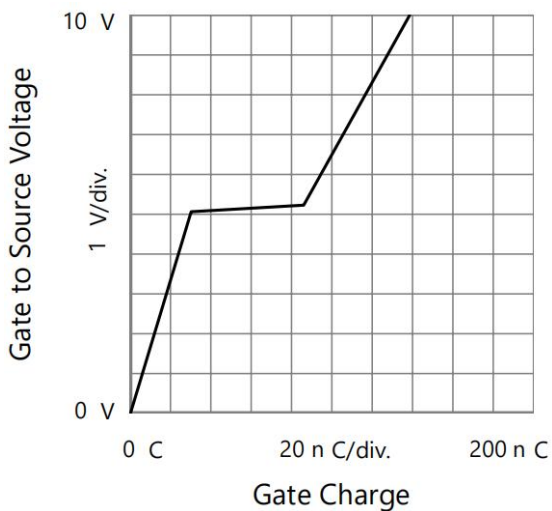


Fig3. Gate charge characteristics

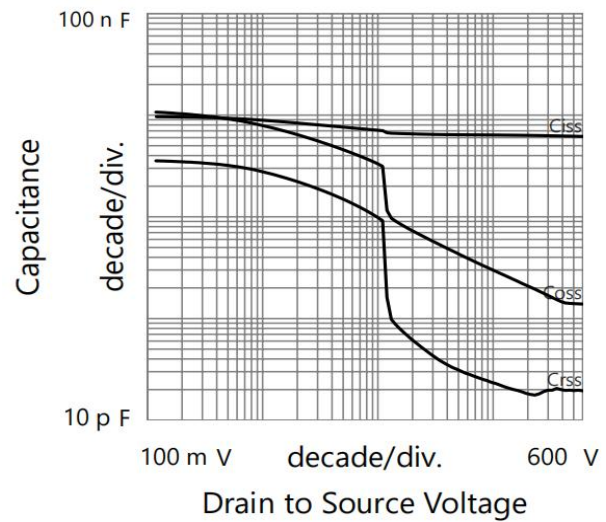
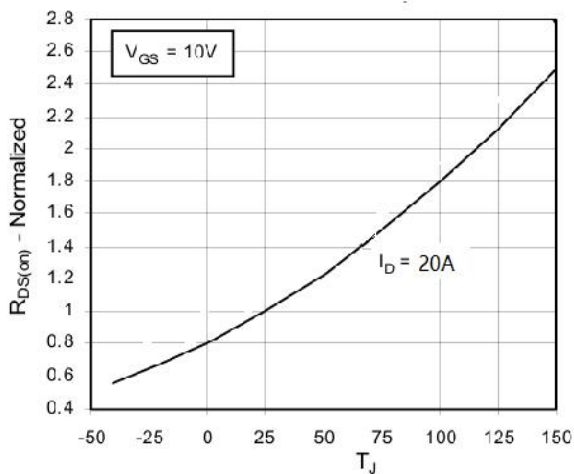
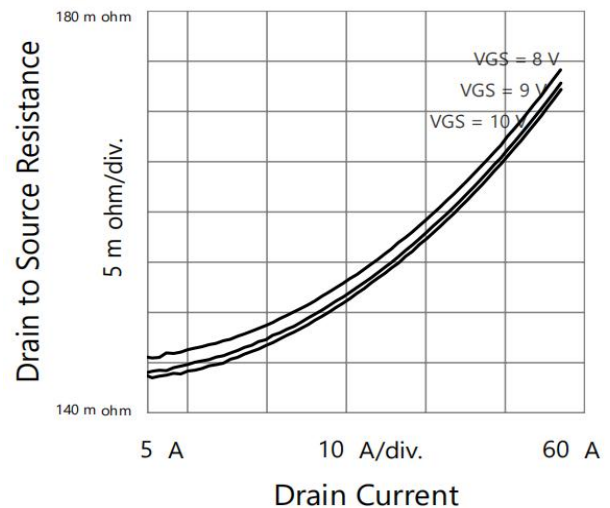


Fig 4. Capacitance Characteristics

Fig 5. $R_{DS(on)}$ vs junction temperatureFig 6. I_D VS $R_{DS(on)}$

特征曲线 ELECTRICAL CHARACTERISTICS

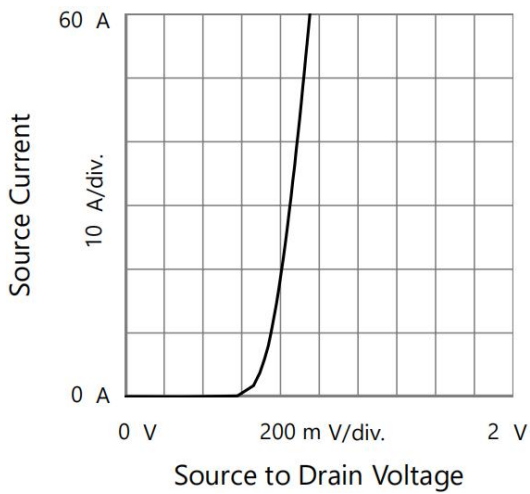


Fig 7 . Forward characteristics of reverse diode

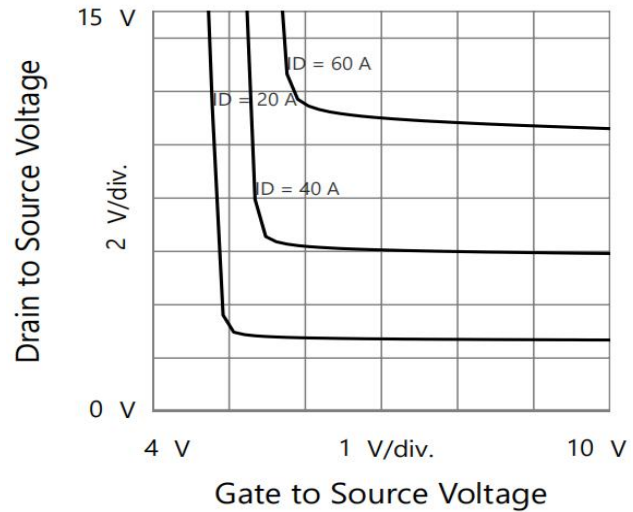


Fig 8 .Drain to Source Voltage vs. Gate to Source Voltage

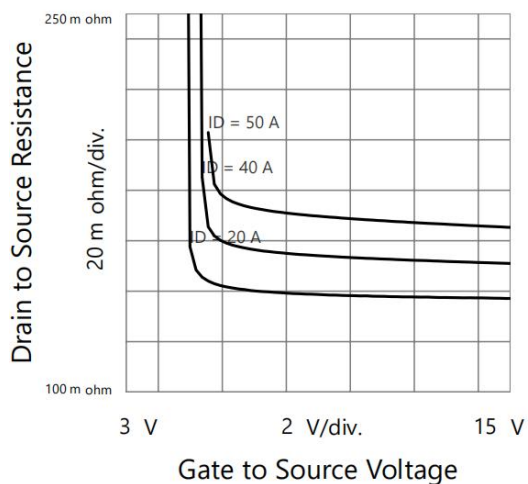


Fig 9 .Drain to Source Resistance vs. Gate to Source Voltage

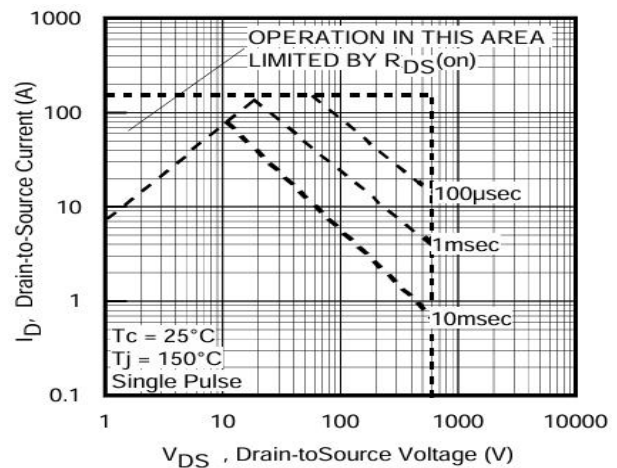


Fig 10 .Safe operating area

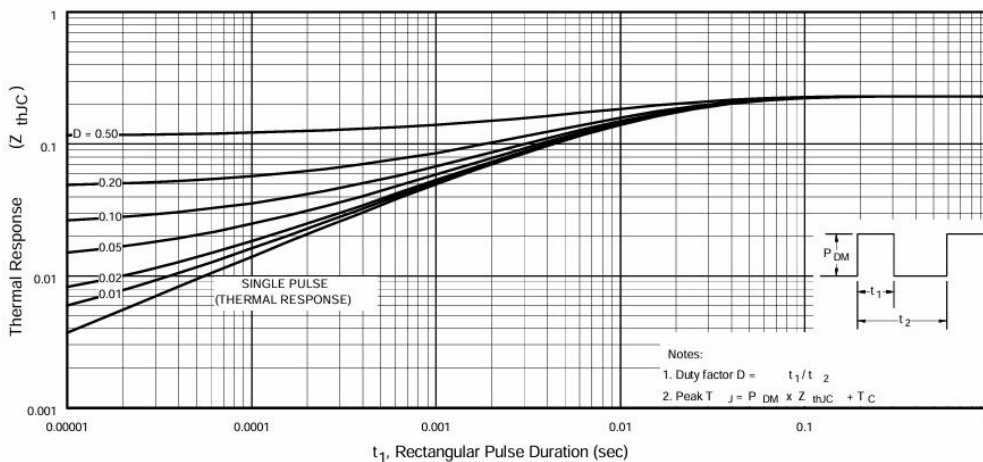
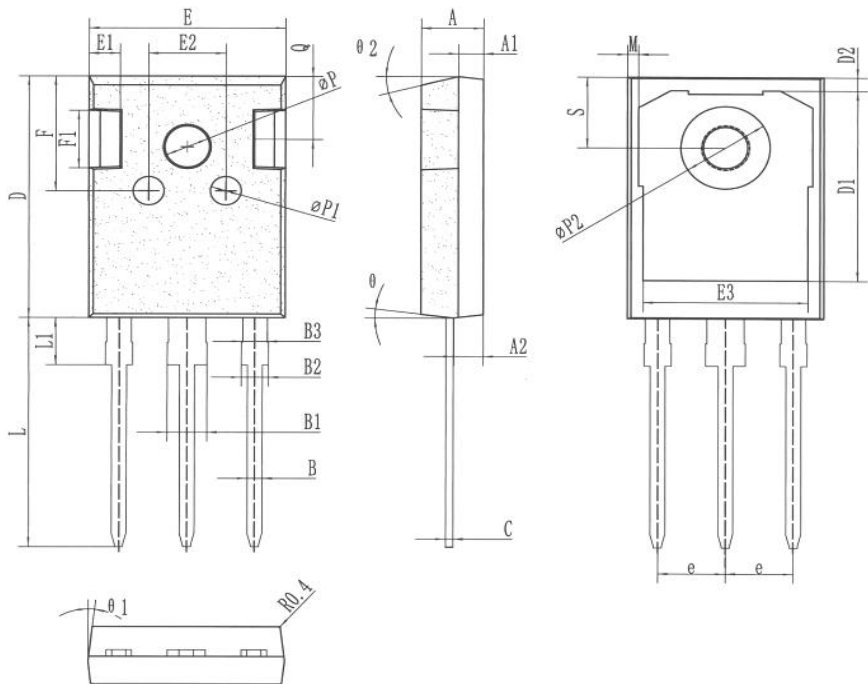


Fig 11 .Transient thermal impedance

外形尺寸 PACKAGE MECHANICAL DATA
TO-247



COMMON DIMENSIONS			
SYMBOL	MM		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	1.90	2.00	2.10
A2	2.30	2.40	2.50
B	1.15	1.20	1.25
B1	3.05	3.15	3.25
B2	2.00	2.10	2.20
B3	1.90	2.00	2.10
C	0.55	0.60	0.65
D	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.02	1.17	1.32
E	15.70	15.80	15.90
E1	2.40	2.50	2.60
E2	6.10	6.20	6.30
E3	13.10	13.30	13.50
F	9.80	10.00	10.20
F1	4.90	5.00	5.10
e	5.44 BSC		
L	19.72	19.92	20.12
L1	3.90	4.10	4.30
φP	3.50	3.60	3.70
φP1	2.40	2.50	2.60
φP2	7.10	7.20	7.30
S	6.05	6.15	6.25
M	0.45	—	0.95
Q	5.60	5.80	6.00
θ	5°	7°	9°
θ 1	5°	7°	9°
θ 2	13°	15°	17°