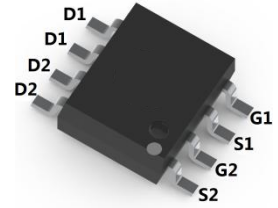
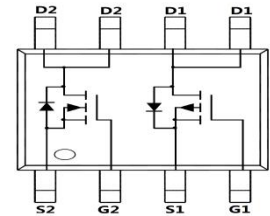


**COMPLEMENTARY MOSFET**
**FEATURES**

- $V_{DS}=30V, I_D=6A, R_{DS(ON)} \leq 30m\Omega @ V_{GS}=10V$
- $V_{DS}=-30V, I_D=-6.5A, R_{DS(ON)} \leq 28m\Omega @ V_{GS}=-10V$
- Low gate charge and Ultra low on-resistance
- For level shifted high side switch and for a host of other applications.
- Surface Mount device

**MECHANICAL DATA**

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


**SOP-8**

**MAXIMUM RATINGS ( $T_A = 25^\circ C$  unless otherwise noted)**

Parameter	Symbol	Max N-channel	Max P-channel	Unit
Drain-source voltage	$V_{DS}$	30	-30	V
Gate-source voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous drain current	$I_D$	$T_A = 25^\circ C$	-6.5	A
		$T_A = 70^\circ C$	-5.3	A
Pulsed drain current	$I_{DM}$	30	-30	A
Avalanche current	$I_{AS}, I_{AR}$	10	23	A
Avalanche energy $L=0.1mH$	$E_{AS}, E_{AR}$	5	26	mJ
Power dissipation	$P_D$	$T_A = 25^\circ C$	2	W
		$T_A = 70^\circ C$	1.3	W
Thermal resistance from Junction to ambient	$R_{\theta JA}$	74		$^\circ C/W$
Thermal resistance from Junction to Lead	$R_{\theta JL}$	32		$^\circ C/W$
Junction temperature	$T_J$	150		$^\circ C$
Storage temperature	$T_{STG}$	-55 ~ +150		$^\circ C$

**N-CHANNEL ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ C$  unless otherwise specified)**

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Drain-Source breakdown voltage	$V_{(BR)DSS}^*$	30			V	$V_{GS}=0V, I_D=250\mu A$
Zero gate voltage drain current	$I_{DSS}^*$			1	$\mu A$	$V_{DS}=30V, V_{GS}=0V$
Gate-body leakage current	$I_{GSS}^*$			$\pm 100$	$\mu A$	$V_{DS}=0V, V_{GS}=\pm 20V$
Gate-threshold voltage	$V_{GS(th)}^*$	1.2	1.8	2.4	V	$V_{DS}=V_{GS}, I_D=250\mu A$
On-State Drain Current	$I_{D(ON)}$	30			A	$V_{DS}=5V, V_{GS}=10V$
Drain-source on-resistance	$R_{DS(ON)}^*$		25	30	m $\Omega$	$V_{GS}=10V, I_D=6A$
			40	48	m $\Omega$	$V_{GS}=10V, I_D=6A, T_J=125^\circ C$
			33.5	42	m $\Omega$	$V_{GS}=4.5V, I_D=5A$
Forward transconductance	$g_{FS}$		15		S	$V_{DS}=5V, I_D=6A$
Diode forward voltage	$V_{SD}$		0.76	1	V	$I_S=1A, V_{GS}=0V$
Diode forward current	$I_S$			2.5	A	
Input capacitance	$C_{iss}$		255	310	pF	$V_{DS}=15V, V_{GS}=0V, f=1MHz$
Output capacitance	$C_{oss}$		45	60	pF	
Reverse transfer capacitance	$C_{rss}$		35	50	pF	
Gate resistance	$R_g$		3.25	4.9	$\Omega$	$V_{DS}=0V, V_{GS}=0V, f=1MHz$
Total gate charge	$Q_g$		2.55	3	nC	$V_{GS}=4.5V, V_{DS}=15V, I_D=6A$
Total gate charge			5.2	6	nC	
Gate-source charge	$Q_{gs}$		0.85		nC	$V_{GS}=10V, V_{DS}=15V, I_D=6A$
Gate-drain charge	$Q_{gd}$		1.3		nC	
Turn-on delay time	$t_{d(on)}$		4.5		nS	
Turn-on rise time	$t_r$		2.5		nS	$V_{GS}=10V, V_{DS}=15V, R_{GEN}=3\Omega, R_L=2.5\Omega$
Turn-off delay time	$t_{d(off)}$		14.5		nS	
Turn-off fall time	$t_f$		3.5		nS	
Body Diode Reverse Recovery Time	$t_{rr}$		8.5	12	nS	$I_F=6A, di/dt=100A/\mu S$
Body Diode Reverse Recovery Charge	$Q_{rr}$		2.2	3	nC	$I_F=6A, di/dt=100A/\mu S$

\*Pulse test ; Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 0.5\%$  .

COMPLEMENTARY MOSFET

N-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

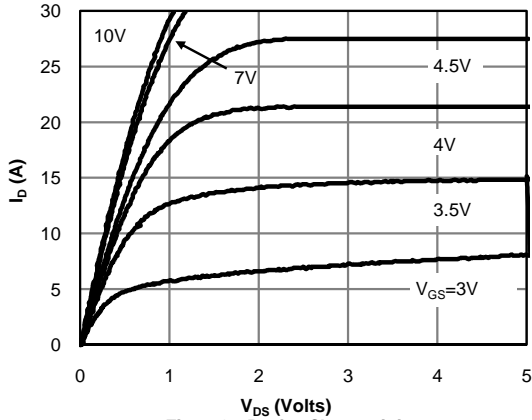


Fig 1: On-Region Characteristics

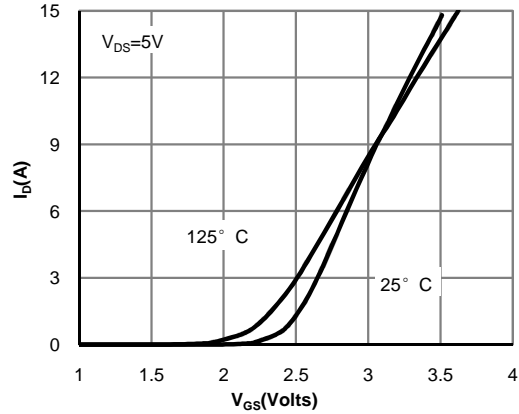


Figure 2: Transfer Characteristics

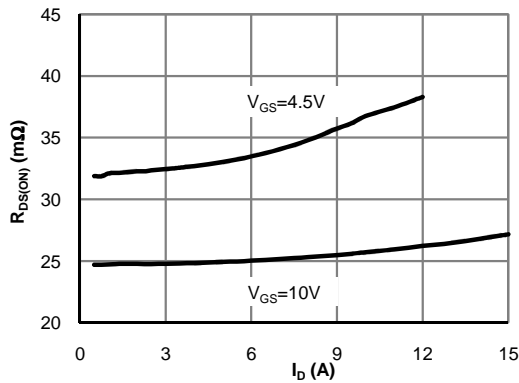


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

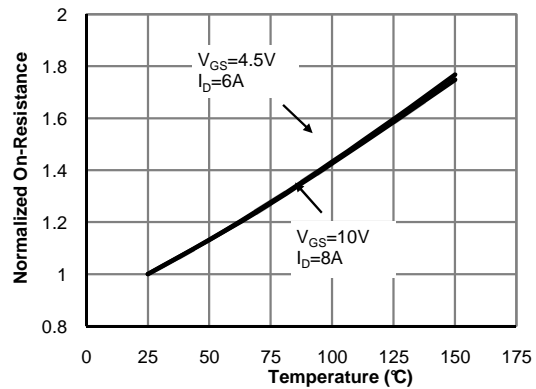


Figure 4: On-Resistance vs. Junction Temperature

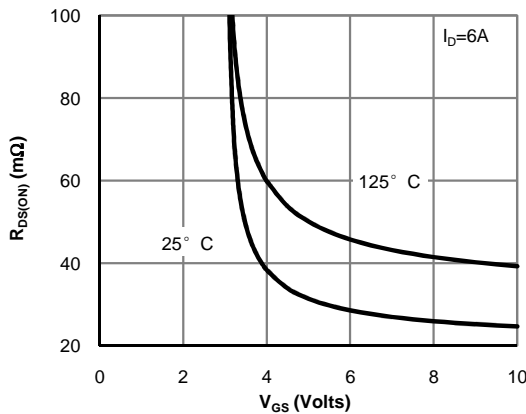


Figure 5: On-Resistance vs. Gate-Source Voltage

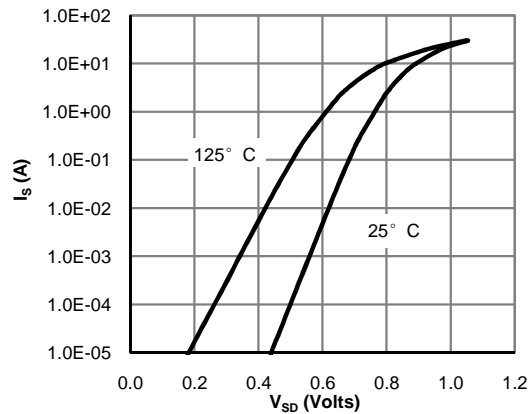


Figure 6: Body-Diode Characteristics

COMPLEMENTARY MOSFET

N-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

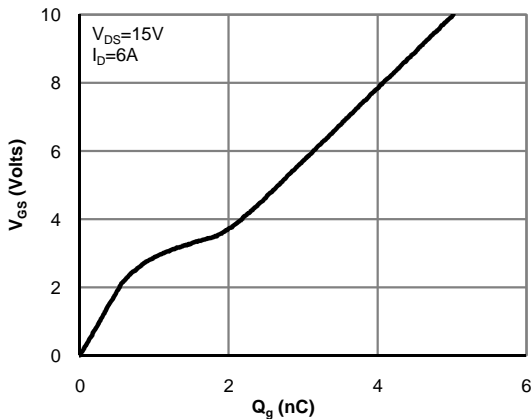


Figure 7: Gate-Charge Characteristics

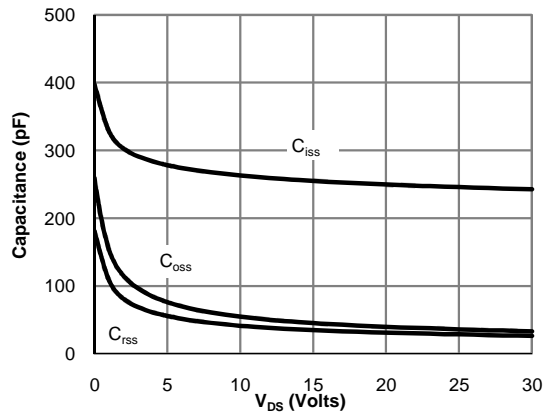


Figure 8: Capacitance Characteristics

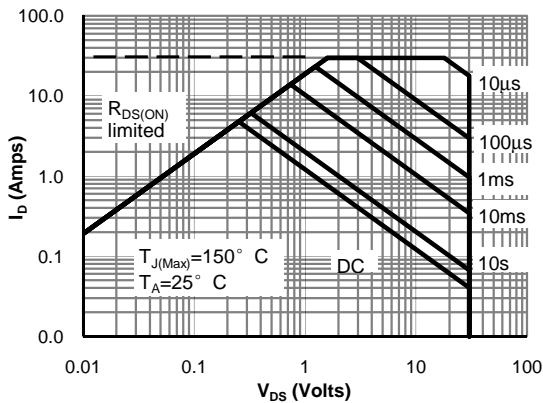


Figure 9: Maximum Forward Biased Safe Operating Area

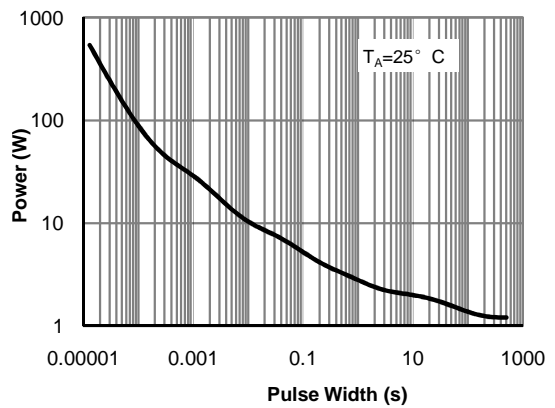


Figure 10: Single Pulse Power Rating Junction-to-Ambient

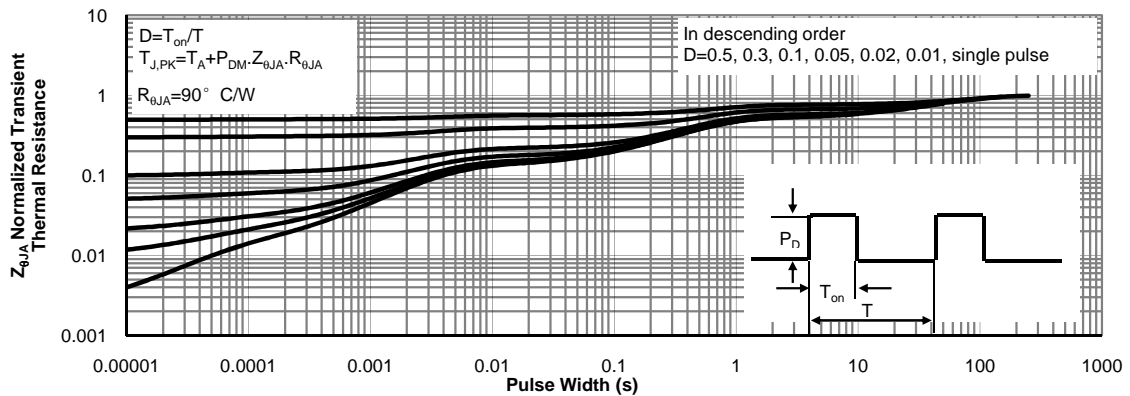
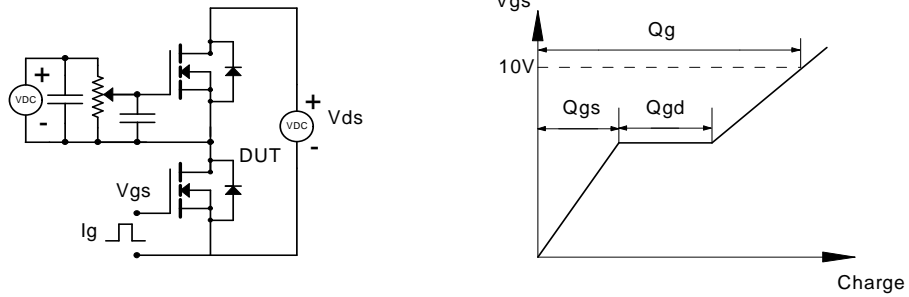


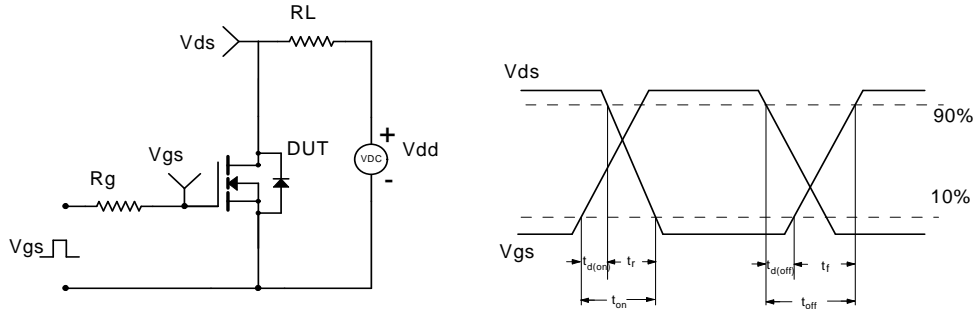
Figure 11: Normalized Maximum Transient Thermal Impedance

COMPLEMENTARY MOSFET

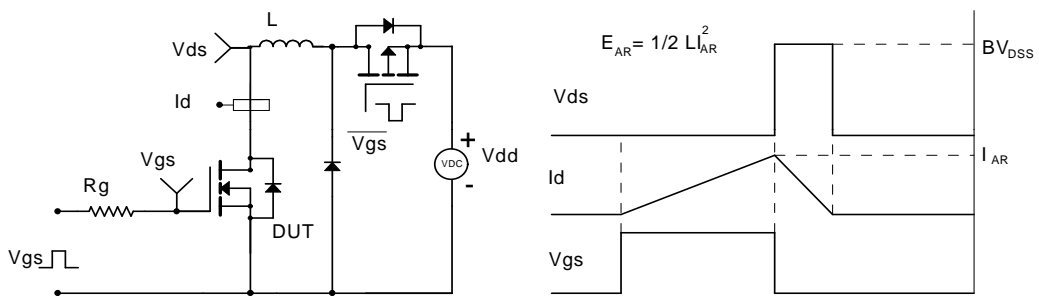
Gate Charge Test Circuit & Waveform



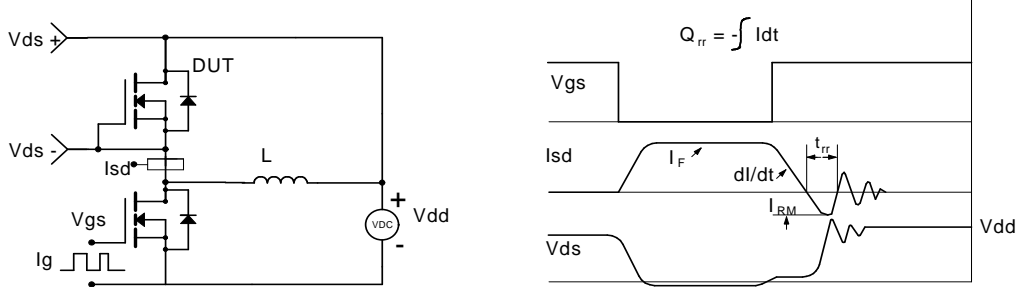
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



**COMPLEMENTARY MOSFET**
**P-CHANNEL ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise specified)**

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Drain-Source breakdown voltage	V <sub>(BR)DSS</sub> *	-30			V	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA
Zero gate voltage drain current	I <sub>DSS</sub> *			-1	μA	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V
Gate-body leakage current	I <sub>GSS</sub> *			±100	nA	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V
Gate-threshold voltage	V <sub>GS(th)</sub> *	-1.3	-1.85	-2.4	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA
On-State Drain Current	I <sub>D(ON)</sub> *	-30			A	V <sub>DS</sub> =-5V, V <sub>GS</sub> =-10V
Drain-source on-resistance	R <sub>DS(ON)</sub> *		22	28	mΩ	V <sub>GS</sub> =-10V, I <sub>D</sub> =-6.5A
			32	40	mΩ	V <sub>GS</sub> =-10V, I <sub>D</sub> =-6.5A, T <sub>J</sub> =125°C
			34	44	mΩ	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A
Forward transconductance	g <sub>FS</sub>		18		S	V <sub>DS</sub> =-5V, I <sub>D</sub> =-6.5A
Diode forward voltage	V <sub>SD</sub>		-0.80	-1	V	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V
Diode forward current	I <sub>S</sub>			-2.5	A	
Input capacitance	C <sub>iss</sub>		760		pF	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz
Output capacitance	C <sub>oss</sub>		140		pF	
Reverse transfer capacitance	C <sub>rss</sub>		95		pF	
Gate resistance	R <sub>g</sub>	1.5	3.2	5	Ω	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz
Total gate charge	Q <sub>g</sub>		6.7	8	nC	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-6.5A
Total gate charge			13.6	16	nC	
Gate-source charge	Q <sub>gs</sub>		2.5		nC	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-6.5A
Gate-drain charge	Q <sub>gd</sub>		3.2		nC	
Turn-on delay time	t <sub>d(on)</sub>		8		nS	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>GEN</sub> =3Ω, R <sub>L</sub> =2.3Ω
Turn-on rise time	t <sub>r</sub>		6		nS	
Turn-off delay time	t <sub>d(off)</sub>		17		nS	
Turn-off fall time	t <sub>f</sub>		5		nS	
Body Diode Reverse Recovery Time	t <sub>rr</sub>		15		nS	I <sub>F</sub> =-6.5A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>		9.7		nC	I <sub>F</sub> =-6.5A, dI/dt=100A/μs

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

COMPLEMENTARY MOSFET

**P-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

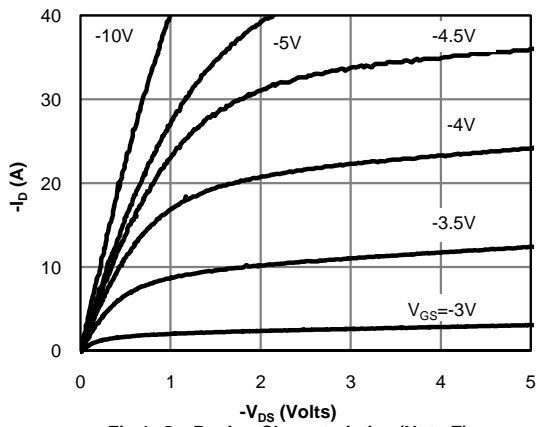


Fig 1: On-Region Characteristics (Note E)

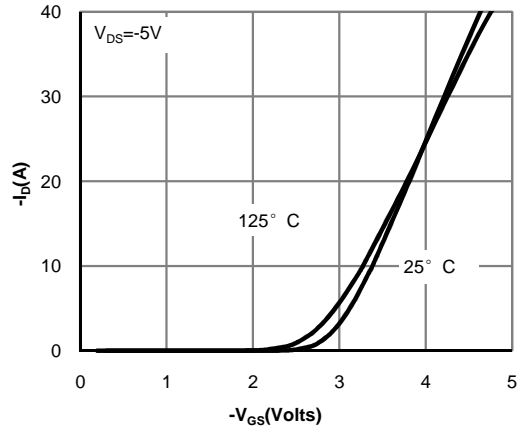


Figure 2: Transfer Characteristics (Note E)

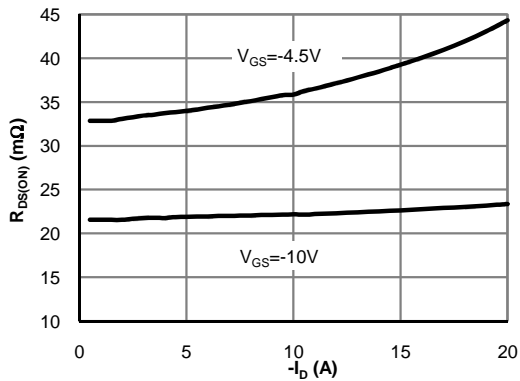


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

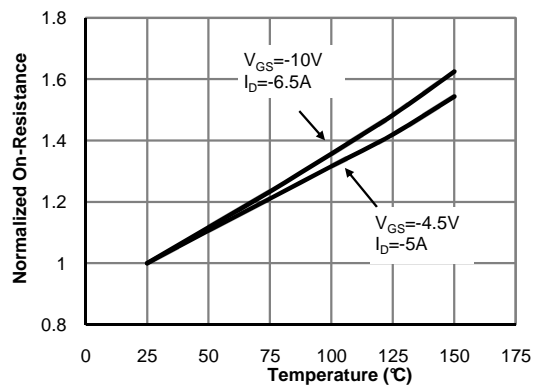


Figure 4: On-Resistance vs. Junction Temperature

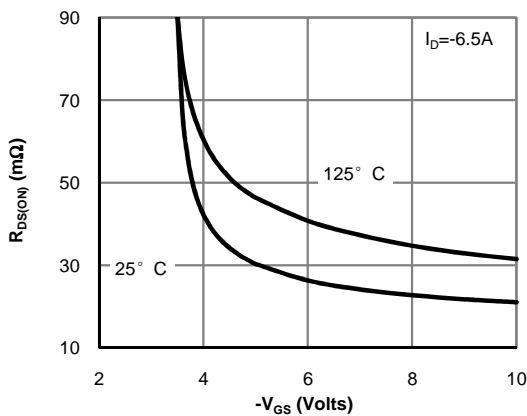


Figure 5: On-Resistance vs. Gate-Source Voltage

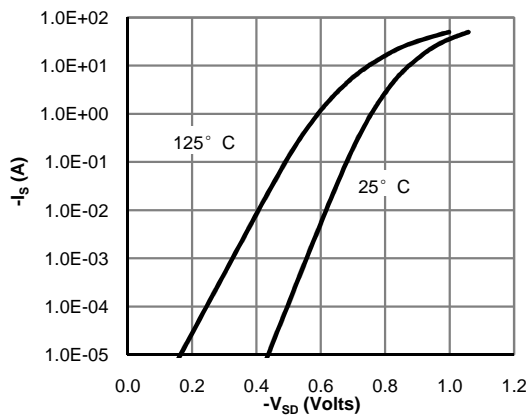


Figure 6: Body-Diode Characteristics

COMPLEMENTARY MOSFET

P-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

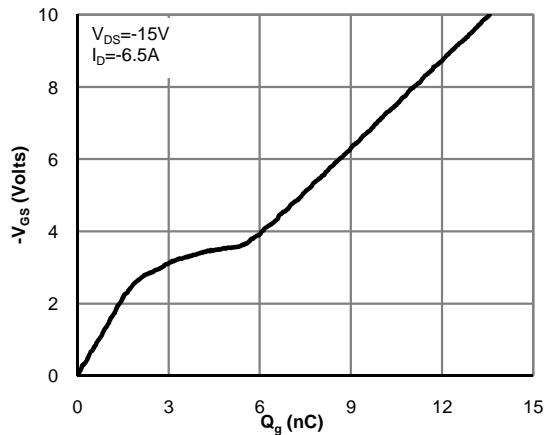


Figure 7: Gate-Charge Characteristics

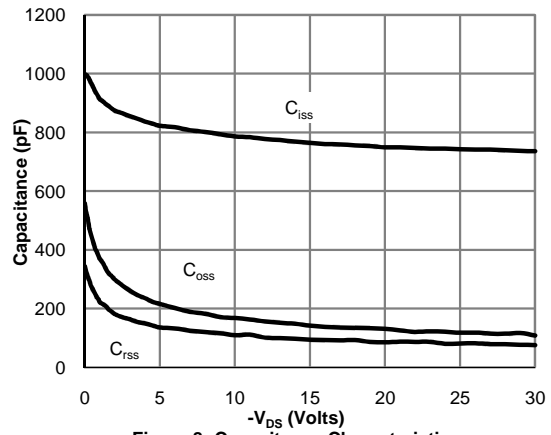


Figure 8: Capacitance Characteristics

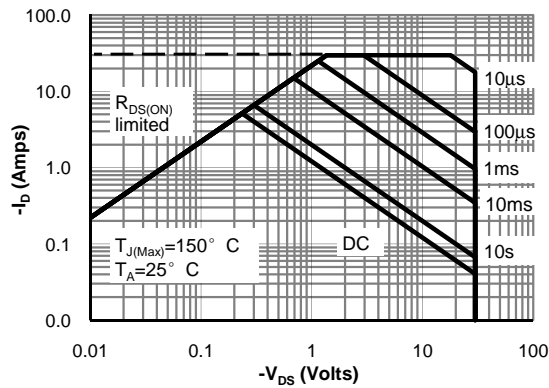


Figure 9: Maximum Forward Biased Safe Operating Area

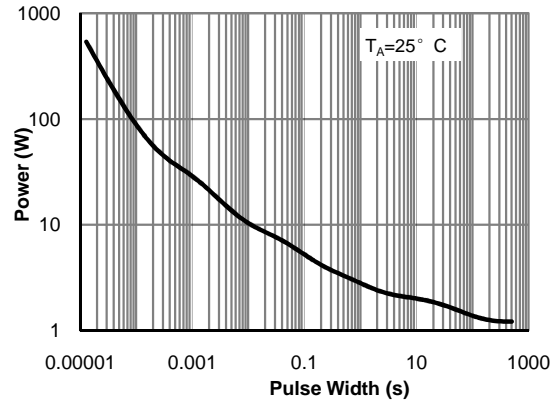


Figure 10: Single Pulse Power Rating Junction-to-Ambient

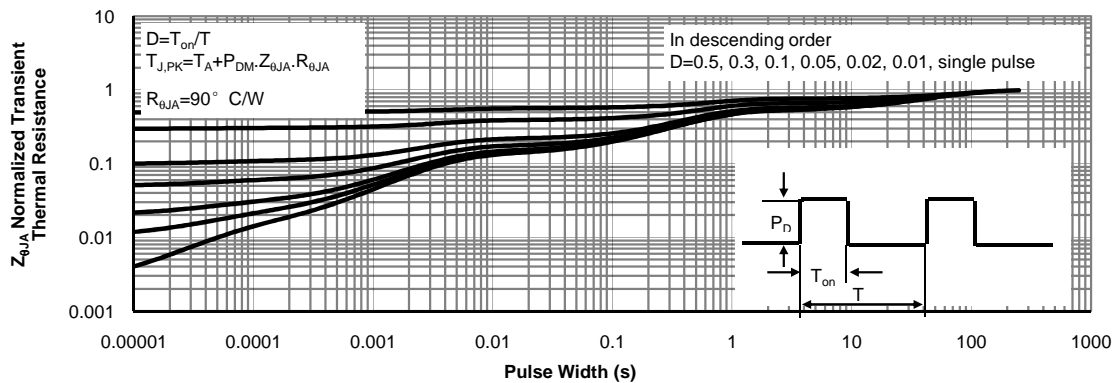
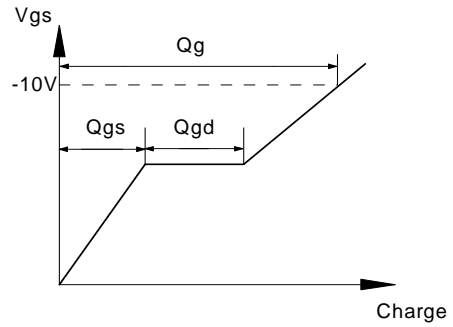
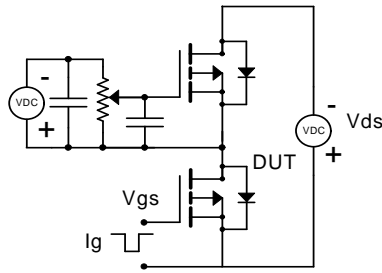


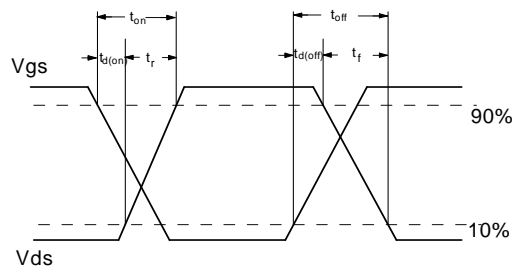
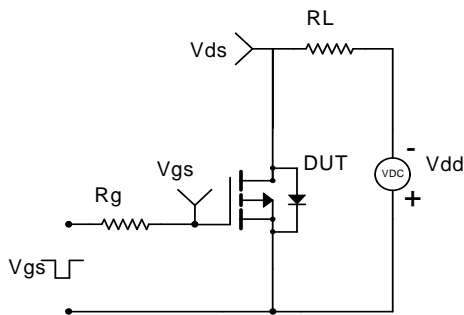
Figure 11: Normalized Maximum Transient Thermal Impedance

COMPLEMENTARY MOSFET

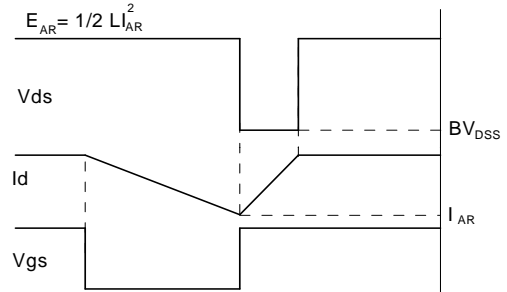
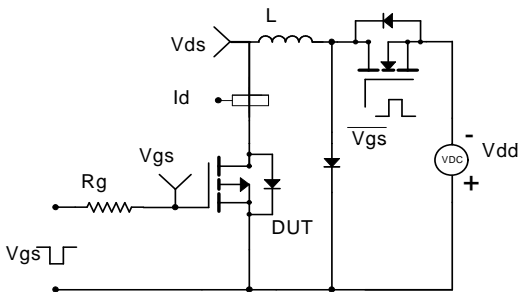
Gate Charge Test Circuit & Waveform



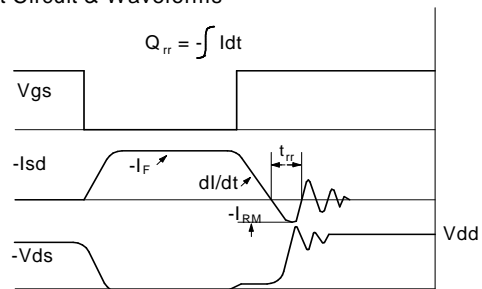
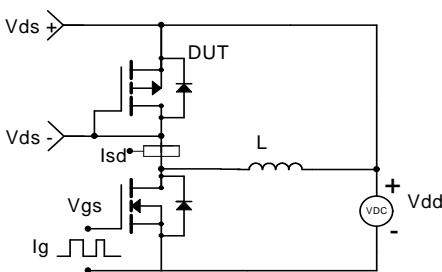
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



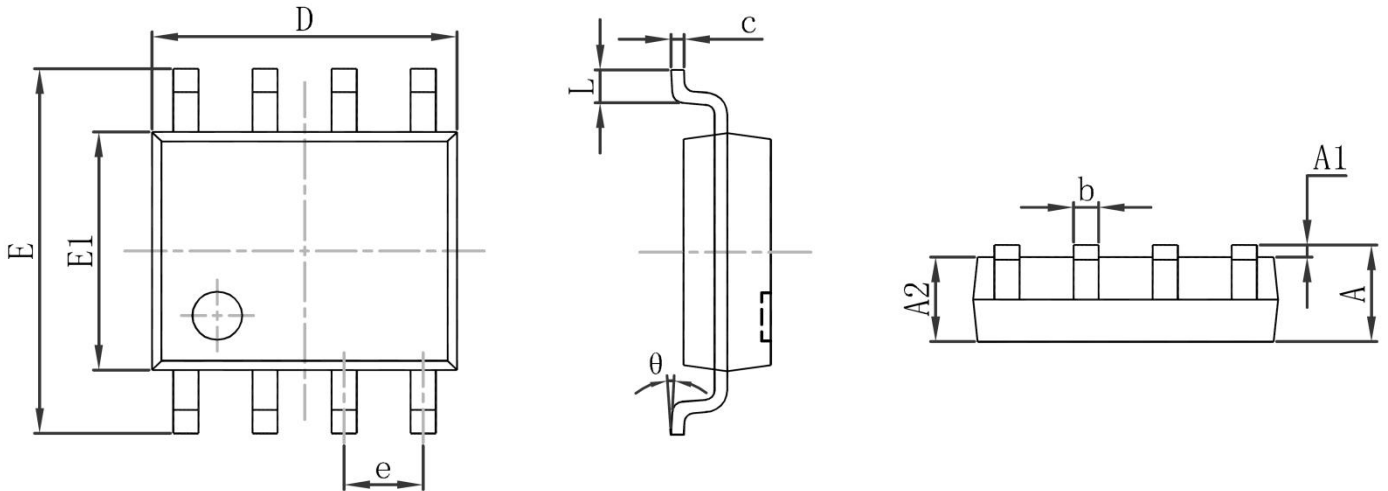
Diode Recovery Test Circuit & Waveforms





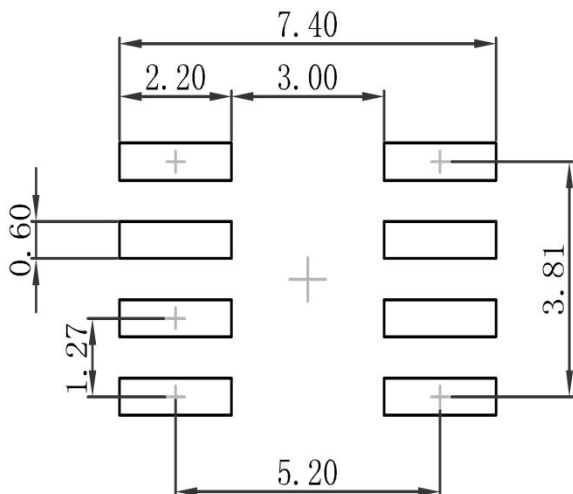
COMPLEMENTARY MOSFET

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

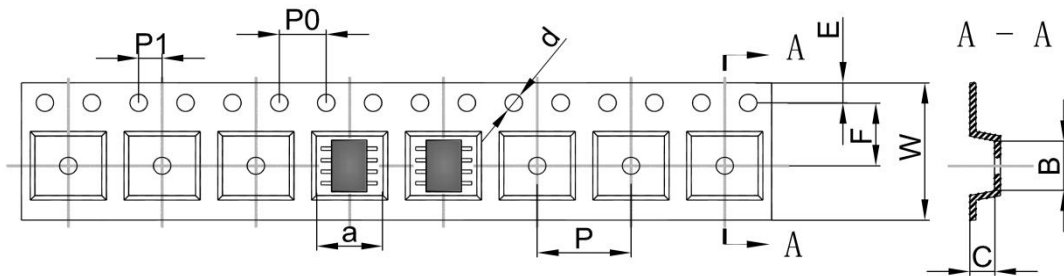


**Note:**

1. Controlling dimension: in millimeters
2. General tolerance: ±0.05mm
3. The pad layout is for reference purposes only

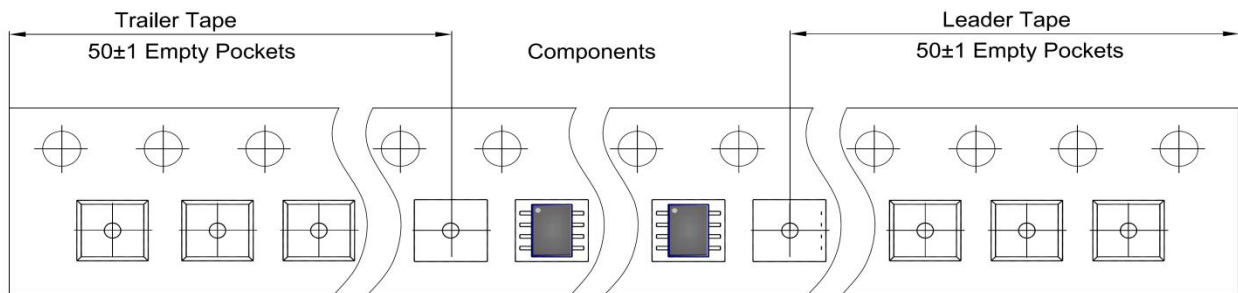
**COMPLEMENTARY MOSFET**  
**SOP-8 Tape and Reel**

**SOP-8 Embossed Carrier Tape**

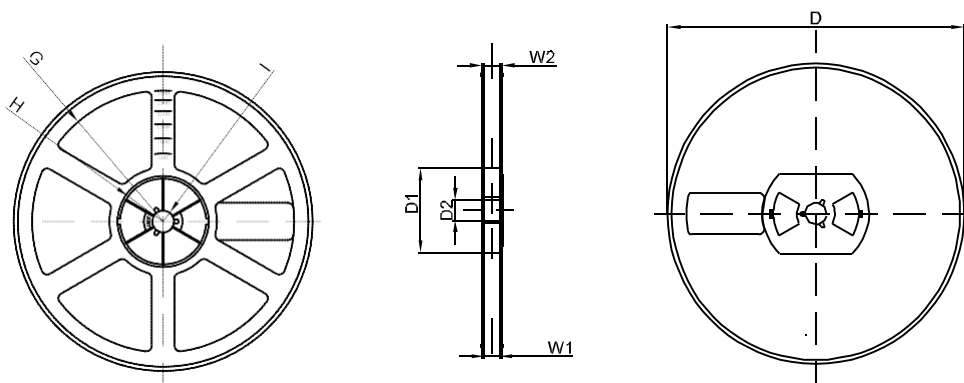


DIMENSIONS ARE IN MILLIMETER										
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOP-8	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

**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