

SOP-8 N+P Dual Enhancement 双沟道增强型 MOS Field Effect Transistor 场效应管

■Features 特点

Low on-resistance 低导通电阻

N: $R_{DS(ON)}=33m\Omega(\text{Type})@V_{GS}=10V$

$R_{DS(ON)}=42m\Omega(\text{Type})@V_{GS}=4.5V$

P: $R_{DS(ON)}=75m\Omega(\text{Type})@V_{GS}=-10V$

$R_{DS(ON)}=85m\Omega(\text{Type})@V_{GS}=-4.5V$

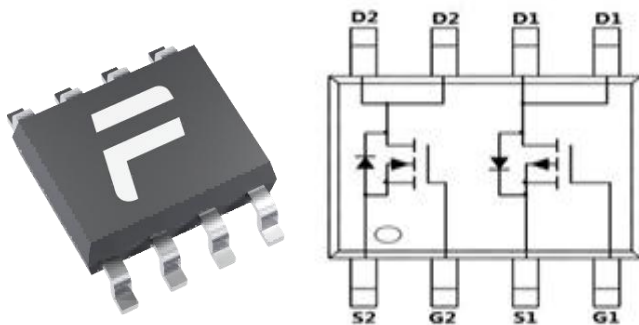
■Applications 应用

Motor Control 马达控制

Synchronous Rectification 同步整流

Fan Pre-drive H-bridge 风扇预驱动半桥

■Internal Schematic Diagram 内部结构



■Absolute Maximum Ratings 最大额定值

Characteristic 特性参数	Symbol 符号	N	P	Unit 单位
Drain-Source Voltage 漏极-源极电压	BV_{DSS}	60	-60	V
Gate- Source Voltage 栅极-源极电压	V_{GS}	± 20	± 20	V
Drain Current (continuous)漏极电流-连续	I_D (at $T_A = 25^\circ\text{C}$ at $T_A = 70^\circ\text{C}$)	4.5 3.6	-3.2 -2.5	A
Drain Current (pulsed)漏极电流-脉冲	I_{DM}	20	-20	A
Total Device Dissipation 总耗散功率	P_{TOT} (at $T_A = 25^\circ\text{C}$ at $T_A = 70^\circ\text{C}$)	2 1.3		W
Thermal Resistance Junction-Ambient 热阻	$R_{\theta JA}$	62.5		$^\circ\text{C}/\text{W}$
Avalanche Energy Single Pulse 雪崩能量	E_{AS}	25		mJ
Junction/Storage Temperature 结温/储存温度	T_J, T_{stg}	-55~150		$^\circ\text{C}$

■ N Electrical Characteristics 电特性

 (T_A=25℃ unless otherwise noted 如无特殊说明, 温度为 25℃)

Characteristic 特性参数	Symbol 符号	Min 最小值	Typ 典型值	Max 最大值	Unit 单位
Drain-Source Breakdown Voltage 漏极-源极击穿电压(I _D =250uA, V _{GS} =0V)	BV _{DSS}	60	—	—	V
Gate Threshold Voltage 栅极开启电压(I _D =250uA, V _{GS} =V _{DS})	V _{GS(th)}	1.0	1.3	2.0	V
Zero Gate Voltage Drain Current 零栅压漏极电流(V _{GS} =0V, V _{DS} =60V)	I _{DSS}	—	—	1	uA
Gate Body Leakage 栅极漏电流(V _{GS} =±20V, V _{DS} =0V)	I _{GSS}	—	—	±100	nA
Static Drain-Source On-State Resistance 静态漏源导通电阻(I _D =4.5A, V _{GS} =10V) (I _D =3A, V _{GS} =4.5V)	R _{DS(ON)}	—	33 42	56 65	mΩ
Diode Forward Voltage Drop 内附二极管正向压降(I _{SD} =1A, V _{GS} =0V)	V _{SD}	—	0.74	1	V
Input Capacitance 输入电容 (V _{GS} =0V, V _{DS} =30V, f=1MHz)	C _{ISS}	—	450	—	pF
Common Source Output Capacitance 共源输出电容(V _{GS} =0V, V _{DS} =30V, f=1MHz)	C _{OSS}	—	60	—	pF
Reverse Transfer Capacitance 反馈电容 (V _{GS} =0V, V _{DS} =30V, f=1MHz)	C _{RSS}	—	25	—	pF
Total Gate Charge 栅极电荷密度 (V _{DS} =30V, I _D =4.5A, V _{GS} =10V)	Q _g	—	9	—	nC
Gate Source Charge 栅源电荷密度 (V _{DS} =30V, I _D =4.5A, V _{GS} =10V)	Q _{gs}	—	2	—	nC
Gate Drain Charge 栅漏电荷密度 (V _{DS} =30V, I _D =4.5A, V _{GS} =10V)	Q _{gd}	—	2	—	nC
Turn-ON Delay Time 开启延迟时间 (V _{DS} =30V I _D =1A, R _{GEN} =3Ω, V _{GS} =10V)	t _{d(on)}	—	5	—	ns
Turn-ON Rise Time 开启上升时间 (V _{DS} =30V I _D =1A, R _{GEN} =3Ω, V _{GS} =10V)	t _r	—	3	—	ns
Turn-OFF Delay Time 关断延迟时间 (V _{DS} =30V I _D =1A, R _{GEN} =3Ω, V _{GS} =10V)	t _{d(off)}	—	16	—	ns
Turn-OFF Fall Time 关断下降时间 (V _{DS} =30V I _D =1A, R _{GEN} =3Ω, V _{GS} =10V)	t _f	—	2	—	ns

■ P Electrical Characteristics 电特性

 (T_A=25℃ unless otherwise noted 如无特殊说明, 温度为 25℃)

Characteristic 特性参数	Symbol 符号	Min 最小值	Typ 典型值	Max 最大值	Unit 单位
Drain-Source Breakdown Voltage 漏极-源极击穿电压(I _D = -250uA, V _{GS} =0V)	BV _{DSS}	-60	—	—	V
Gate Threshold Voltage 栅极开启电压(I _D = -250uA, V _{GS} = V _{DS})	V _{GS(th)}	-1.0	-1.65	-3.0	V
Zero Gate Voltage Drain Current 零栅压漏极电流(V _{GS} =0V, V _{DS} = -60V)	I _{DSS}	—	—	-1	uA
Gate Body Leakage 栅极漏电流(V _{GS} =±20V, V _{DS} =0V)	I _{GSS}	—	—	±100	nA
Static Drain-Source On-State Resistance 静态漏源导通电阻(I _D = -3.2A, V _{GS} = -10V) (I _D = -2.8A, V _{GS} = -4.5V)	R _{DS(ON)}	—	75 85	95 105	mΩ
Diode Forward Voltage Drop 内附二极管正向压降(I _{SD} = -1A, V _{GS} =0V)	V _{SD}	—	-0.73	-1.0	V
Input Capacitance 输入电容 (V _{GS} =0V, V _{DS} = -30V, f=1MHz)	C _{ISS}	—	930	—	pF
Common Source Output Capacitance 共源输出电容(V _{GS} =0V, V _{DS} = -30V, f=1MHz)	C _{OSS}	—	85	—	pF
Reverse Transfer Capacitance 反馈电容 (V _{GS} =0V, V _{DS} = -30V, f=1MHz)	C _{RSS}	—	35	—	pF
Total Gate Charge 栅极电荷密度 (V _{DS} = -30V, I _D = -3.2A, V _{GS} = -10V)	Q _g	—	16	—	nC
Gate Source Charge 栅源电荷密度 (V _{DS} = -30V, I _D = -3.2A, V _{GS} = -10V)	Q _{gs}	—	2	—	nC
Gate Drain Charge 栅漏电荷密度 (V _{DS} = -30V, I _D = -3.2A, V _{GS} = -10V)	Q _{gd}	—	3	—	nC
Turn-ON Delay Time 开启延迟时间 (V _{DS} = -30V I _D = -1A, R _{GEN} =3Ω, V _{GS} = -10V)	t _{d(on)}	—	8	—	ns
Turn-ON Rise Time 开启上升时间 (V _{DS} = -30V I _D = -1A, R _{GEN} =3Ω, V _{GS} = -10V)	t _r	—	4	—	ns
Turn-OFF Delay Time 关断延迟时间 (V _{DS} = -30V I _D = -1A, R _{GEN} =3Ω, V _{GS} = -10V)	t _{d(off)}	—	32	—	ns
Turn-OFF Fall Time 关断下降时间 (V _{DS} = -30V I _D = -1A, R _{GEN} =3Ω, V _{GS} = -10V)	t _f	—	8	—	ns

■ N Typical Characteristic Curve 典型特性曲线

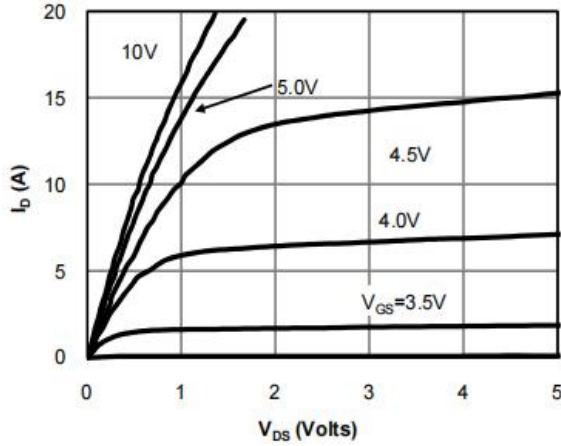


Figure 1: Output Characteristics

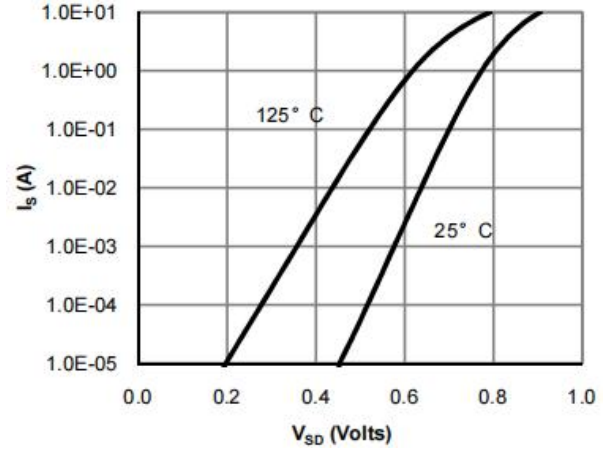


Figure 2: Diode Forward Characteristics

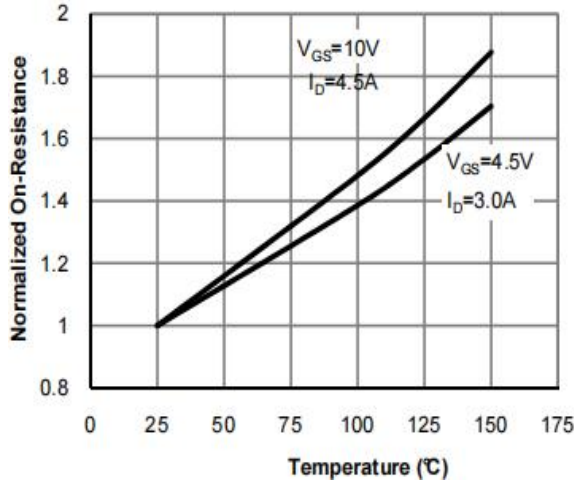


Figure 3: On-Resistance vs. T_J

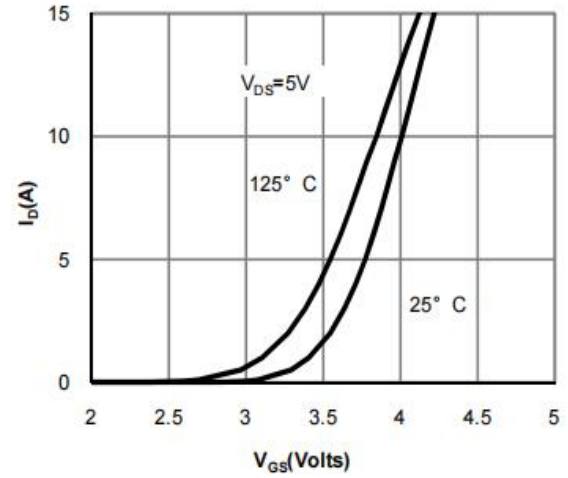


Figure 4: Transfer Characteristics

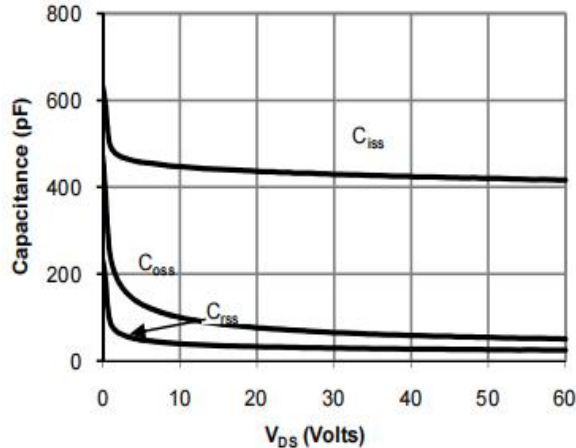


Figure 5: Capacitance Characteristics

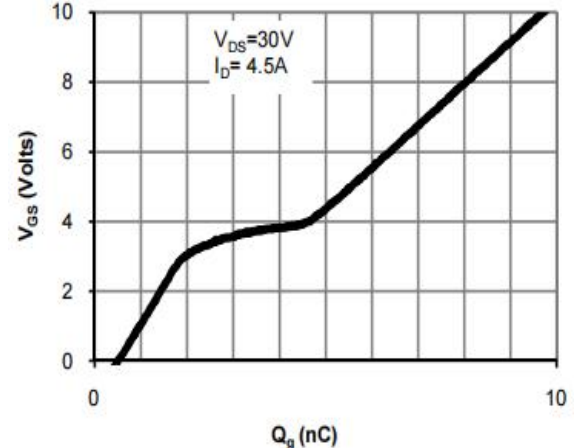


Figure 6: Gate-Charge Characteristics

■ N Typical Characteristic Curve 典型特性曲线

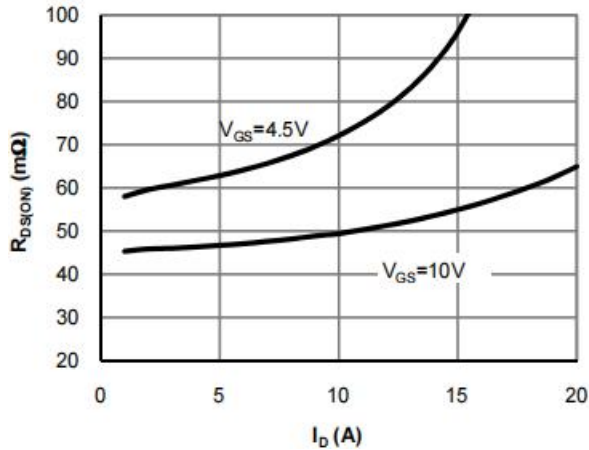


Figure 7: On-Resistance vs. Drain Current

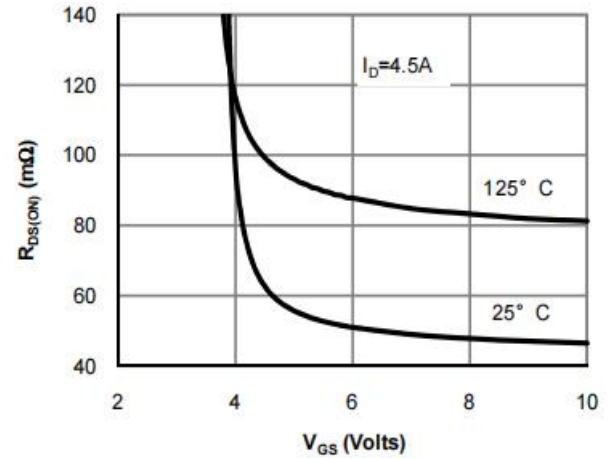


Figure 8: On-Resistance vs. V_{GS}

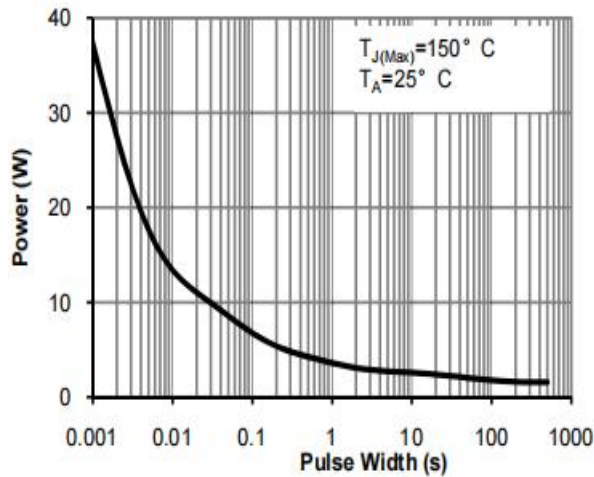


Figure 9: Power Rating Curve

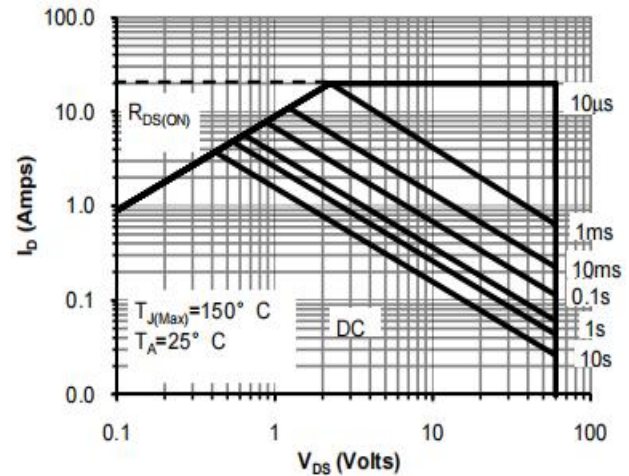


Figure 10: Safe Operating Area

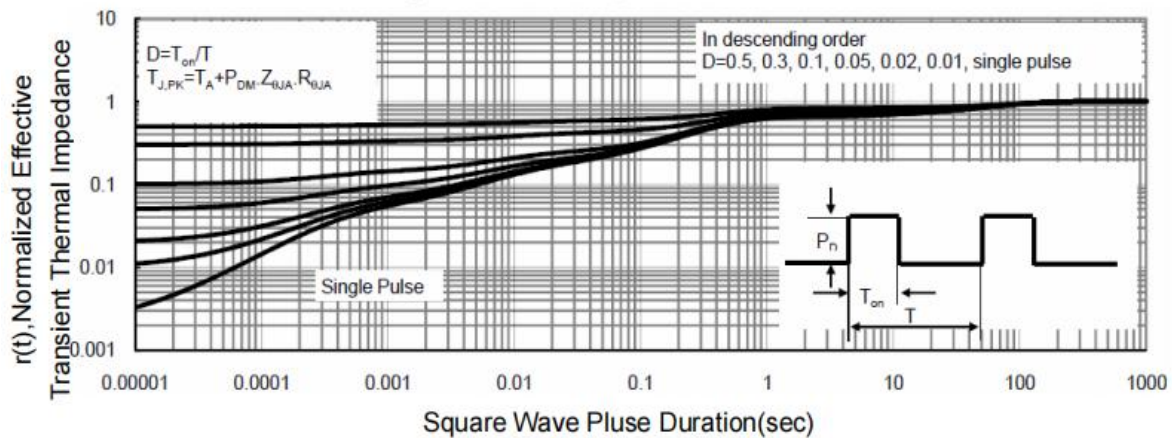


Figure 11: Transient Thermal Response Curve

■ P Typical Characteristic Curve 典型特性曲线

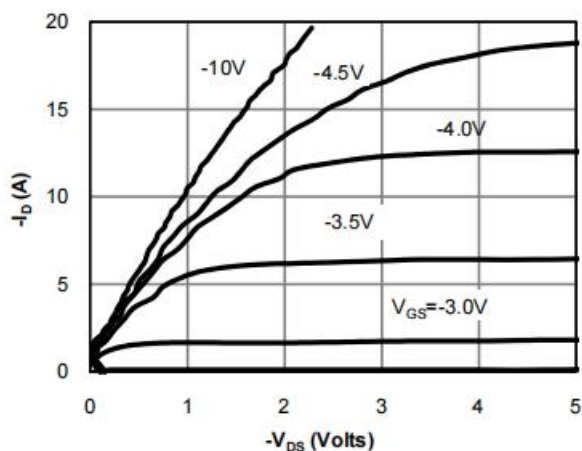


Figure 1: Output Characteristics

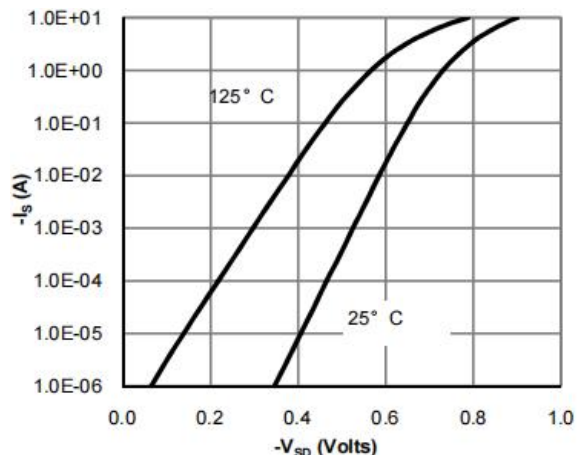


Figure 2: Diode Forward Characteristics

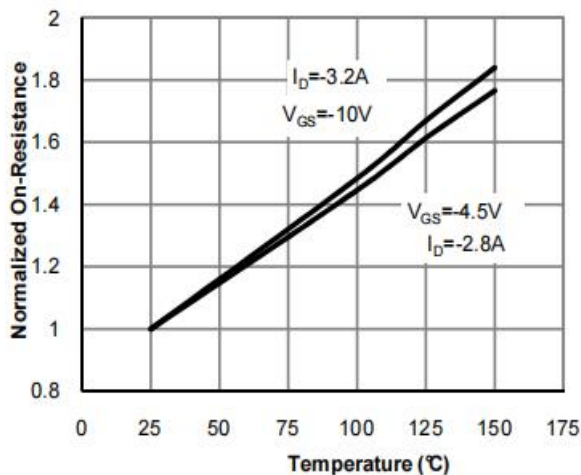


Figure 3: On-Resistance vs. T_J

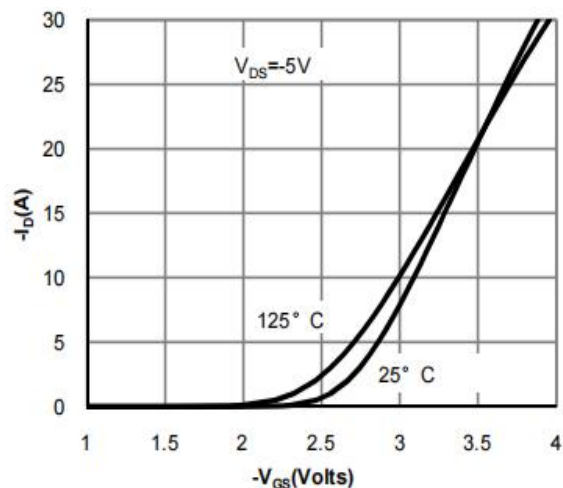


Figure 4: Transfer Characteristics

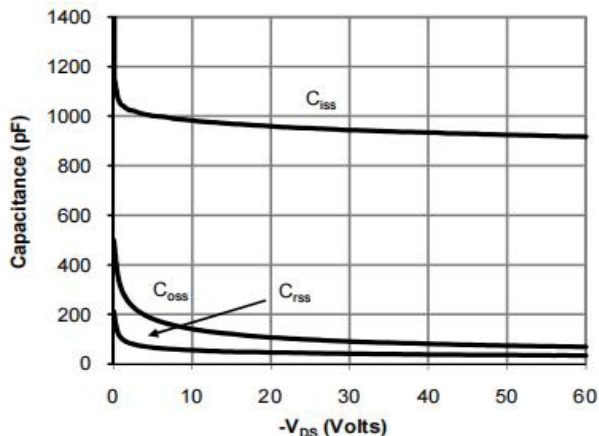


Figure 5: Capacitance Characteristics

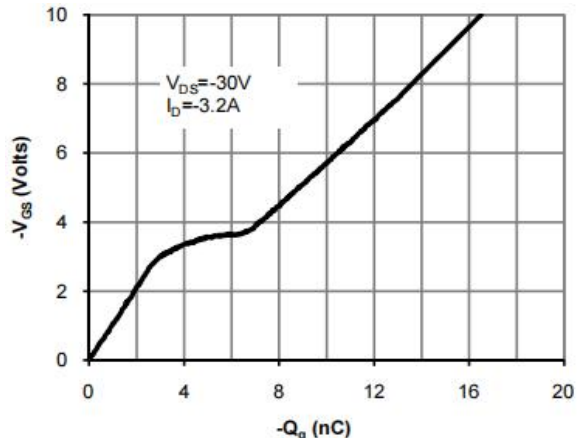


Figure 6: Gate-Charge Characteristics

■ P Typical Characteristic Curve 典型特性曲线

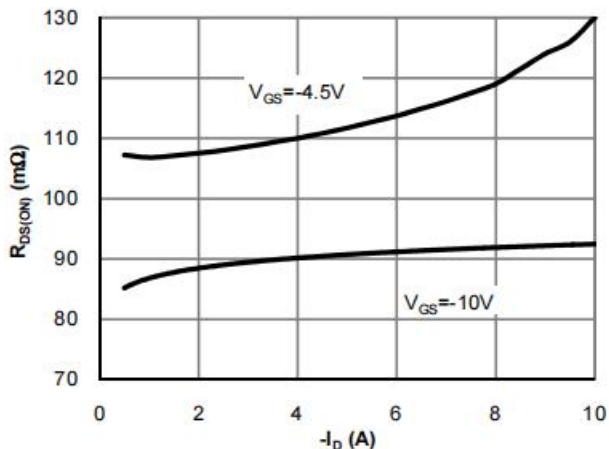


Figure 7: On-Resistance vs. Drain Current

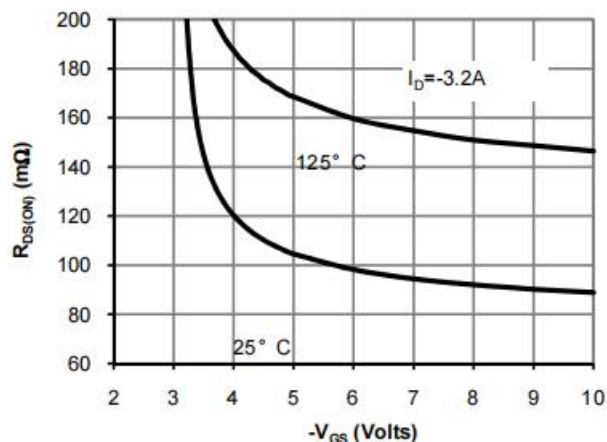


Figure 8: On-Resistance vs. V_{GS}

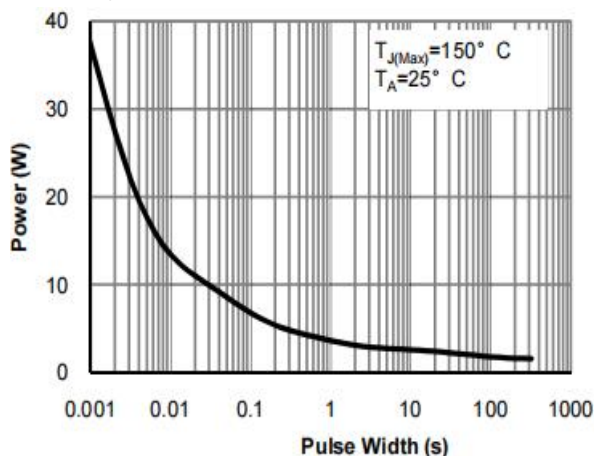


Figure 9: Power Rating Curve

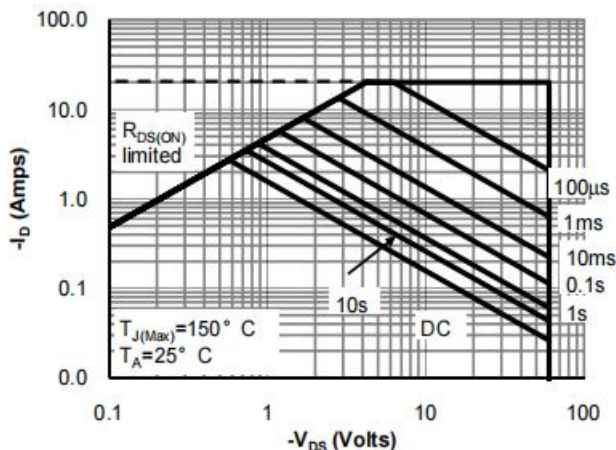


Figure 10: Safe Operating Area

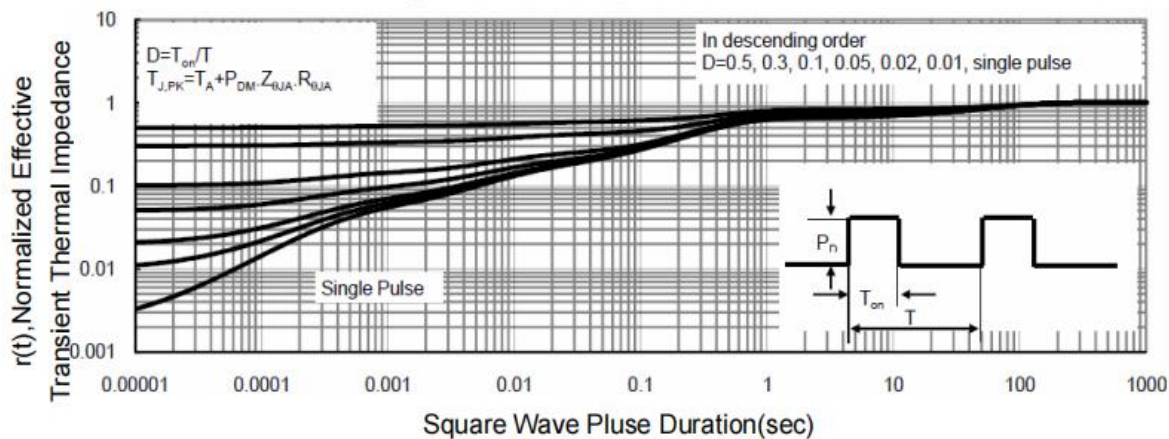
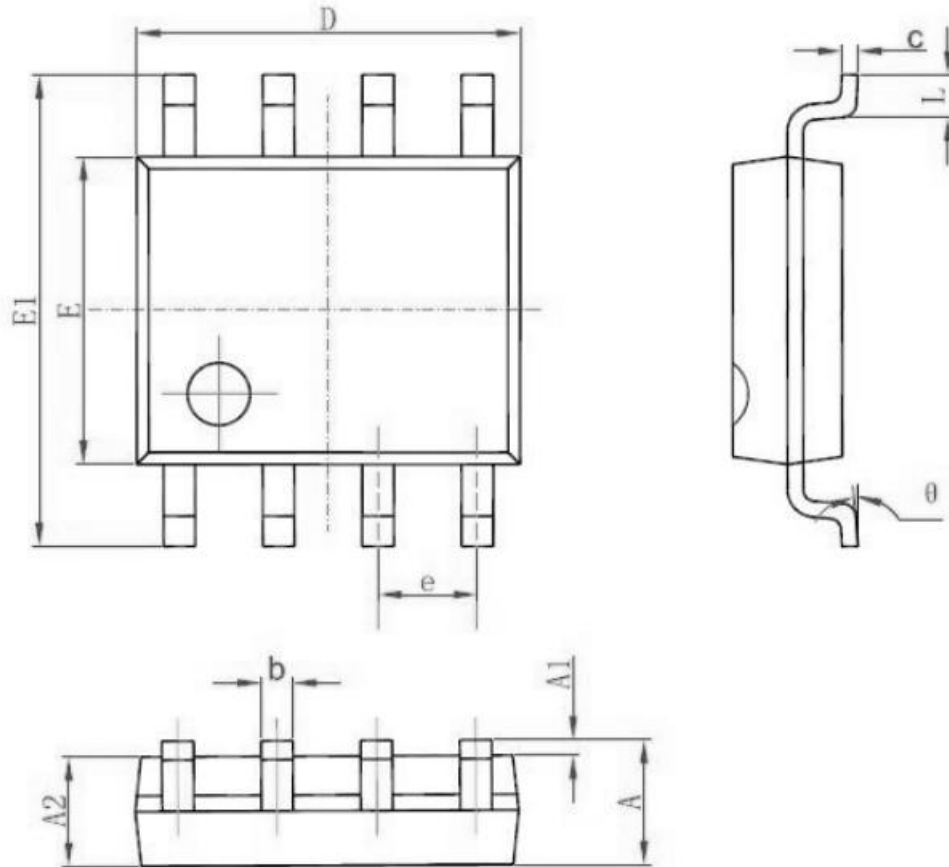


Figure 11: Transient Thermal Response Curve

■ **Dimension 外形封装尺寸**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°