
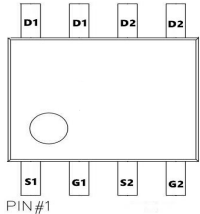




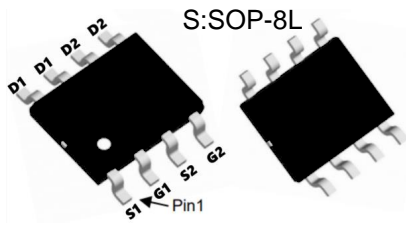
TM026G04S

N+P-Channel Enhancement Mode Mosfet

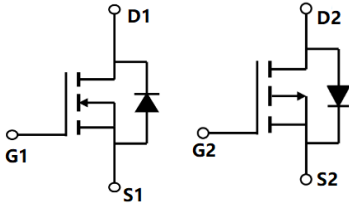
<p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM 	<p>Product Summary</p> <p>N Channel $V_{DS} = 40V, I_D = 7.3A$ $R_{DS(ON)} = 26m\Omega (typ.) @ V_{GS} = 10V$</p> <p>P Channel $V_{DS} = -40V, I_D = -6.1A$ $R_{DS(ON)} = 56m\Omega (typ.) @ V_{GS} = -10V$</p> <p>100% UIS Tested 100% R_g Tested</p> 
--	---



Marking: 7004



S:SOP-8L



Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	7.3	-6.1	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	4.9	-3.8	A
I_{DM}	Pulsed Drain Current ²	26	-22	A
EAS	Single Pulse Avalanche Energy ³	16.2	39	mJ
I_{AS}	Avalanche Current	6.8	-6.8	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ⁴	1.67	1.67	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	57		$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	30		$^\circ C/W$



TM026G04S

N+P-Channel Enhancement Mode Mosfet

N-Channel Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	40	44	---	V
ΔBVDSS/ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.034	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =5A	---	26	36	mΩ
		V _{GS} =4.5V, I _D =4A	---	36	49	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	-4.56	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =32V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =32V, V _{GS} =0V, T _J =55°C	---	---	5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =5V, I _D =5A	---	14	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2.6	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =20V, V _{GS} =4.5V, I _D =5A	---	5.5	---	nC
Q _{gs}	Gate-Source Charge		---	1.25	---	
Q _{gd}	Gate-Drain Charge		---	2.5	---	
Td(on)	Turn-On Delay Time	V _{DD} =20V, V _{GS} =10V, R _G =3.3Ω I _D =1A	---	8.9	---	ns
T _r	Rise Time		---	2.2	---	
Td(off)	Turn-Off Delay Time		---	41	---	
T _f	Fall Time		---	2.7	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	593	---	pF
C _{oss}	Output Capacitance		---	76	---	
C _{rss}	Reverse Transfer Capacitance		---	56	---	
I _s	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	7.3	A
ISM	Pulsed Source Current ^{2,5}		---	---	23	A
VSD	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed, pulse width ≦ 300us, duty cycle ≦ 2%
- 3、The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=10A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.



TM026G04S

N+P-Channel Enhancement Mode Mosfet

P-Channel Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-40	-44	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.018	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-3A	---	56	76	mΩ
		V _{GS} =-4.5V, I _D =-2A	---	76	85	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.5	-2.5	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	2.5	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-40V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-40V, V _{GS} =0V, T _J =55°C	---	---	-5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =-5V, I _D =-3A	---	5.8	---	S
Qg	Total Gate Charge (-4.5V)	V _{DS} =-32V, V _{GS} =-4.5V, I _D =-3A	---	6.4	---	nC
Qgs	Gate-Source Charge		---	2.1	---	
Qgd	Gate-Drain Charge		---	2.5	---	
Td(on)	Turn-On Delay Time	V _{DD} =-20V, V _{GS} =-4.5V, R _G =3.3Ω, I _D =-3A	---	4.2	---	ns
T _r	Rise Time		---	23	---	
Td(off)	Turn-Off Delay Time		---	26.8	---	
T _f	Fall Time		---	20.6	---	
Ciss	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	620	---	pF
Coss	Output Capacitance		---	65	---	
Crss	Reverse Transfer Capacitance		---	53	---	
IS	Continuous Source Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	-6.1	A
ISM	Pulsed Source Current ^{2,4}		---	---	-16.1	A
VSD	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1	V

Note :

1. The data tested by surface mounted on a 1 inch²FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
3. The power dissipation is limited by 150°C junction temperature
4. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.



TM026G04S

N+P-Channel Enhancement Mode Mosfet

N-Channel Typical Characteristics

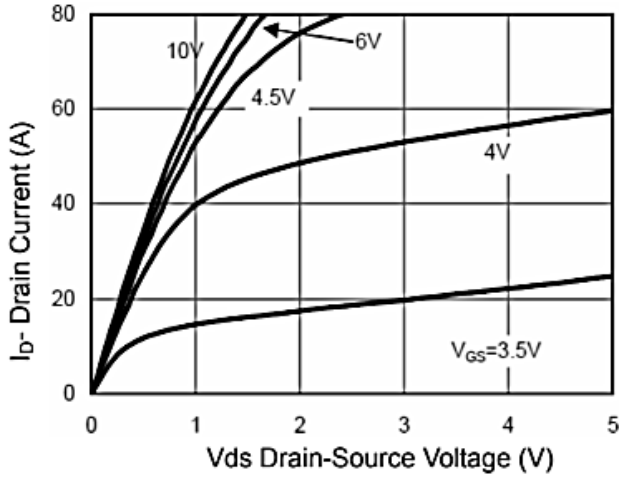


Figure 1 Output Characteristics

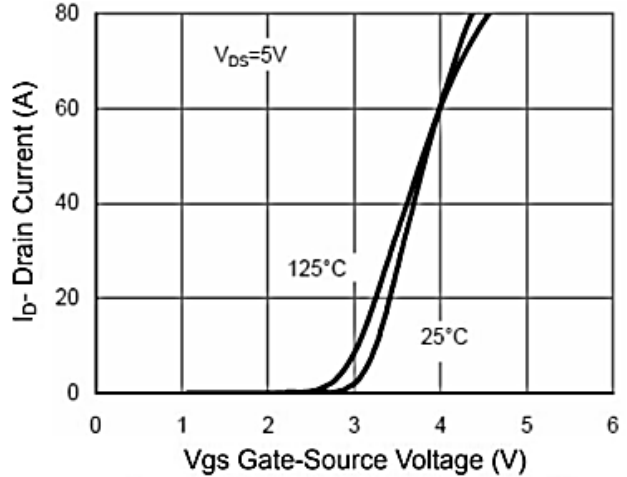


Figure 2 Transfer Characteristics

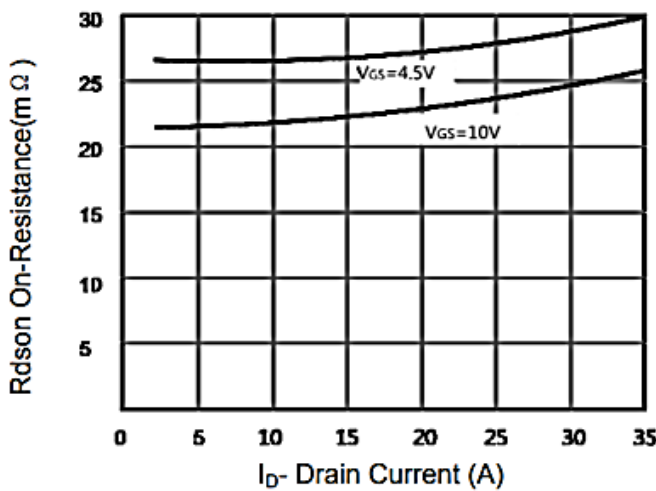


Figure 3 Rdson- Drain Current

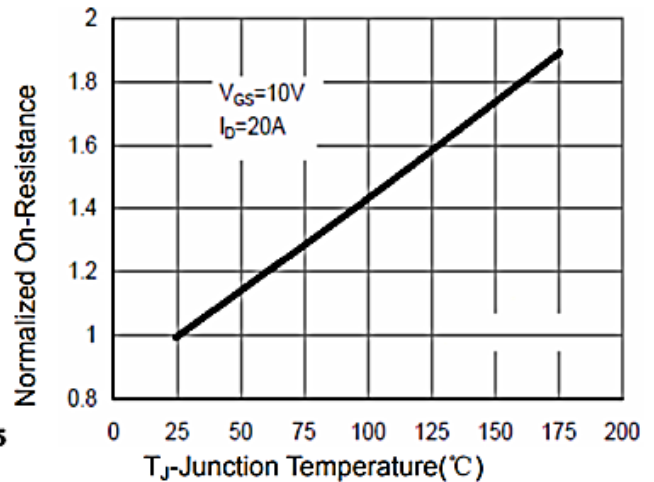


Figure 4 Rdson-Junction Temperature

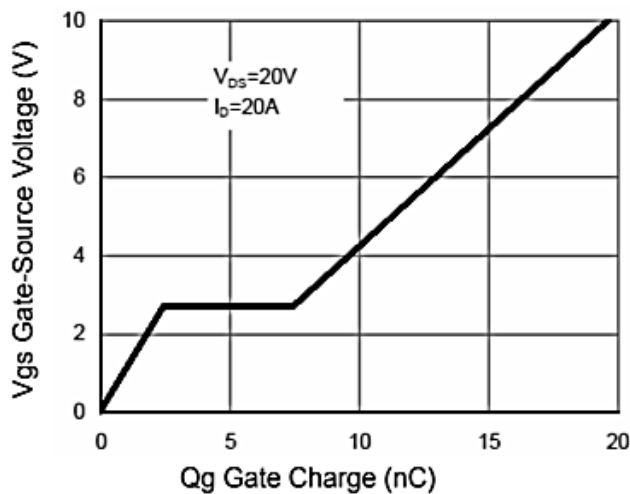


Figure 5 Gate Charge

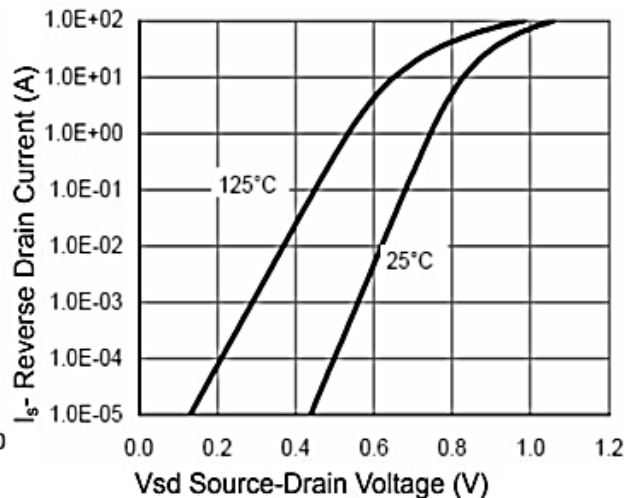


Figure 6 Source- Drain Diode Forward



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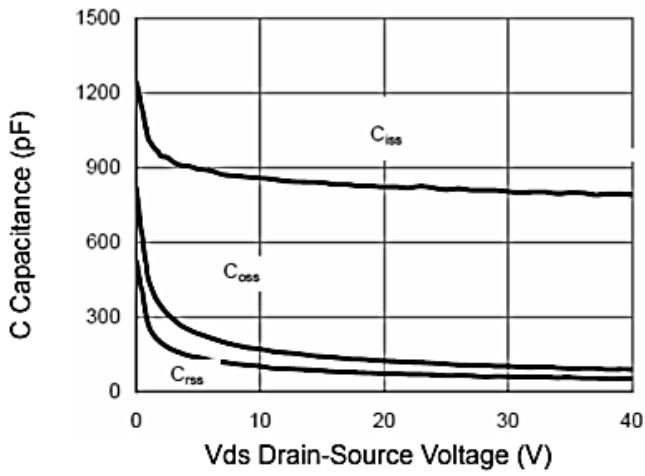


Figure 7 Capacitance vs Vds

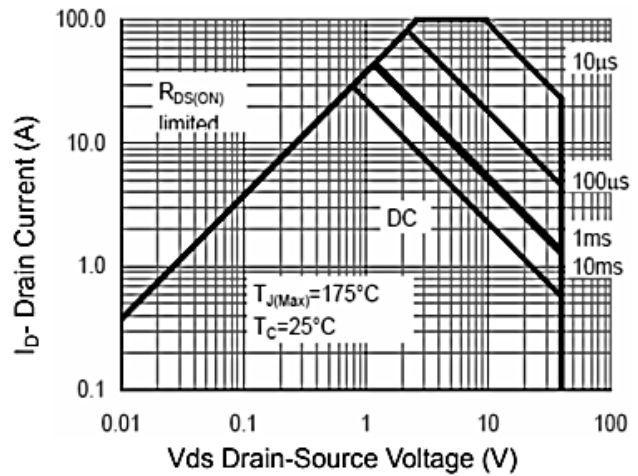


Figure 8 Safe Operation Area

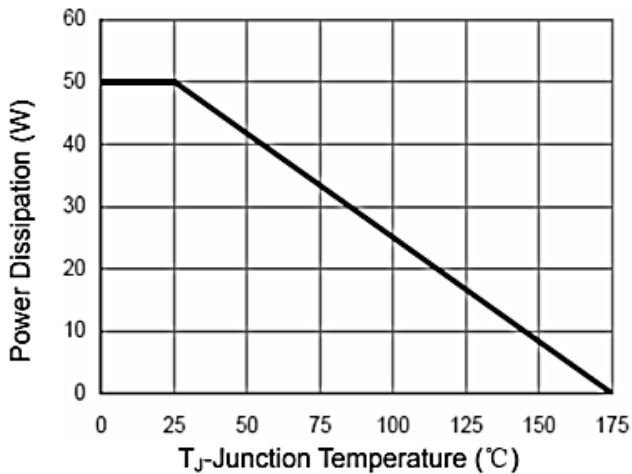


Figure 9 Power De-rating

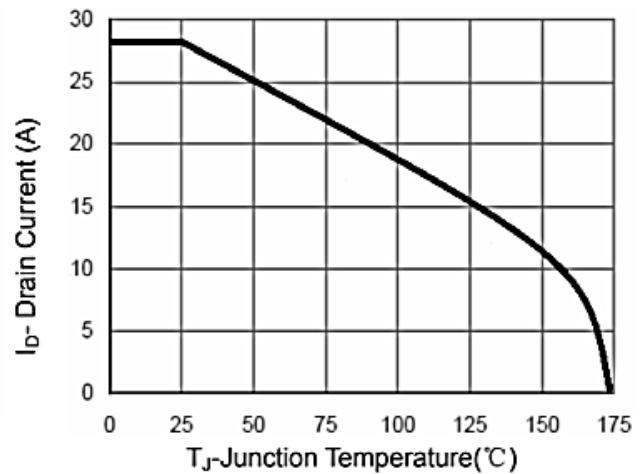


Figure 10 Id Current De-rating

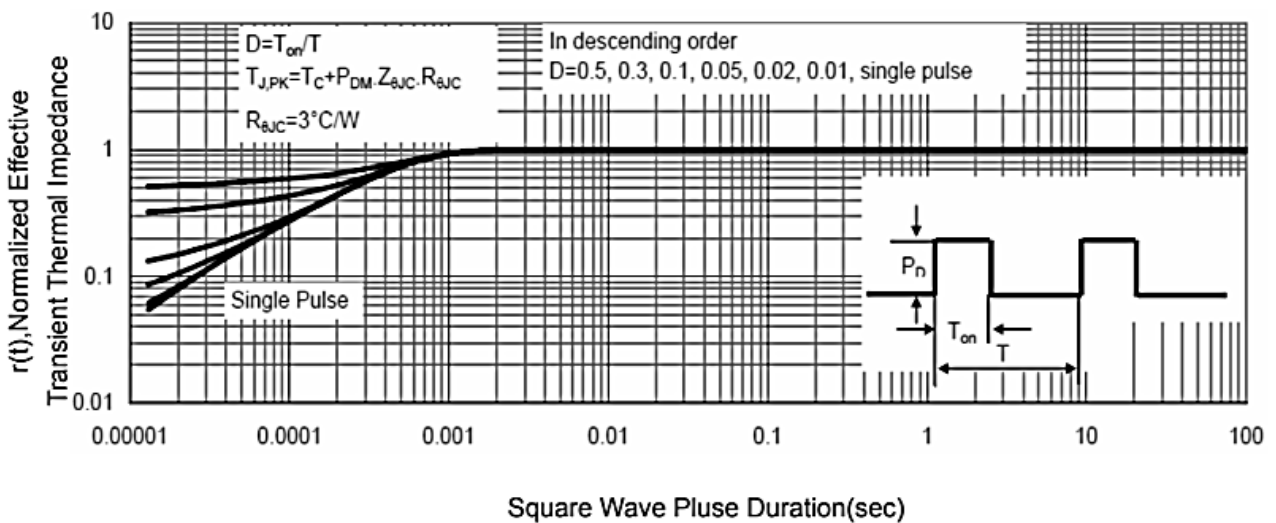


Figure 11 Normalized Maximum Transient Thermal Impedance



TM026G04S

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P-Typical Characteristics

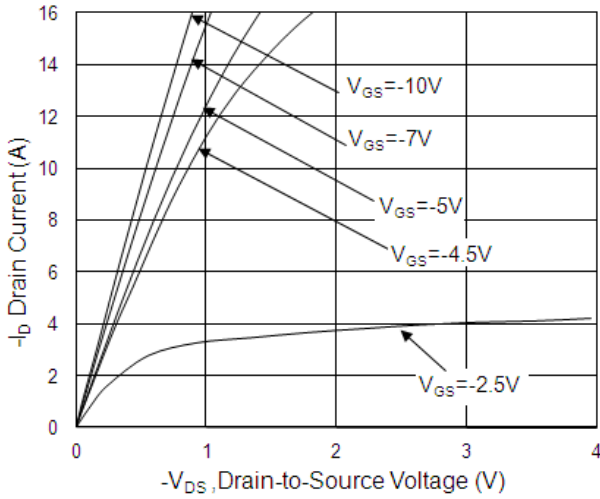


Fig.1 Typical Output Characteristics

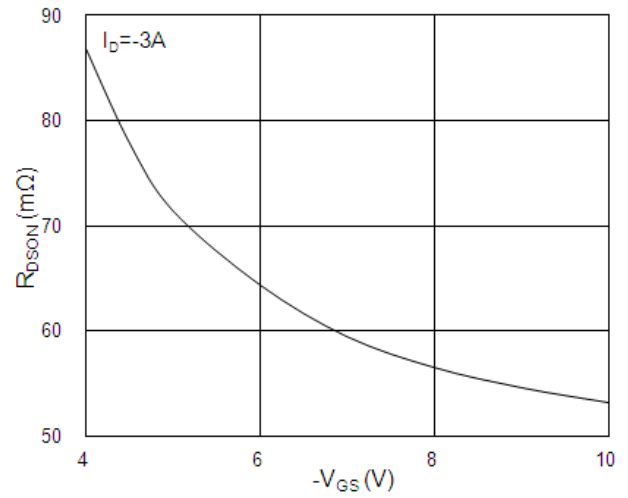


Fig.2 On-Resistance vs. G-S Voltage

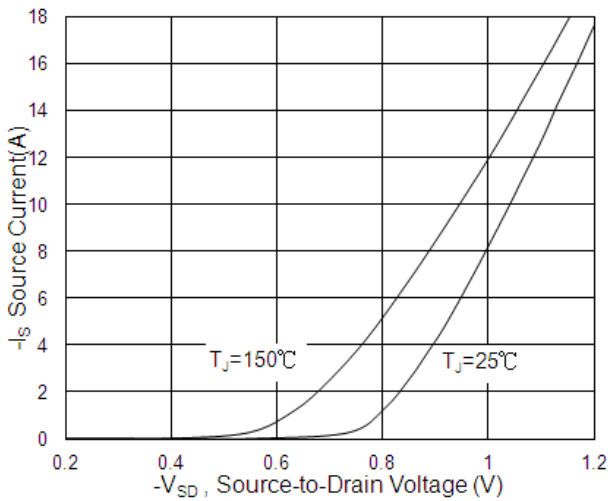


Fig.3 Forward Characteristics Of Reverse

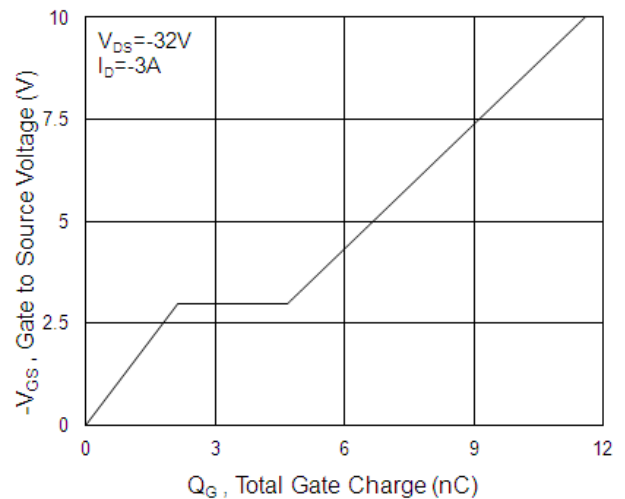


Fig.4 Gate-Charge Characteristics

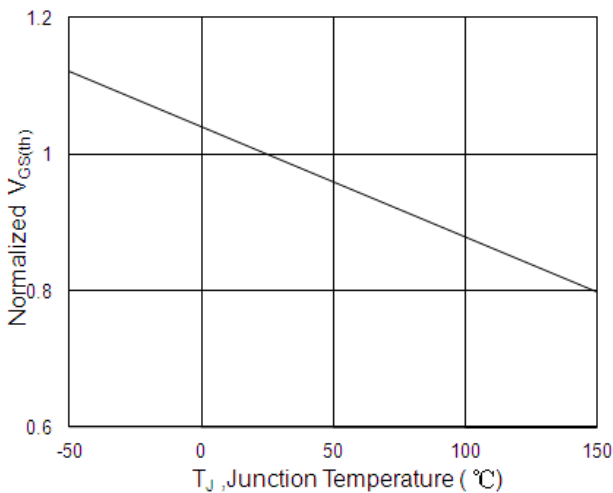


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

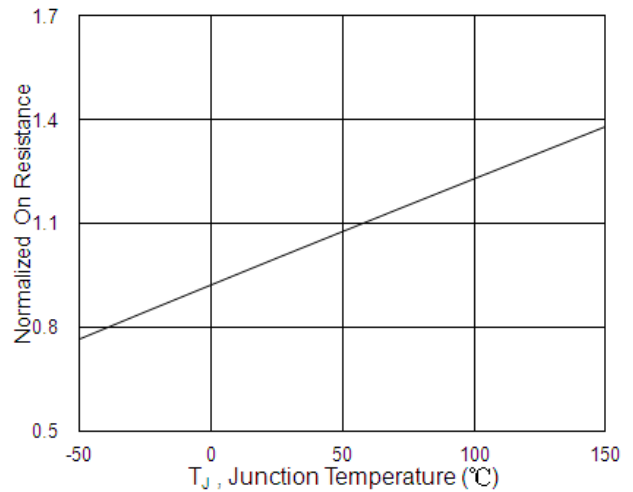


Fig.6 Normalized $R_{DS(on)}$ vs. T_J



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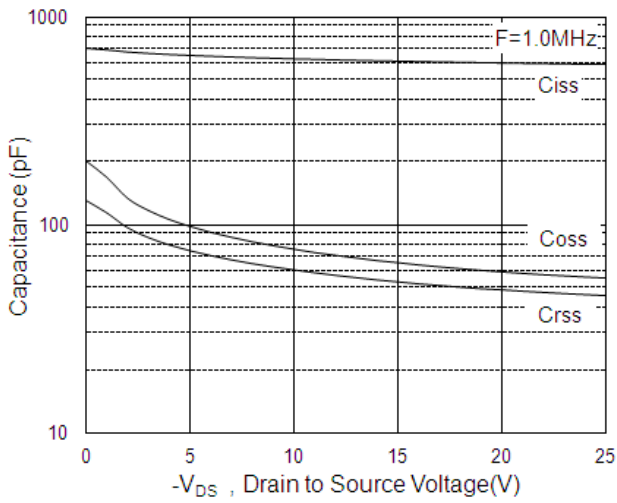


Fig.7 Capacitance

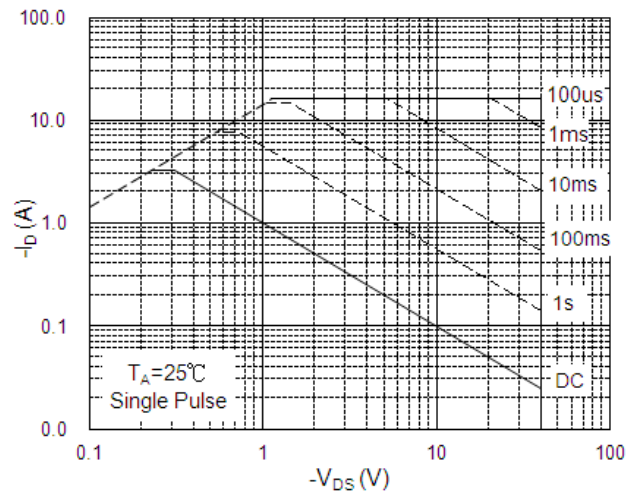


Fig.8 Safe Operating Area

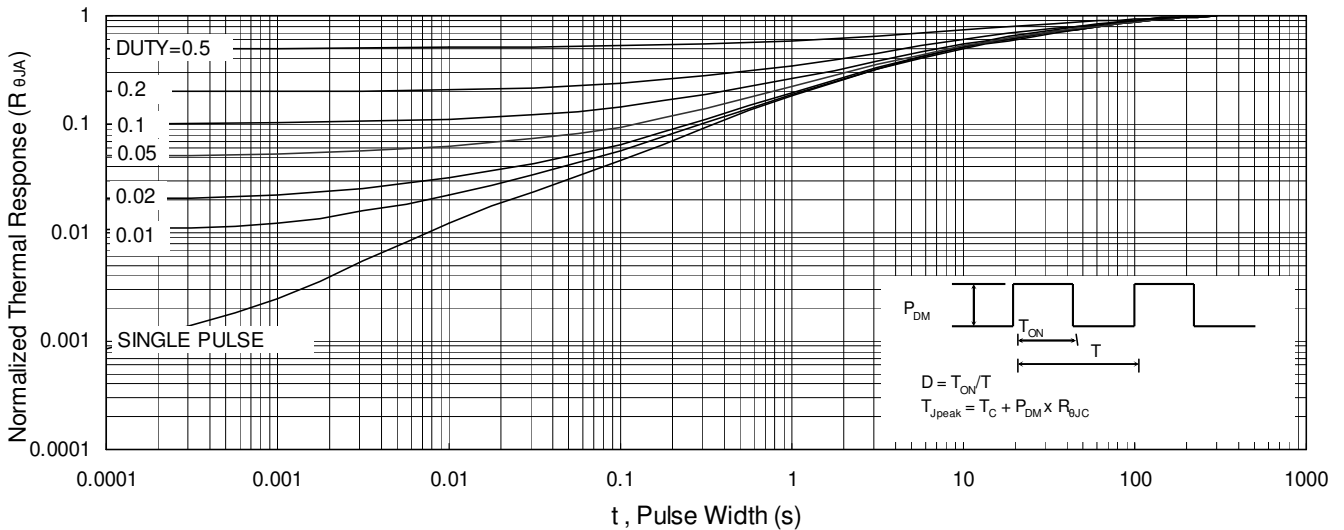


Fig.9 Normalized Maximum Transient Thermal Impedance

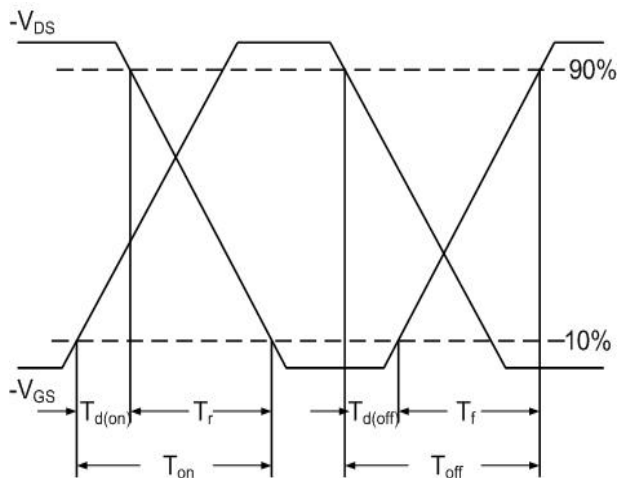


Fig.10 Switching Time Waveform

Data and specifications subject to change without notice.

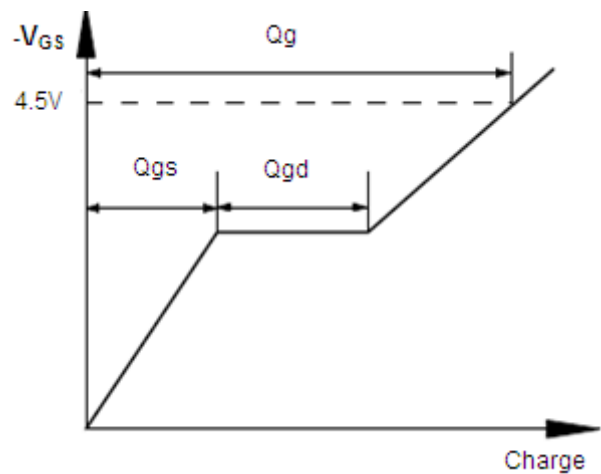
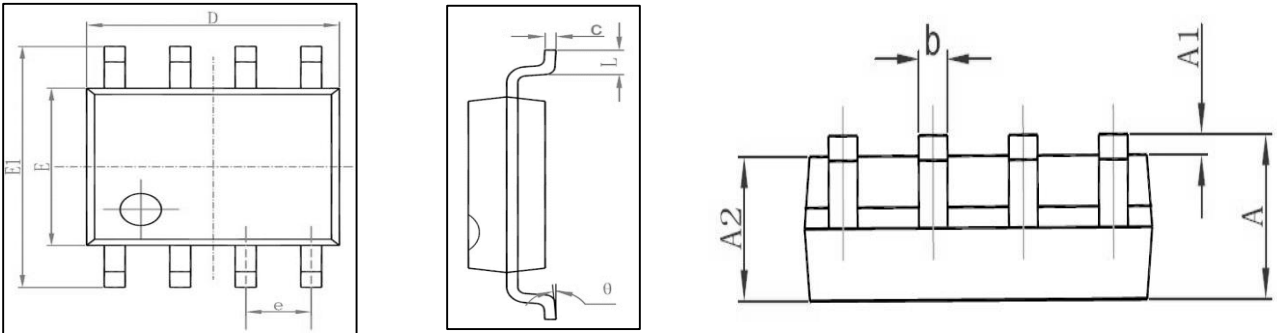
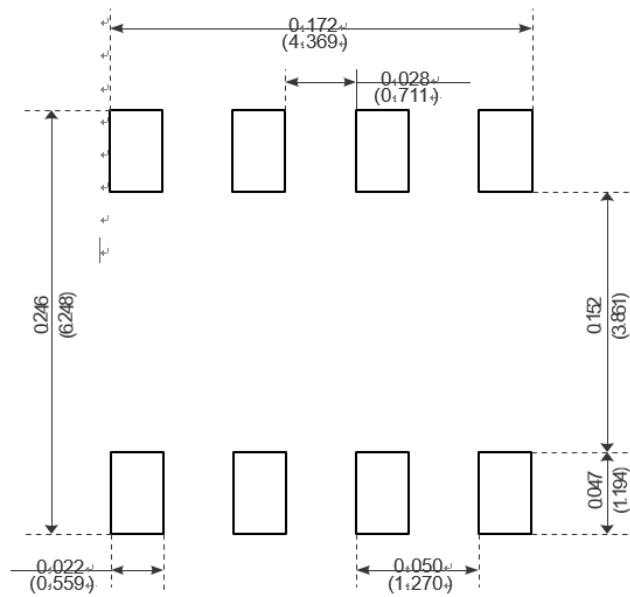


Fig.11 Gate Charge Waveform

Package Mechanical Data:SOP-8L



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°



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