

TO-252 N Channel Enhancement 沟道增强型 MOS Field Effect Transistor 场效应管

■Features 特点

Low on-resistance 低导通电阻

$R_{DS(ON)}=22m\Omega(\text{Type})@V_{GS}=10V$

$R_{DS(ON)}=28m\Omega(\text{Type})@V_{GS}=4.5V$

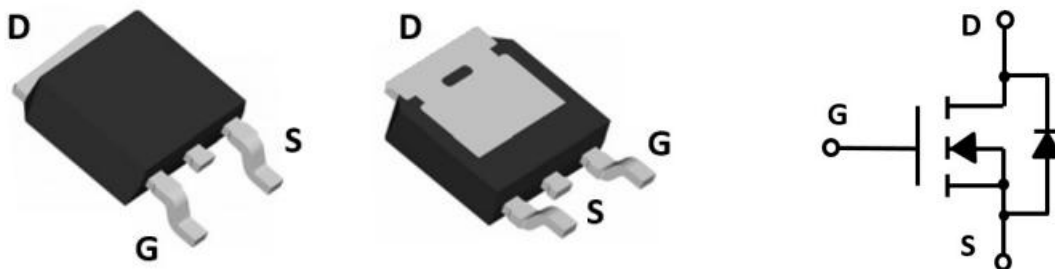
■Applications 应用

Motor Drive 马达驱动

DC-DC Conversion 升压转换

Power Management 电源管理

■Internal Schematic Diagram 内部结构



■Absolute Maximum Ratings 最大额定值

Characteristic 特性参数	Symbol 符号	Rat 额定值	Unit 单位
Drain-Source Voltage 漏极-源极电压	BV_{DSS}	60	V
Gate- Source Voltage 栅极-源极电压	V_{GS}	± 20	V
Drain Current (continuous)漏极电流-连续	I_D (at $T_C = 25^\circ C$ at $T_A = 25^\circ C$)	30 5.6	A
Drain Current (pulsed)漏极电流-脉冲	I_{DM}	46	A
Total Device Dissipation 总耗散功率	$P_{TOT}(\text{at } T_C = 25^\circ C$ at $T_A = 25^\circ C)$	34.7 2	W
Thermal Resistance Junction-Case 热阻	$R_{\theta JC}$	3.6	$^\circ C/W$
Thermal Resistance Junction-Ambient 热阻	$R_{\theta JA}$	62	$^\circ C/W$
Avalanche Energy Single Pulse 雪崩能量	E_{AS}	25.5	mJ
Junction/Storage Temperature 结温/储存温度	T_J, T_{stg}	-55~150	$^\circ C$

■ Electrical Characteristics 电特性

($T_A=25^{\circ}\text{C}$ unless otherwise noted 如无特殊说明, 温度为 25°C)

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($I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$)	BV_{DSS}	60	—	—	V
Gate Threshold Voltage 栅极开启电压($I_D=250\mu\text{A}$, $V_{GS}=V_{DS}$)	$V_{GS(th)}$	1.0	1.5	2.5	V
Zero Gate Voltage Drain Current 零栅压漏极电流($V_{GS}=0\text{V}$, $V_{DS}=48\text{V}$)	I_{DSS}	—	—	1	μA
Gate Body Leakage 栅极漏电流($V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$)	I_{GSS}	—	—	± 100	nA
Static Drain-Source On-State Resistance 静态漏源导通电阻($I_D=15\text{A}$, $V_{GS}=10\text{V}$) ($I_D=10\text{A}$, $V_{GS}=4.5\text{V}$)	$R_{DS(ON)}$	—	22 28	30 38	$\text{m}\Omega$
Diode Forward Voltage Drop 内附二极管正向压降($I_{SD}=15\text{A}$, $V_{GS}=0\text{V}$)	V_{SD}	—	—	1.2	V
Input Capacitance 输入电容 ($V_{GS}=0\text{V}$, $V_{DS}=30\text{V}$, $f=1\text{MHz}$)	C_{ISS}	—	1378	—	pF
Common Source Output Capacitance 共源输出电容($V_{GS}=0\text{V}$, $V_{DS}=30\text{V}$, $f=1\text{MHz}$)	C_{OSS}	—	86	—	pF
Reverse Transfer Capacitance 反馈电容($V_{GS}=0\text{V}$, $V_{DS}=30\text{V}$, $f=1\text{MHz}$)	C_{RSS}	—	64	—	pF
Total Gate Charge 栅极电荷密度 ($V_{DS}=48\text{V}$, $I_D=12\text{A}$, $V_{GS}=4.5\text{V}$)	Q_g	—	12.6	—	nC
Gate Source Charge 栅源电荷密度 ($V_{DS}=48\text{V}$, $I_D=12\text{A}$, $V_{GS}=4.5\text{V}$)	Q_{gs}	—	3.2	—	nC
Gate Drain Charge 栅漏电荷密度 ($V_{DS}=48\text{V}$, $I_D=12\text{A}$, $V_{GS}=4.5\text{V}$)	Q_{gd}	—	6.3	—	nC
Turn-ON Delay Time 开启延迟时间 ($V_{DS}=30\text{V}$ $I_D=10\text{A}$, $R_{GEN}=3.3\Omega$, $V_{GS}=10\text{V}$)	$t_{d(on)}$	—	8	—	ns
Turn-ON Rise Time 开启上升时间 ($V_{DS}=30\text{V}$ $I_D=10\text{A}$, $R_{GEN}=3.3\Omega$, $V_{GS}=10\text{V}$)	t_r	—	14.2	—	ns
Turn-OFF Delay Time 关断延迟时间 ($V_{DS}=30\text{V}$ $I_D=10\text{A}$, $R_{GEN}=3.3\Omega$, $V_{GS}=10\text{V}$)	$t_{d(off)}$	—	24.4	—	ns
Turn-OFF Fall Time 关断下降时间 ($V_{DS}=30\text{V}$ $I_D=10\text{A}$, $R_{GEN}=3.3\Omega$, $V_{GS}=10\text{V}$)	t_f	—	4.6	—	ns

■ Typical Characteristic Curve 典型特性曲线

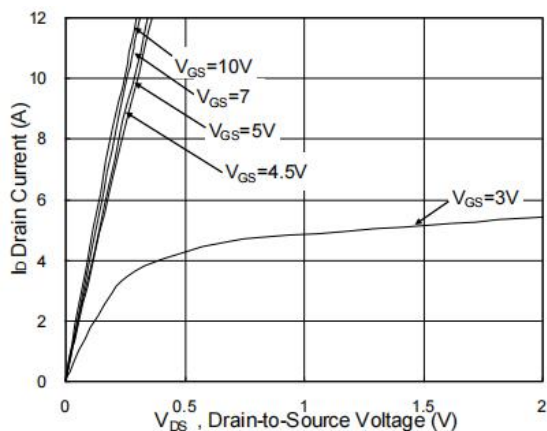


Figure 1: Output Characteristics

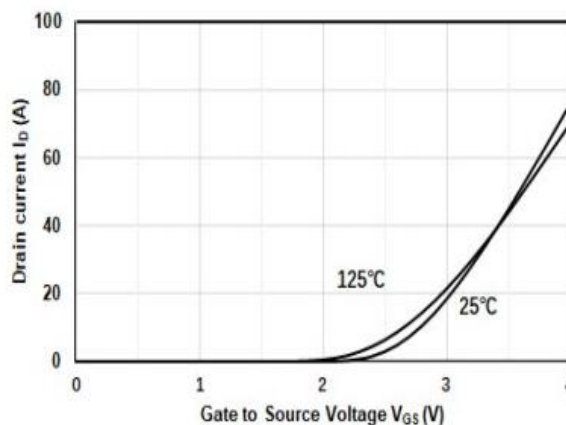


Figure 2: Transfer Characteristics

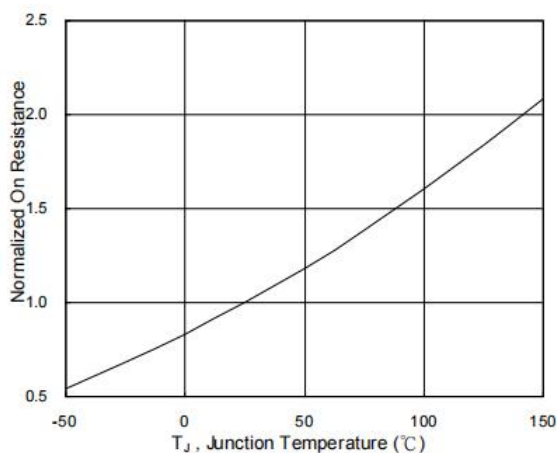


Figure 3: On-Resistance vs. T_J

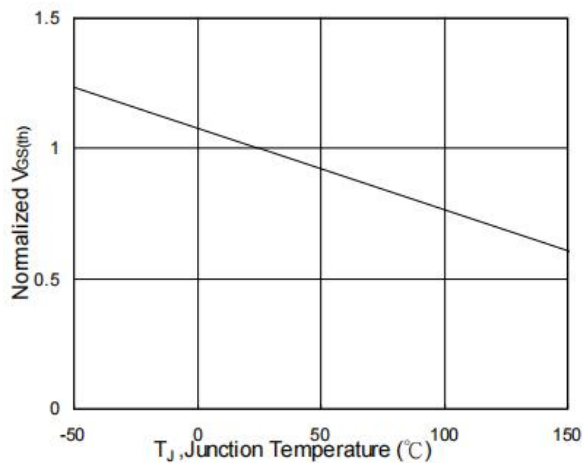


Figure 4: $V_{GS(th)}$ vs. Temperature

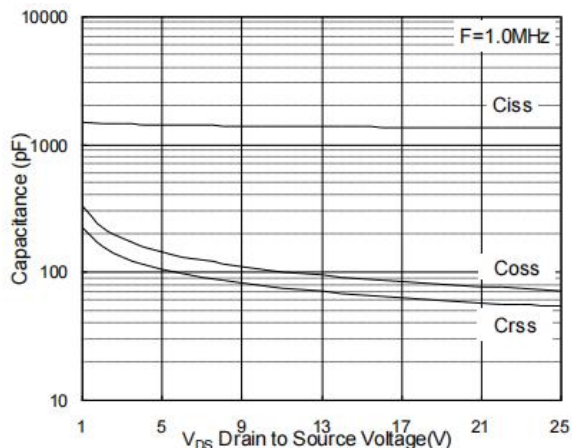


Figure 5: Capacitance Characteristics

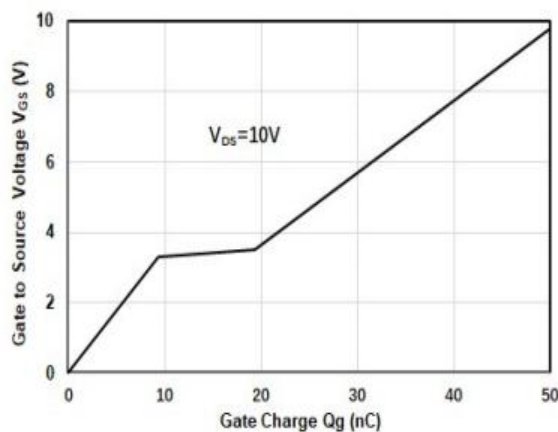


Figure 6: Gate-Charge Characteristics

■ Typical Characteristic Curve 典型特性曲线

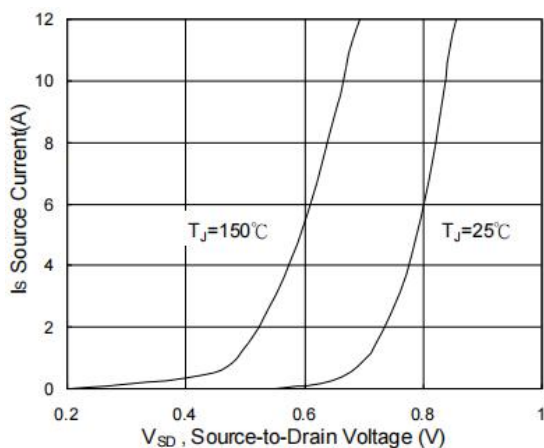


Figure 7: Diode Characteristics

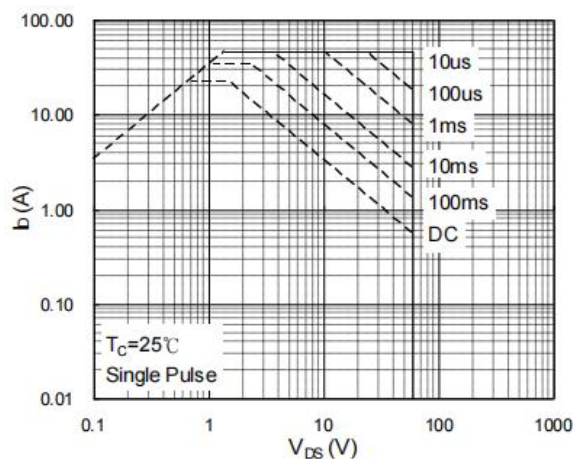


Figure 8: Safe Operating Area

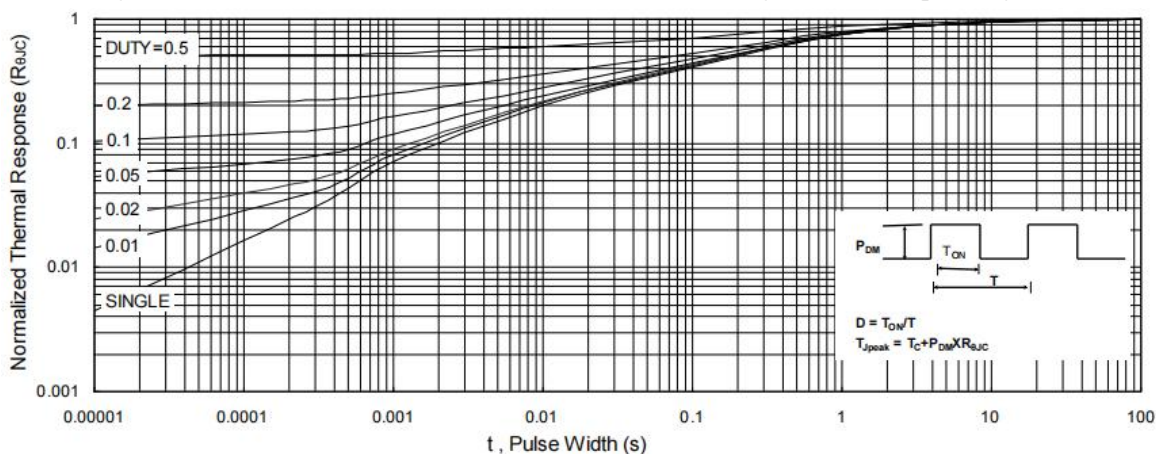
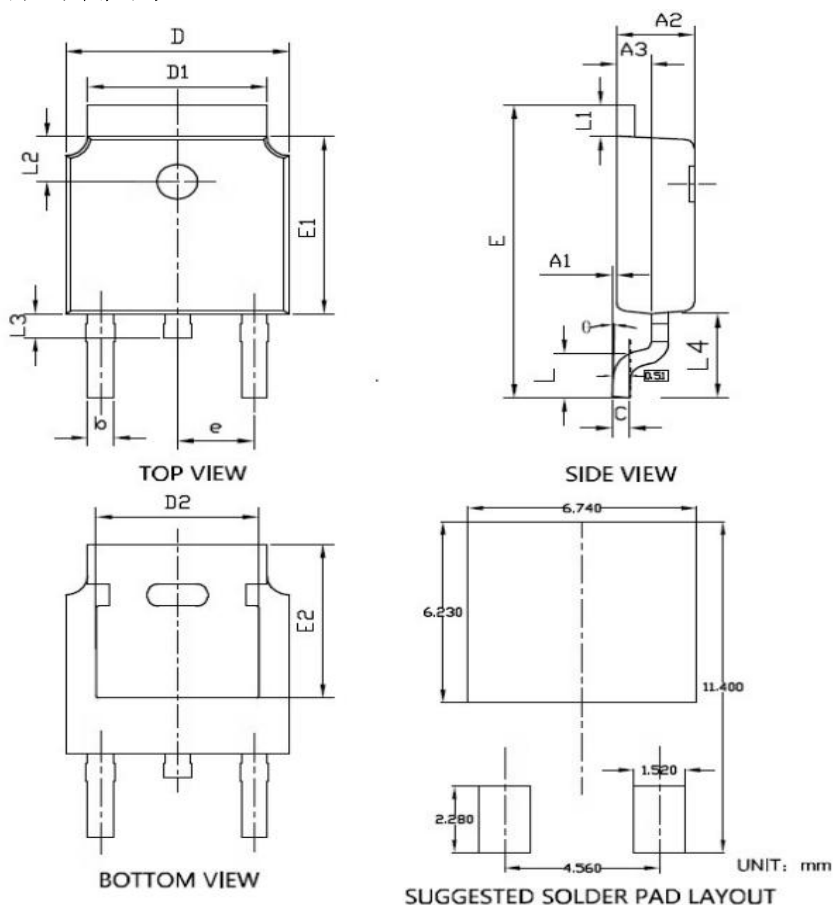


Figure 9: Transient Thermal Response Curve

■ Dimension 外形封装尺寸



DIMENSIONS						
SYMBOL	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.008	0.000	---	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	---	0.050	0.900	---	1.270
L2	0.055	---	0.075	1.400	---	1.900
L3	0.240	0.310	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
θ	0°	---	10°	0°	---	10°