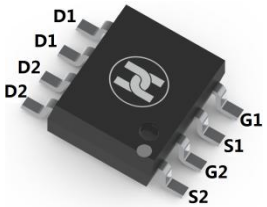
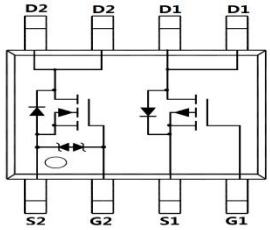
COMPLEMENTARY MOSFET



SOP-8



FEATURES

- V_{DS}=30V,I_D=8A,$R_{DS(ON)}$≤20mΩ@V_{GS}=10V
- V_{DS}=-30V,I_D=-7A,$R_{DS(ON)}$≤22mΩ@V_{GS}=-10V
- Low gate charge and Ultra low on-resistance
- For low Input Voltage inverter applications
- Surface Mount device

MECHANICAL DATA

- Case: SOP-8
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.3 grams (approximate)

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Parameter		Symbol	Max N-channel	Max P-channel	Unit
Drain-source voltage		V_{DS}	30	-30	V
Gate-source voltage		V_{GS}	±20	±20	V
Continuous drain current	T_A = 25°C	I_D	8	-7	A
	T_A = 70°C		6.5	-6	A
Pulsed drain current		I_{DM}	40	-40	A
Avalanche current		I_{AS},I_{AR}	19	27	A
Avalanche energy L=0.1mH		E_{AS},E_{AR}	18	36	mJ
Power dissipation	T_A = 25°C	P_D	2	2	W
	T_A = 70°C		1.3	1.3	W
Thermal resistance from Junction to ambient		$R_{\theta JA}$	90		°C/W
Thermal resistance from Junction to Lead		$R_{\theta JL}$	40		°C/W
Junction temperature		T_J	150		°C
Storage temperature		T_{STG}	-55 ~+150		°C

N-CHANNEL ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Drain-Source breakdown voltage	$V_{(BR)DSS}$*	30			V	V_{GS}=0V, I_D=250μA
Zero gate voltage drain current	I_{DSS}*			1	μA	V_{DS}=30V, V_{GS}=0V
Gate-body leakage current	I_{GSS}*			±10	μA	V_{DS}=0V, V_{GS}=±16V
Gate-threshold voltage	$V_{GS(th)}$*	1.2	1.8	2.4	V	V_{DS}=V_{GS}, I_D=250μA
On-State Drain Current	$I_{D(ON)}$	40			A	V_{DS}=5V, V_{GS}=10V
Drain-source on-resistance	$R_{DS(ON)}$*		16.5	20	mΩ	V_{GS}=10V, I_D=8A
			23	28	mΩ	V_{GS}=10V, I_D=8A, T_J=125°C
			19.5	28	mΩ	V_{GS}=4.5V, I_D=6A
Forward transconductance	g_{FS}		30		S	V_{DS}=5V, I_D=8A
Diode forward voltage	V_{SD}		0.75	1	V	I_S=1A, V_{GS}=0V
Diode forward current	I_S			2.5	A	
Input capacitance	C_{iss}	600	740	888	pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
Output capacitance	C_{oss}	77	110	145	pF	
Reverse transfer capacitance	C_{rss}	50	82	115	pF	
Gate resistance	R_g	0.5	1.1	1.7	Ω	V_{DS}=0V, V_{GS}=0V, f=1MHz
Total gate charge	Q_g	6	7.5	9	nC	V_{GS}=4.5V,V_{DS}=15V,I_D=8A
Total gate charge		12	15	18	nC	V_{GS}=10V,V_{DS}=15V,I_D=8A
Gate-source charge	Q_{gs}		2.5		nC	
Gate-drain charge	Q_{gd}		3		nC	
Turn-on delay time	$t_{d(on)}$		5		nS	V_{GS}=10V, V_{DS}=15V, R_{GEN}=3Ω,R_L=1.8Ω
Turn-on rise time	t_r		3.5		nS	
Turn-off delay time	$t_{d(off)}$		19		nS	
Turn-off fall time	t_f		3.5		nS	
Body Diode Reverse Recovery Time	t_{rr}	6	8	10	nS	I_F=8A, dI/dt=500A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	14	18	22	nC	I_F=8A, dI/dt=500A/μs

*Pulse test ; Pulse width ≤300μs, Duty cycle ≤ 0.5% .

COMPLEMENTARY MOSFET

N-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

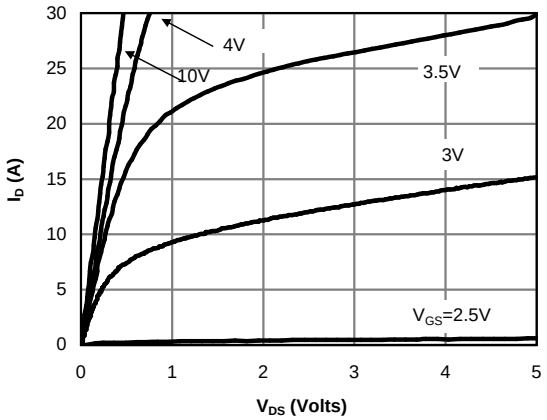


Fig 1: On-Region Characteristics

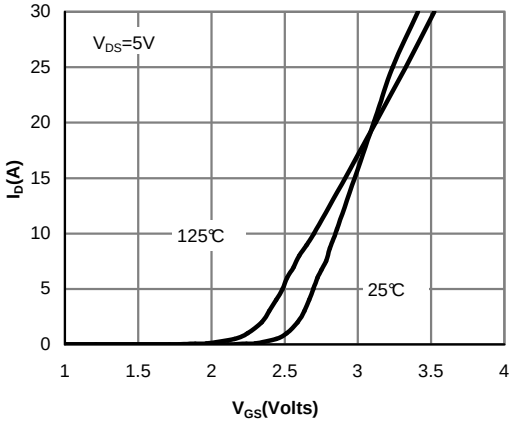


Figure 2: Transfer Characteristics

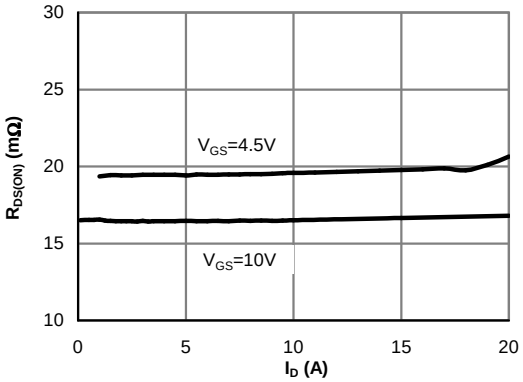


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

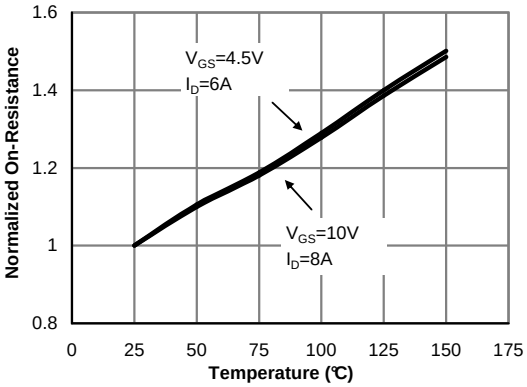


Figure 4: On-Resistance vs. Junction Temperature

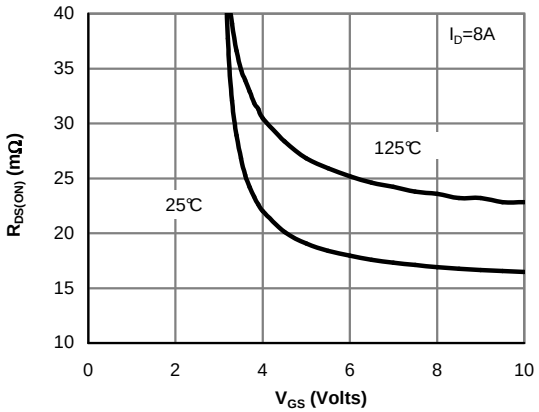


Figure 5: On-Resistance vs. Gate-Source Voltage

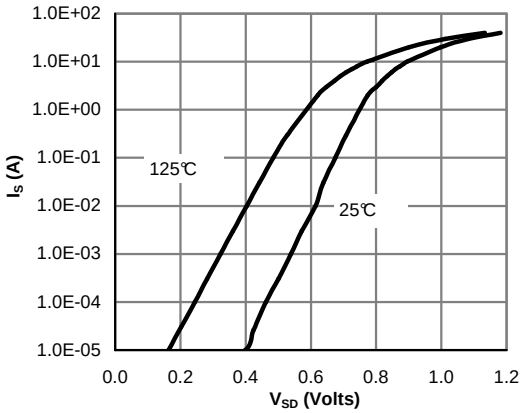


Figure 6: Body-Diode Characteristics

COMPLEMENTARY MOSFET

N-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

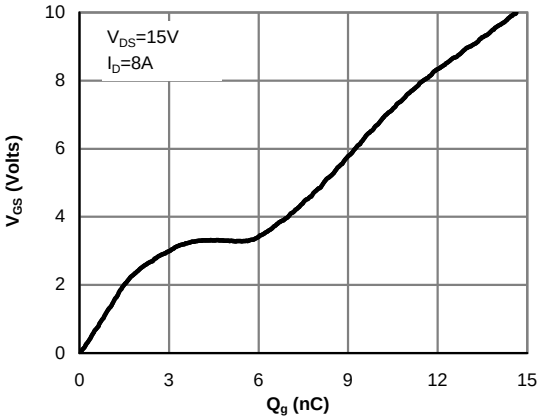


Figure 7: Gate-Charge Characteristics

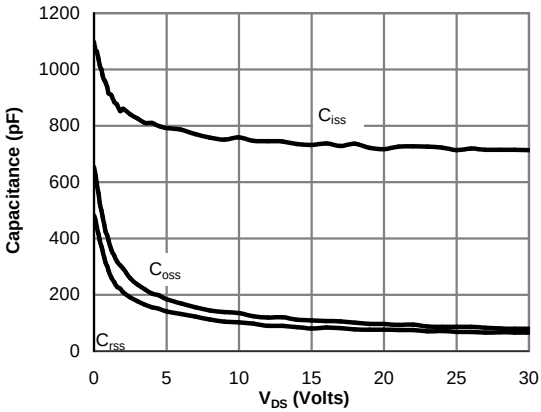


Figure 8: Capacitance Characteristics

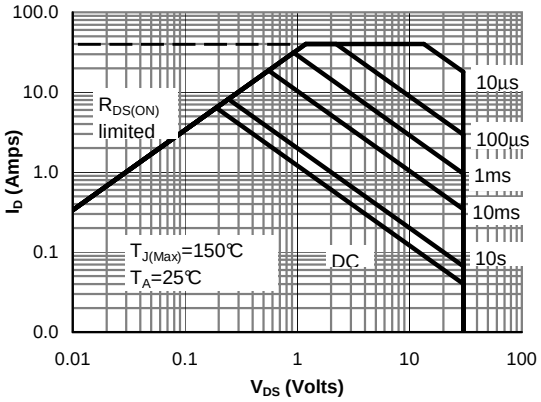


Figure 9: Maximum Forward Biased Safe Operating Area

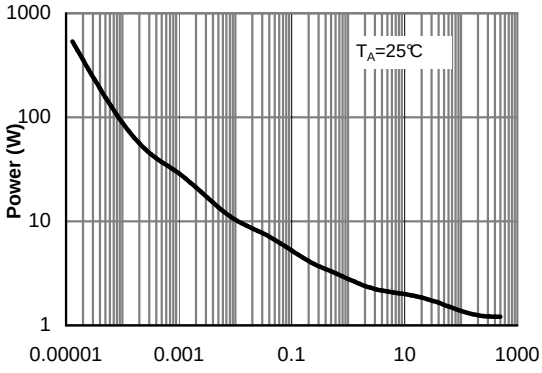


Figure 10: Single Pulse Power Rating Junction-to-Ambient

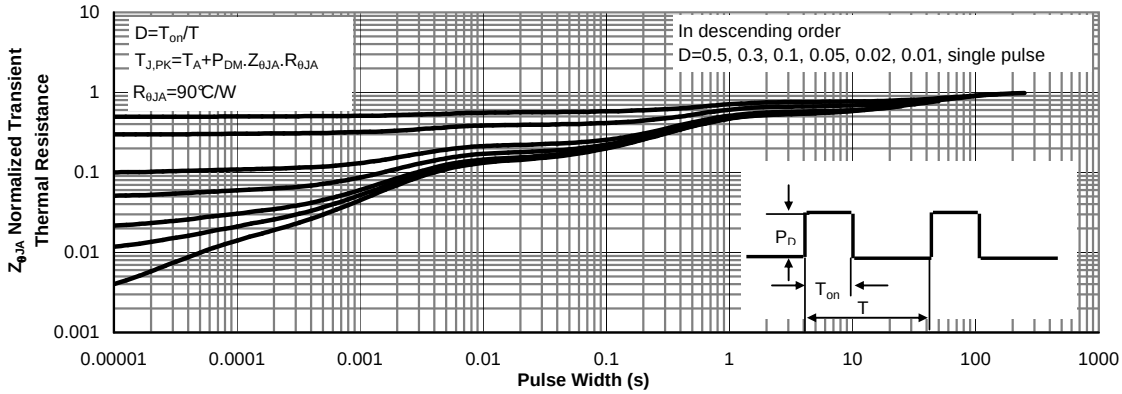
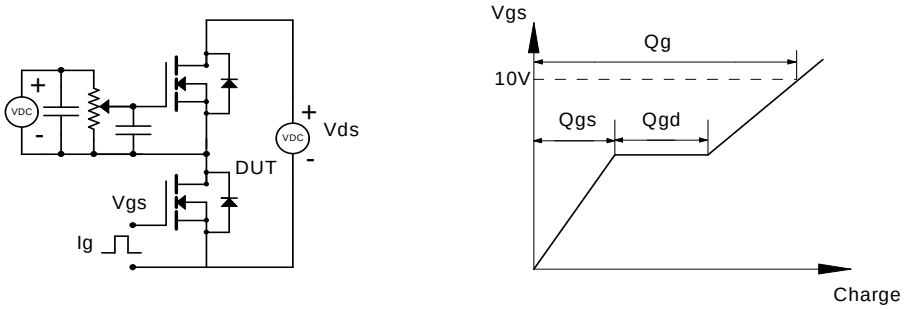


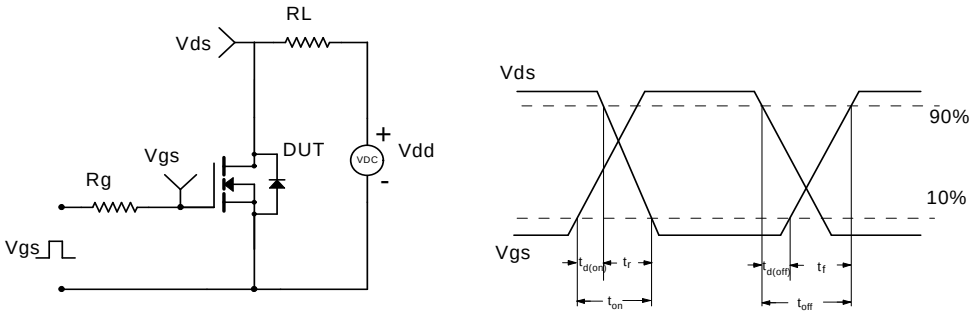
Figure 11: Normalized Maximum Transient Thermal Impedance

COMPLEMENTARY MOSFET

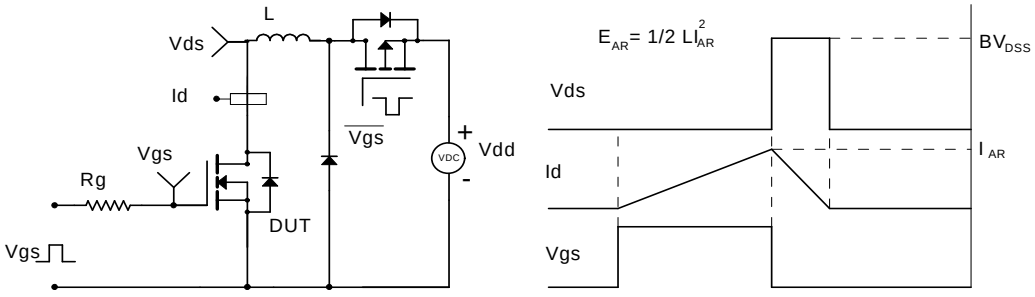
Gate Charge Test Circuit & Waveform



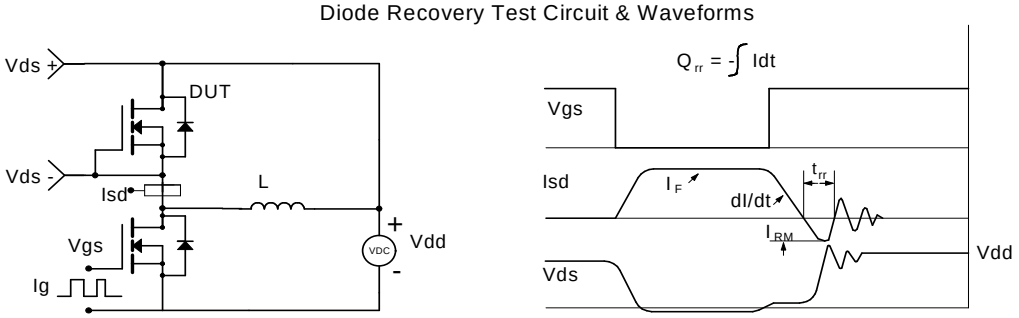
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



COMPLEMENTARY MOSFET

P-CHANNEL ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Drain-Source breakdown voltage	$V_{(BR)DSS}$*	-30			V	V_{GS}=0V, I_D=-250μA
Zero gate voltage drain current	I_{DSS}*			-1	μA	V_{DS}=-30V, V_{GS}=0V
Gate-body leakage current	I_{GSS}*			±100	nA	V_{DS}=0V, V_{GS}=±20V
Gate-threshold voltage	$V_{GS(th)}$*	-1.4	-2.0	-2.5	V	V_{DS}=V_{GS}, I_D=-250μA
On-State Drain Current	$I_{D(ON)}$*	-40			A	V_{DS}=-5V, V_{GS}=-10V
Drain-source on-resistance	$R_{DS(ON)}$*		22	28	mΩ	V_{GS}=-10V, I_D=-7A
			32	40	mΩ	V_{GS}=-10V,I_D=-7A, T_J=125°C
			34	44	mΩ	V_{GS}=-4.5V, I_D=-3.5A
Forward transconductance	g_{FS}		24		S	V_{DS}=-5V, I_D=-7A
Diode forward voltage	V_{SD}		-0.75	-1	V	I_S=-1A, V_{GS}=0V
Diode forward current	I_S			-2.5	A	
Input capacitance	C_{iss}	830	1040	1250	pF	V_{DS}=-15V, V_{GS}=0V, f=1MHz
Output capacitance	C_{oss}	125	180	235	pF	
Reverse transfer capacitance	C_{rss}	75	125	175	pF	
Gate resistance	R_g	2	4	6	Ω	V_{DS}=0V, V_{GS}=0V, f=1MHz
Total gate charge	Q_g	7.5	9.6	12	nC	V_{GS}=-4.5V,V_{DS}=-15V,I_D=-7A
Total gate charge		15	19	23	nC	V_{GS}=-10V,V_{DS}=-15V,I_D=-7A
Gate-source charge	Q_{gs}		3.6		nC	
Gate-drain charge	Q_{gd}		4.6		nC	
Turn-on delay time	$t_{d(on)}$		10		nS	V_{GS}=-10V, V_{DS}=-15V, R_{GEN}=3Ω,R_L=2.2Ω
Turn-on rise time	t_r		5.5		nS	
Turn-off delay time	$t_{d(off)}$		26		nS	
Turn-off fall time	t_f		9		nS	
Body Diode Reverse Recovery Time	t_{rr}		11.5	15	nS	I_F=-7A, dI/dt=500A/μs
Body Diode Reverse Recovery Charge	Q_{rr}		25	32.5	nC	I_F=-7A, dI/dt=500A/μs

*Pulse test ; Pulse width ≤300μs, Duty cycle ≤ 0.5% .

COMPLEMENTARY MOSFET

P-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

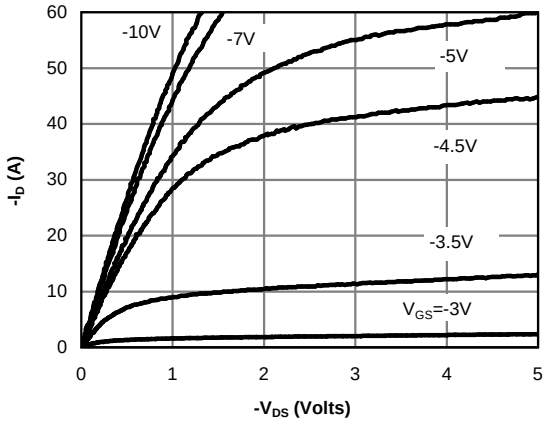


Fig 1: On-Region Characteristics

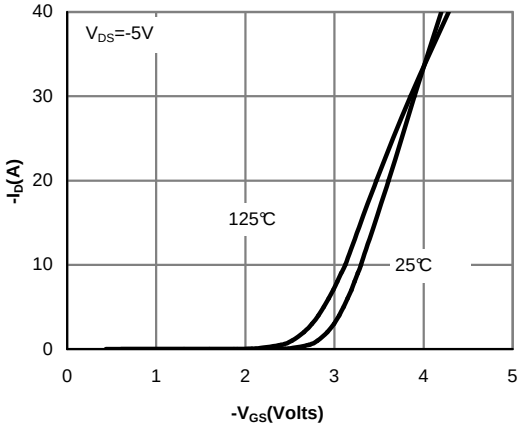


Figure 2: Transfer Characteristics

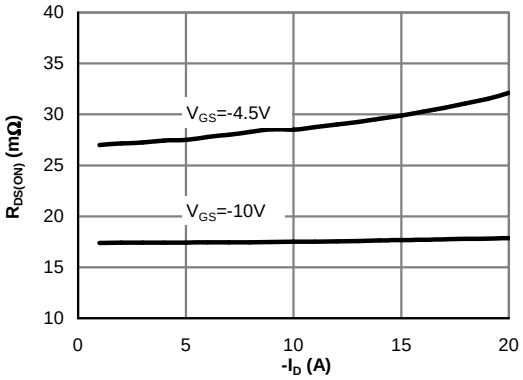


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

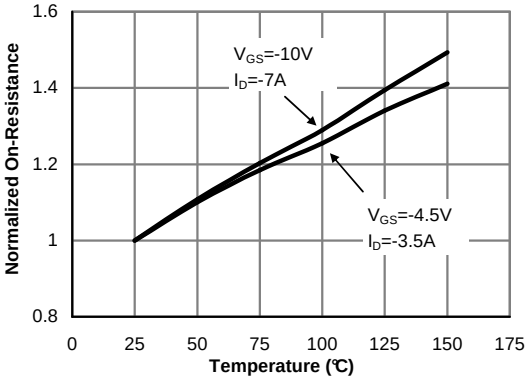


Figure 4: On-Resistance vs. Junction Temperature

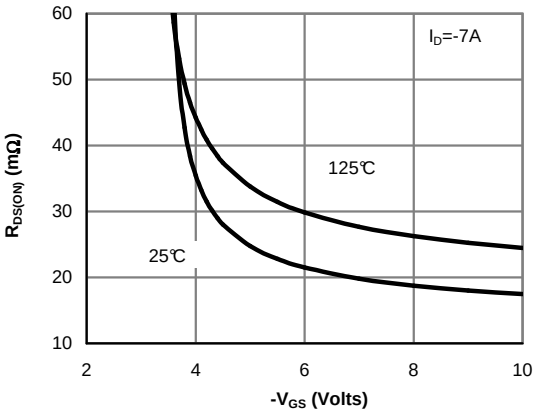


Figure 5: On-Resistance vs. Gate-Source Voltage

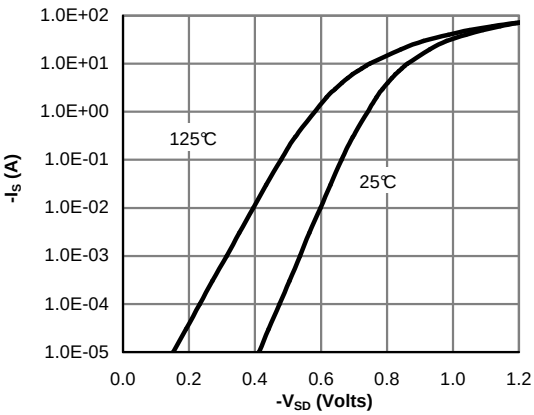


Figure 6: Body-Diode Characteristics

COMPLEMENTARY MOSFET

P-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

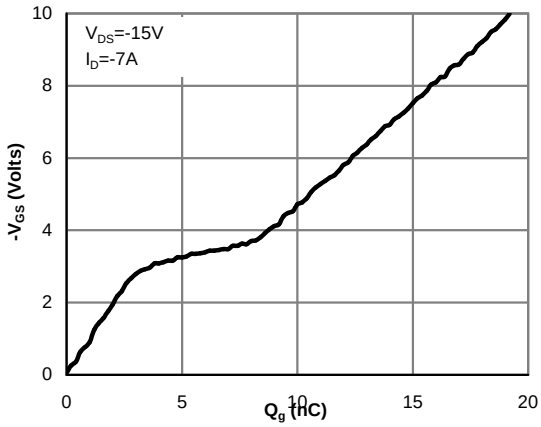


Figure 7: Gate-Charge Characteristics

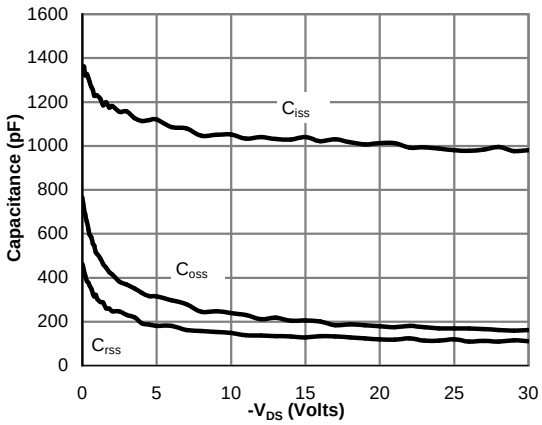


Figure 8: Capacitance Characteristics

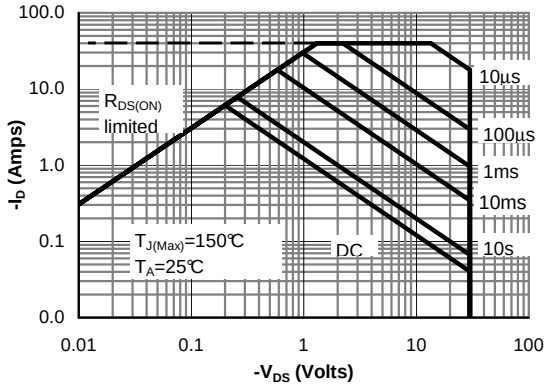


Figure 9: Maximum Forward Biased Safe Operating Area

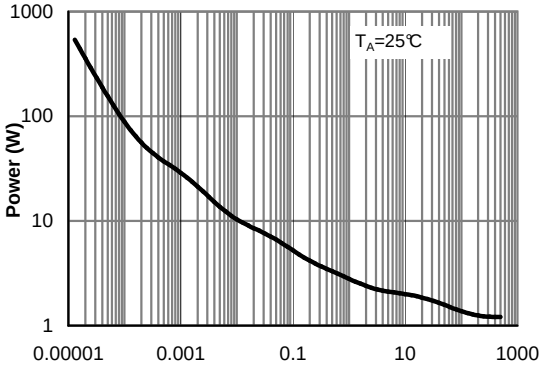


Figure 10: Single Pulse Power Rating Junction-to-Ambient

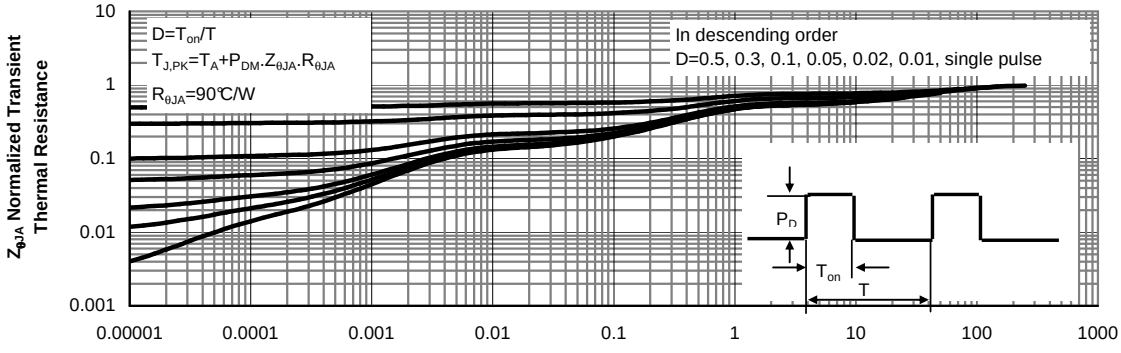
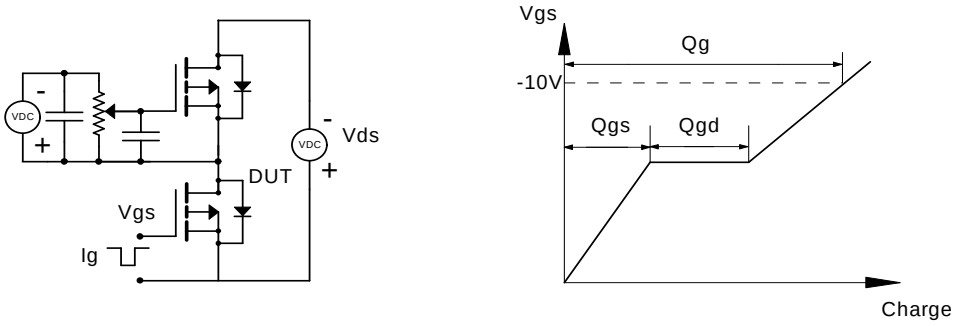


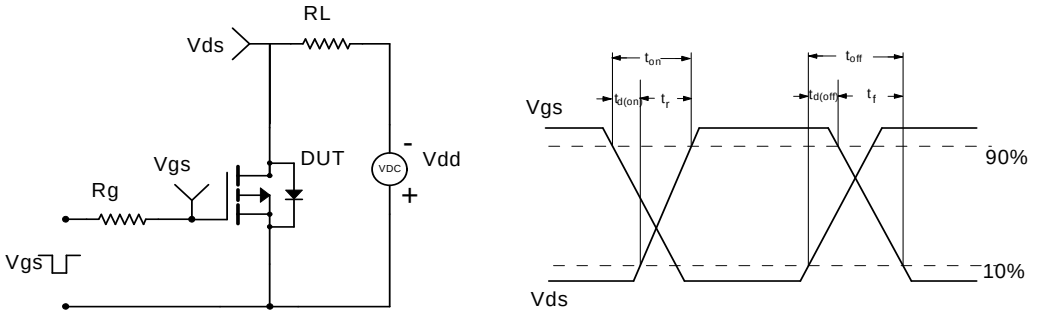
Figure 11: Normalized Maximum Transient Thermal Impedance

COMPLEMENTARY MOSFET

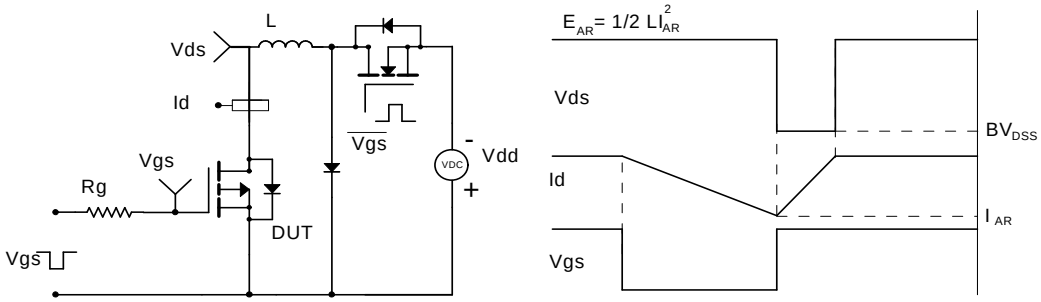
Gate Charge Test Circuit & Waveform



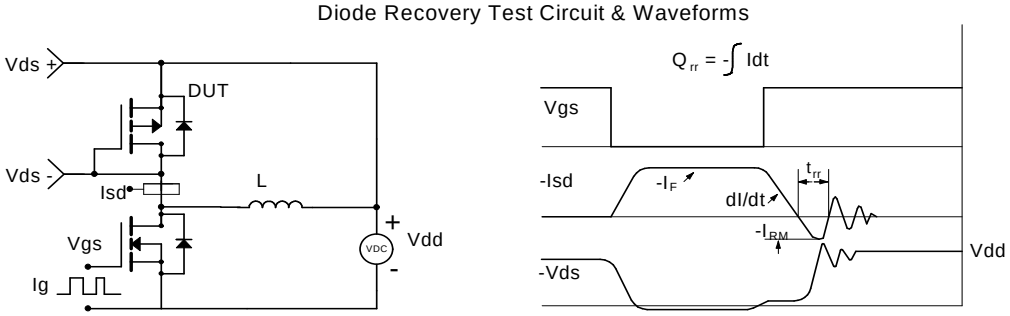
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

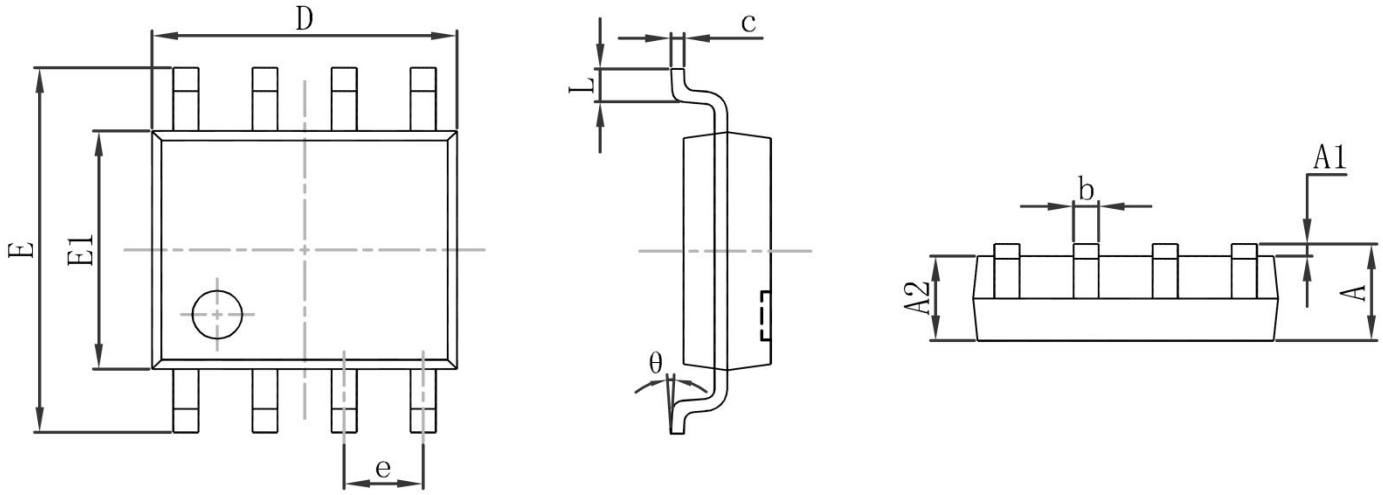


Diode Recovery Test Circuit & Waveforms



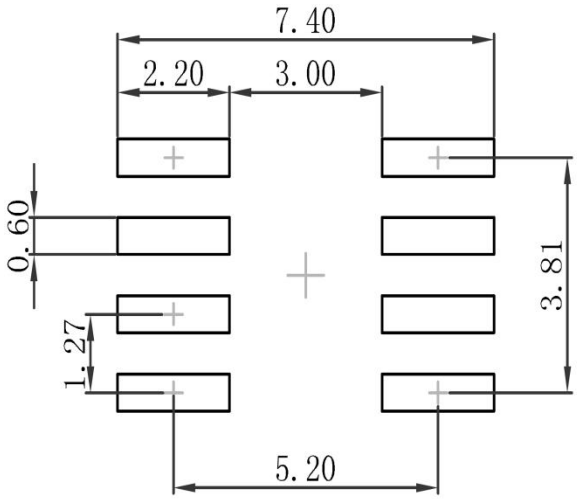
COMPLEMENTARY MOSFET

SOP-8 Package Outline Dimensions



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	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270(BSC)		0.050（BSC）	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

SOP-8 Suggested Pad Layout



Note:

1.Controlling dimension: in millimeters

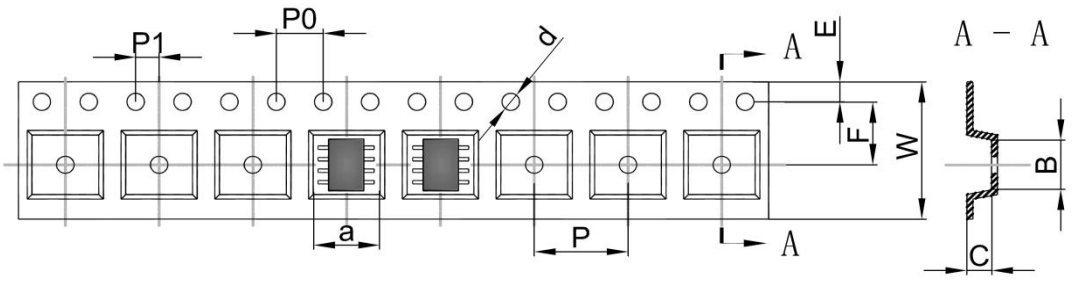
2.General tolerance: ±0.05mm

3.The pad layout is for reference purposes only

COMPLEMENTARY MOSFET

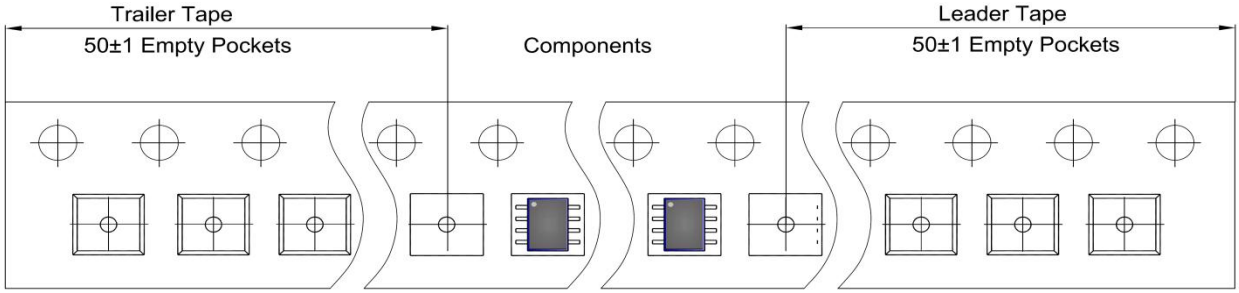
SOP-8 Tape and Reel

SOP-8 Embossed Carrier Tape

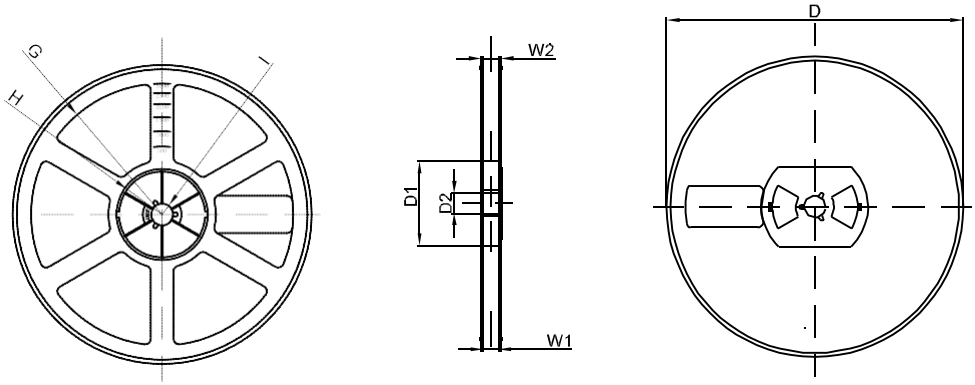


	DIMENSIONS ARE IN MILLIMETER									
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOP-8	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

SOP-8 Tape Leader and Trailer



SOP-8 Reel



	DIMENSIONS ARE IN MILLIMETER							
REEL OPTION	D	D1	D2	G	H	I	W1	W2
13” DIA	Ø330.00	100.00	13.00	R151.00	R56.00	R6.50	12.40	17.60
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1