



MP4N60ER

主要参数MAIN CHARACTERISTICS

ID	4A
VDSS	640V
Rdson-max (Vgs=10V)	2.8Ω
Qg-Typ	13nC

用途

- 高频开关电源
- 电子镇流器
- LED 电源

产品特性

- 低栅极电荷
- 开关速度快
- 产品全部经过雪崩测试
- 高抗 dv/dt 能力
- RoHS 产品

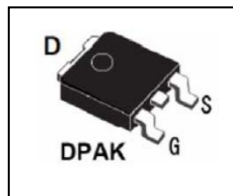
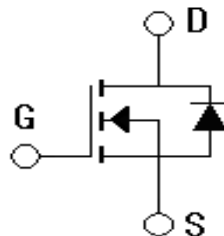
APPLICATIONS

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge LED power supplies

FEATURES

- Low gate charge
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

封装 Package



订货信息 ORDER MESSAGE

订货型号 Order codes				印记 Marking	封装 Package
有卤-条管 Halogen-Tube	无卤-条管 Halogen-Free-Tube	有卤-编带 Halogen-Reel	无卤-编带 Halogen-Free-Reel		
N/A	MP4N60ER-R-BR	N/A	MP4N60ER-R-AR	MP4N60ER	DPAK



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}	640	V
连续漏极电流 Drain Current-continuous	I_D $T=25^{\circ}\text{C}$ $T=100^{\circ}\text{C}$	4	A
		2.4	A
最大脉冲漏极电流 (注 1) Drain Current - pulse (note 1)	I_{DM}	16	A
最高栅源电压 Gate-Source Voltage	V_{GS}	± 30	V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	E_{AS}	20	mJ
耗散功率 Power Dissipation	P_D $T_c=25^{\circ}\text{C}$ -Derate above 25°C	120	W
		0.96	W/ $^{\circ}\text{C}$
最高结温及存储温度 Operating and Storage Temperature Range	T_J, T_{STG}	150; $-55 \sim +150$	$^{\circ}\text{C}$
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}	$I_D=250\ \mu A$, $V_{GS}=0V$	640	—	—	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\ \mu A$, referenced to $25^\circ C$	—	0.6	—	V/ $^\circ C$
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=600V$, $V_{GS}=0V$, $T_C=25^\circ C$	—	—	1	μA
		$V_{DS}=480V$, $V_{GS}=0V$, $T_C=125^\circ C$	—	—	100	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	—	4	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V$, $I_D=2.0A$ $25^\circ C$	—	2.4	2.8	Ω
正向跨导 Forward Transconductance	g_{fs}	$V_{DS}=40V$, $I_D=2.0A$ (note 4)	—	7.2	—	S
动态特性 Dynamic Characteristics						
栅极电阻 Gate resistance	R_g	$F=1.0MHz$ open drain	1.5	2.3	3.5	Ω
输入电容 Input capacitance	C_{iss}	$V_{DS}=25V$, $V_{GS}=0V$, $f=1.0MHz$	—	520	—	pF
输出电容 Output capacitance	C_{oss}		—	60	—	pF
反向传输电容 Reverse transfer capacitance	C_{rss}		—	3	—	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 =4A, R _G =25Ω (note 4, 5)	—	10	—	ns
上升时间 Turn-On rise time	t _r		—	23.6	—	ns
延迟时间 Turn-Off delay time	t _d (off)		—	31.8	—	ns
下降时间 Turn-Off Fall time	t _f		—	25.4	—	ns
栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =480V ,	—	13	—	nC
栅—源电荷 Gate-Source charge	Q _{gs}	I _D =4A	—	4.2	—	nC
栅—漏电荷 Gate-Drain charge	Q _{gd}	V _{GS} =10V (note 4, 5)	—	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 —Source Diode Forward Current	I _S		—	—	4	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}		—	—	16	A
正向压降 Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =4A	—	—	1.40	V
反向恢复时间 Reverse recovery time	t _{rr}	V _{GS} =0V, I _S =4A	—	54.6	—	ns
反向恢复电荷 Reverse recovery charge	Q _{rr}	dI _F /dt=100A/ μ s (note 4)	—	55	—	nC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	数值 Value	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	1	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	103	$^{\circ}C/W$

注释:

- 1: 脉冲宽度由最高结温限制
- 2: $L=0.5mH, I_{AS}=9A, V_{DD}=50V, R_G=25\Omega$, 起始结温 $T_J=25^{\circ}C$
- 3: $I_{SD} \leq 20A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$, 起始结温 $T_J=25^{\circ}C$
- 4: 脉冲测试: 脉冲宽度 $\leq 300\mu s$, 占空比 $\leq 2\%$
- 5: 基本与工作温度无关

Notes:

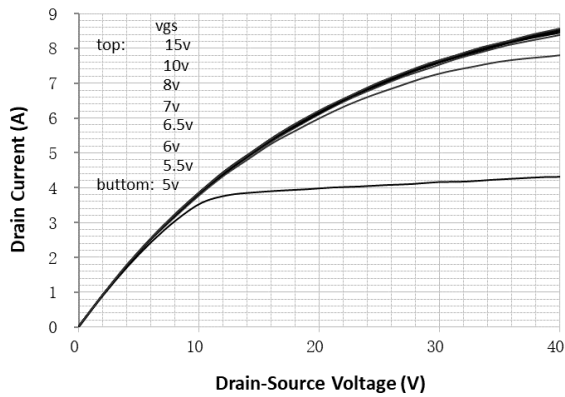
- 1: Pulse width limited by maximum junction temperature
- 2: $L=0.5mH, I_{AS}=9A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^{\circ}C$
- 3: $I_{SD} \leq 20A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$, Starting $T_J=25^{\circ}C$
- 4: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$



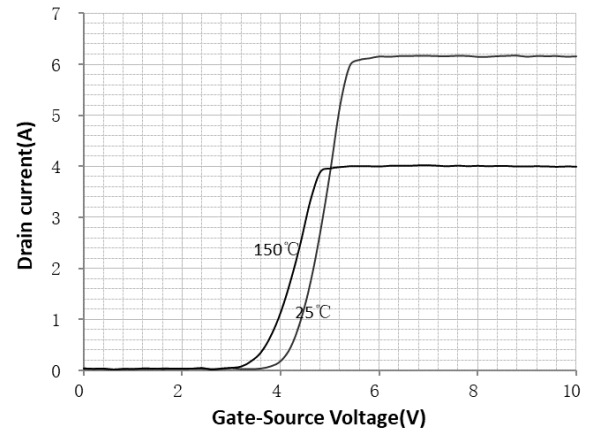


特征曲线ELECTRICAL CHARACTERISTICS (curves)

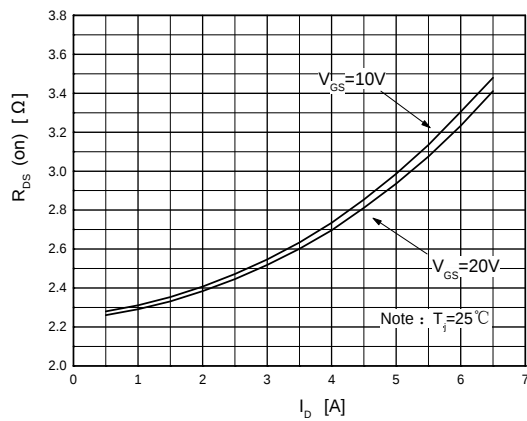
On-Region Characteristics



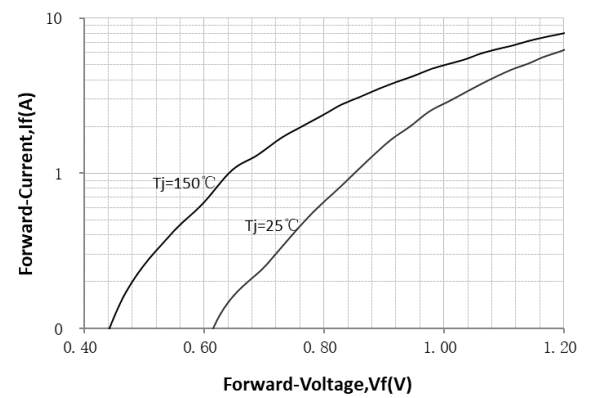
Transfer Characteristics



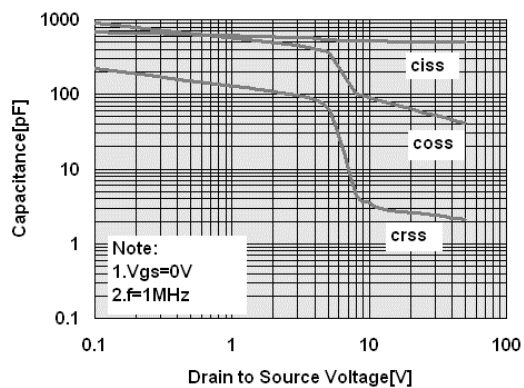
On-Resistance Variation vs. Drain Current and Gate Voltage



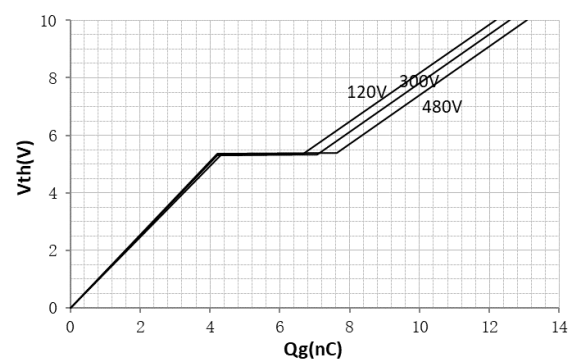
Body Diode Forward Voltage Variation vs. Source Current



Capacitance Characteristics

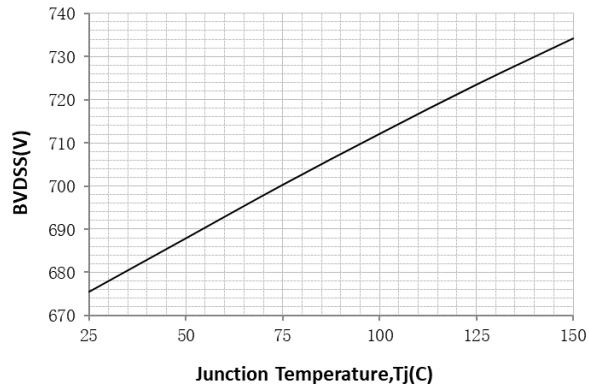
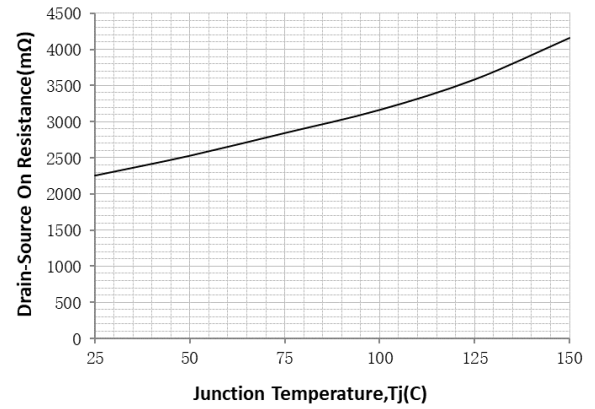
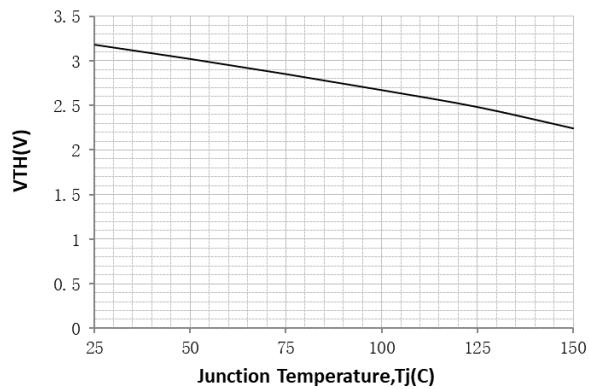
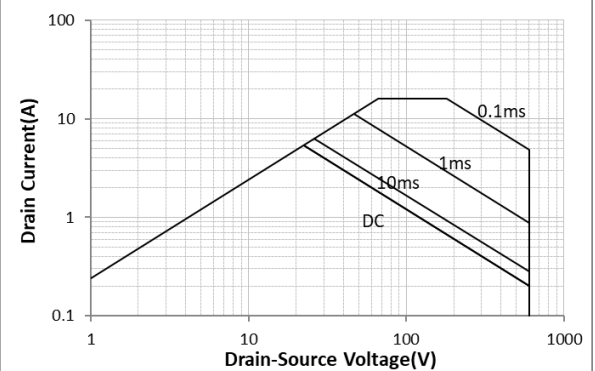
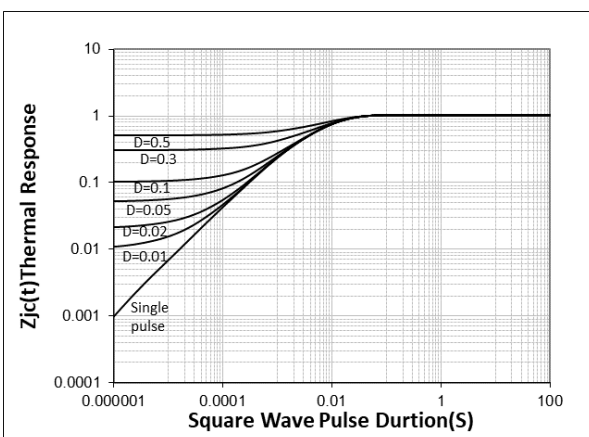


Gate Charge Characteristics





特征曲线ELECTRICAL CHARACTERISTICS (curves)

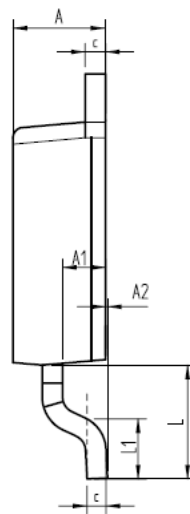
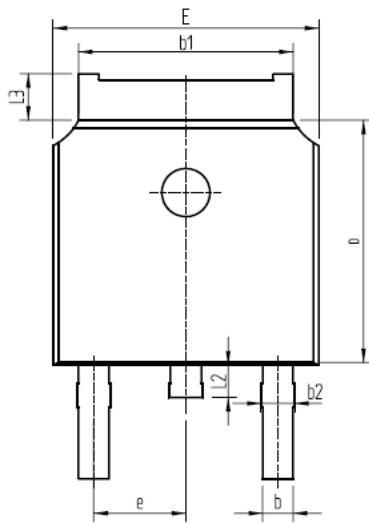
Breakdown Voltage Variation
vs. TemperatureOn-Resistance Variation
vs. Temperature V_{TH}
vs. TemperatureMaximum Safe Operating Area
For MP4N60ERTransient Thermal Response Curve
For MP4N60ER



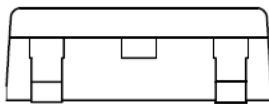
外形尺寸 PACKAGE MECHANICAL DATA

DPAK

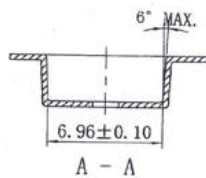
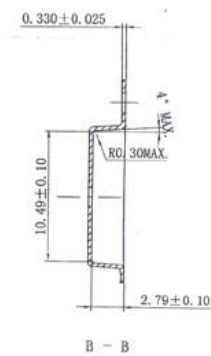
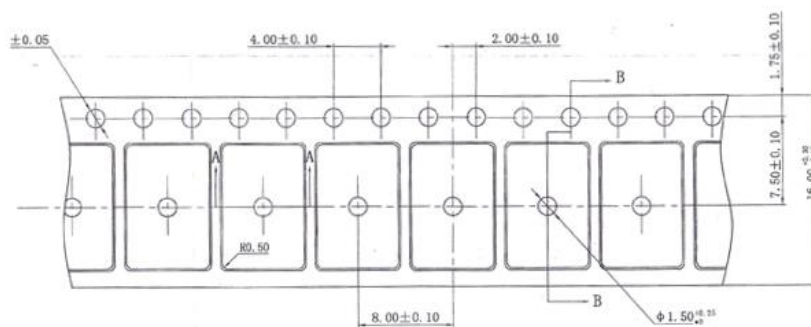
单位 Unit: mm



SYMBOL	mm	
	MIN	MAX
A	2.16	2.41
A1	0.97	1.17
A2	0.00	0.15
b	0.63	0.93
b1	5.13	5.53
b2	0.66	0.96
c	0.40	0.60
D	5.80	6.40
E	6.30	6.90
e	2.286BSC	
L	2.50	3.30
L1	1.20	1.80
L2	0.60	1.00
L3	0.85	1.30



编带 REEL





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