

N-Ch and P-Ch Fast Switching MOSFETs

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary



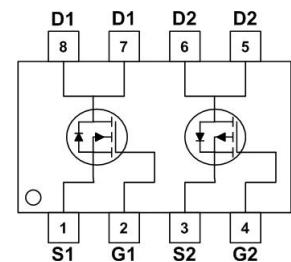
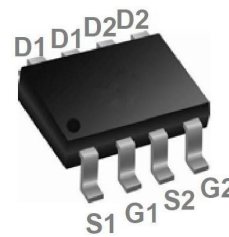
BVDSS	RDS(on)	ID
20V	12mΩ	8A
-20V	16mΩ	-8A

Description

The UD8G02S is the high performance complementary N-ch and P-ch MOSFETs with high cell density, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications.

The UD8G02S meet the RoHS and Green

SOP8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-Source Voltage	± 12	± 12	V
$I_D @ T_a = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	8	-8	A
$I_D @ T_a = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	5	-5	A
I_{DM}	Pulsed Drain Current ²	32	-30	A
EAS	Single Pulse Avalanche Energy ³	---	---	mJ
$P_D @ T_c = 25^\circ C$	Total Power Dissipation ⁴	2	1.5	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	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	---	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	---	$^\circ C/W$

N-Ch and P-Ch Fast Switching MOSFETs

N-Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	---	---	$V/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=4.5V$, $I_D=21A$	---	12	16	$m\Omega$
		$V_{GS}=2.5V$, $I_D=13A$	---	16	20.5	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	0.5	0.75	1.2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	$mV/^{\circ}\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=20V$, $V_{GS}=0V$, $T_J=55^{\circ}\text{C}$	---	---	---	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	---	---	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=10A$	---	15	---	nC
Q_{gs}	Gate-Source Charge		---	2	---	
Q_{gd}	Gate-Drain Charge		---	5.2	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=10V$, $V_{GS}=4.5V$, $R_G=3\Omega$, $I_D=10A$	---	9	---	ns
T_r	Rise Time		---	25	---	
$T_{d(off)}$	Turn-Off Delay Time		---	37	---	
T_f	Fall Time		---	14	---	
C_{iss}	Input Capacitance	$V_{DS}=10V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	700	---	pF
C_{oss}	Output Capacitance		---	132	---	
C_{rss}	Reverse Transfer Capacitance		---	114	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	20	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=21A$, $T_J=25^{\circ}\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=21A$, $di/dt=100A/\mu s$, $T_J=25^{\circ}\text{C}$	---	---	---	nS
Q_{rr}	Reverse Recovery Charge		---	---	---	nC

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

N-Ch and P-Ch Fast Switching MOSFETs

P-Channel Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	---	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-4.5V$, $I_D=-13A$	---	16	21	$m\Omega$
		$V_{GS}=-2.5V$, $I_D=-10A$	---	20	26	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-0.4	-0.7	-1	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-20V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-20V$, $V_{GS}=0V$, $T_J=100^\circ\text{C}$	---	---	---	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V$, $I_D=-20A$	---	---	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	---	---	Ω
Q_g	Total Gate Charge	$V_{DS}=-10V$, $V_{GS}=-4.5V$, $I_D=-13A$	---	33.7	---	nC
Q_{gs}	Gate-Source Charge		---	3.5	---	
Q_{gd}	Gate-Drain Charge		---	10.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{GS}=-4.5V$, $V_{DS}=-10V$, $I_D=-13A$, $R_{GEN}=10\Omega$	---	11	---	ns
T_r	Rise Time		---	35	---	
$T_{d(off)}$	Turn-Off Delay Time		---	30	---	
T_f	Fall Time		---	10	---	
C_{iss}	Input Capacitance	$V_{DS}=-10V$, $V_{GS}=0V$, $f=1MHz$	---	1200	---	pF
C_{oss}	Output Capacitance		---	191	---	
C_{rss}	Reverse Transfer Capacitance		---	168	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-20	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-13A$, $T_J=25^\circ\text{C}$	---	---	-1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycles $\leq 2\%$

Typical Performance Characteristics-N

Figure1: Output Characteristics

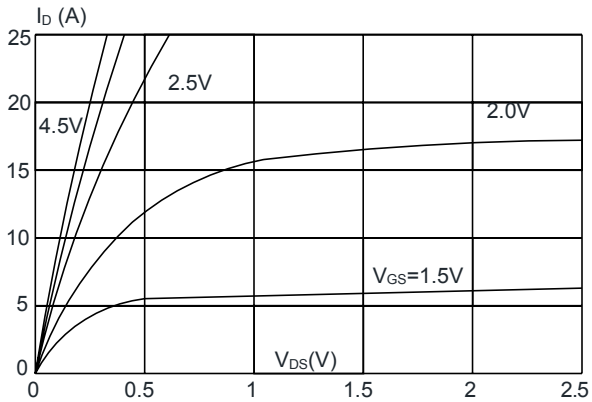


Figure 2: Typical Transfer Characteristics

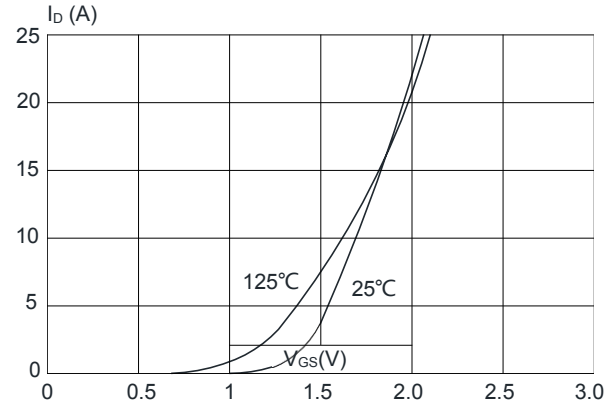


Figure 3: On-resistance vs. Drain Current

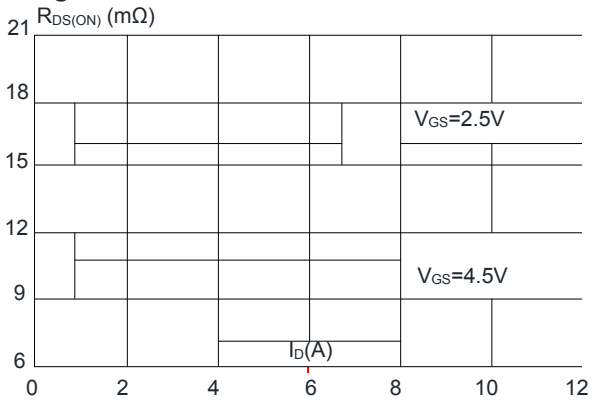


Figure 4: Body Diode Characteristics

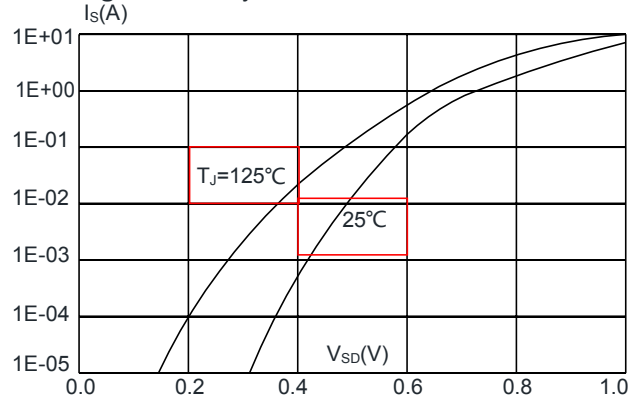


Figure 5: Gate Charge Characteristics

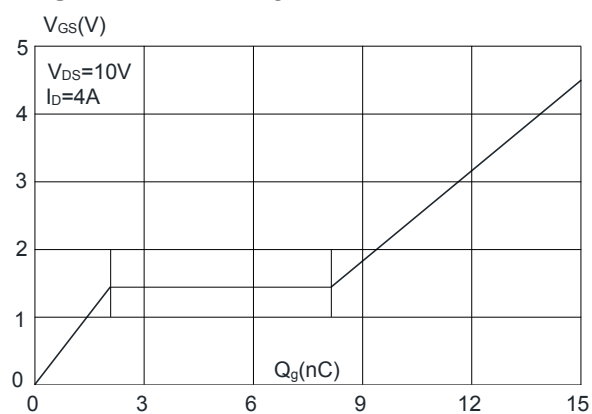
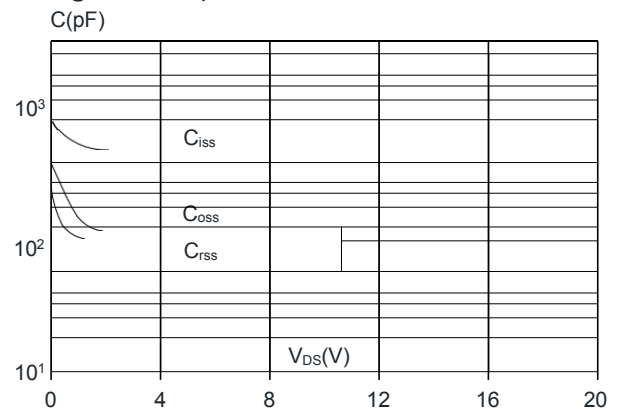


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

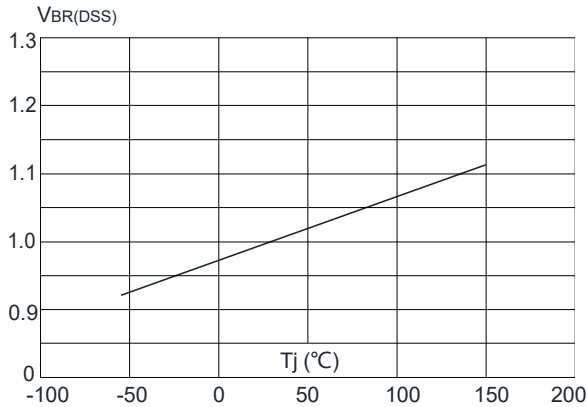


Figure 8: Normalized on Resistance vs. Junction Temperature

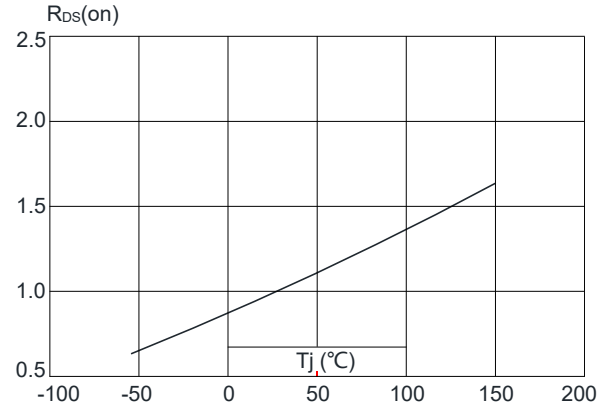


Figure 9: Maximum Safe Operating Area

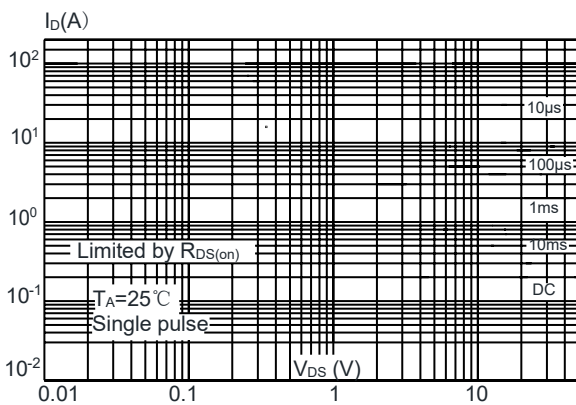


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

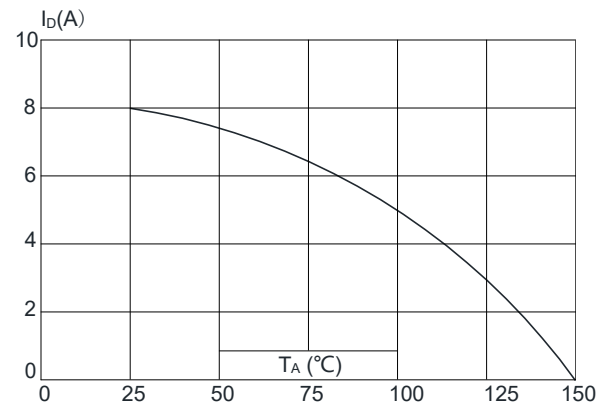
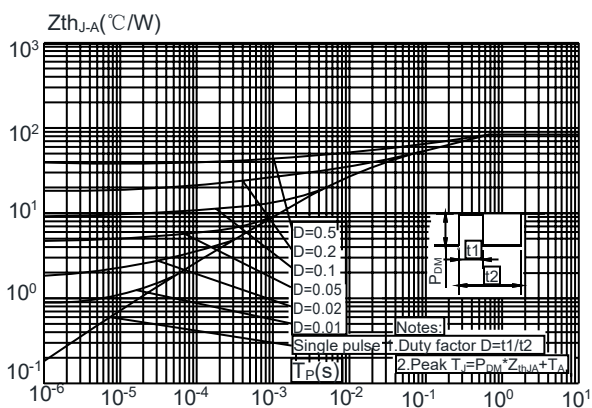


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Typical Performance Characteristics-P

Figure 1: Output Characteristics

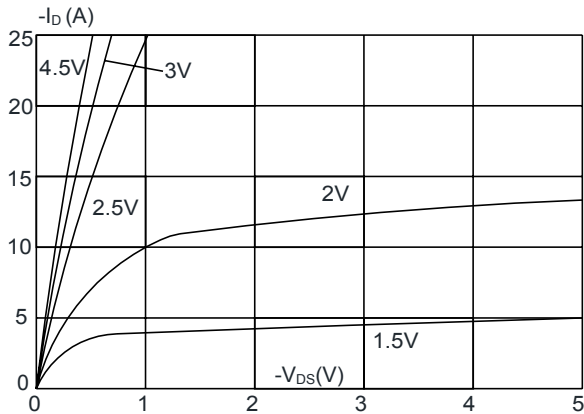


Figure 2: Typical Transfer Characteristics

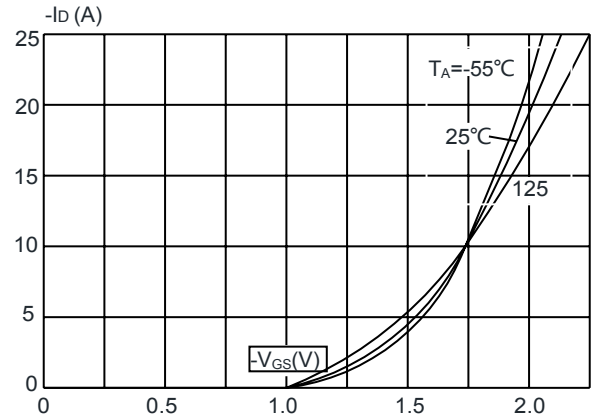


Figure 3: On-resistance vs. Drain Current

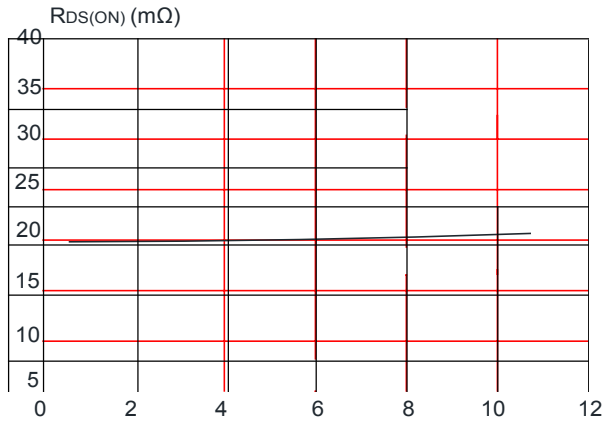


Figure 4: Body Diode Characteristics

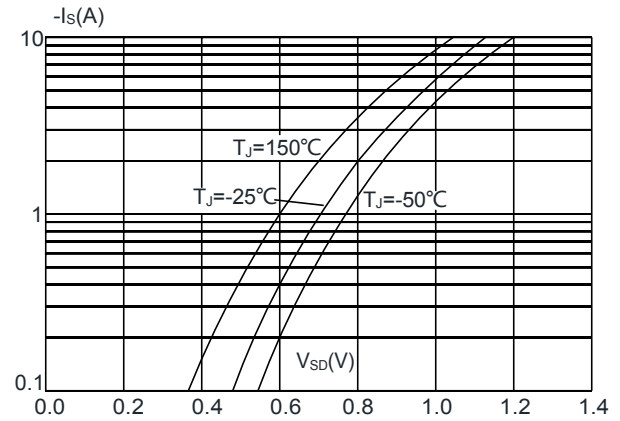


Figure 5: Gate Charge Characteristics

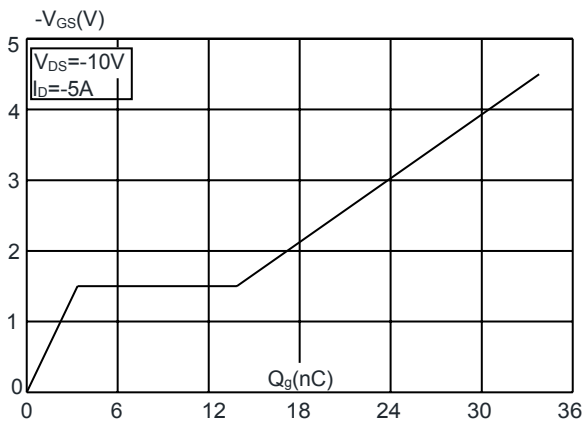
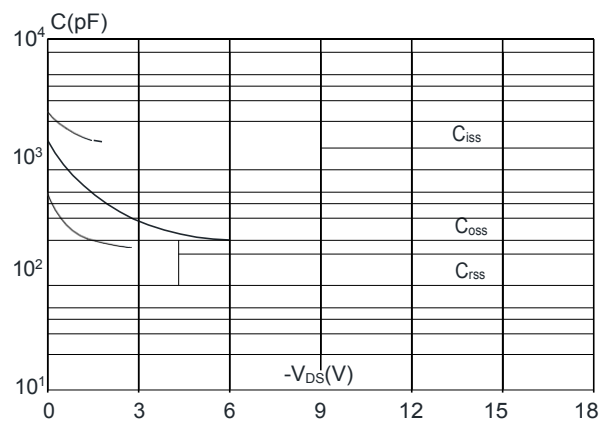


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

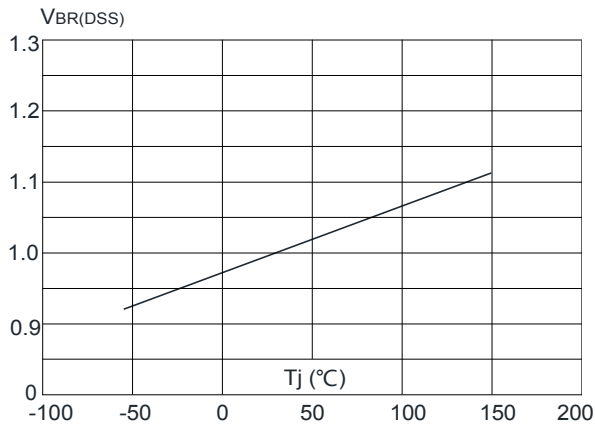


Figure 8: Normalized on Resistance vs. Junction Temperature

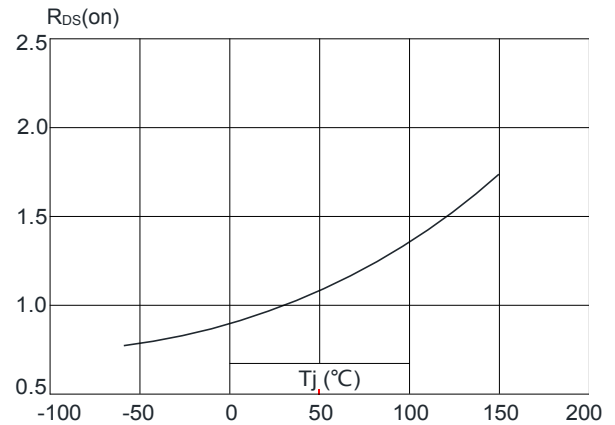


Figure 9: Maximum Safe Operating Area

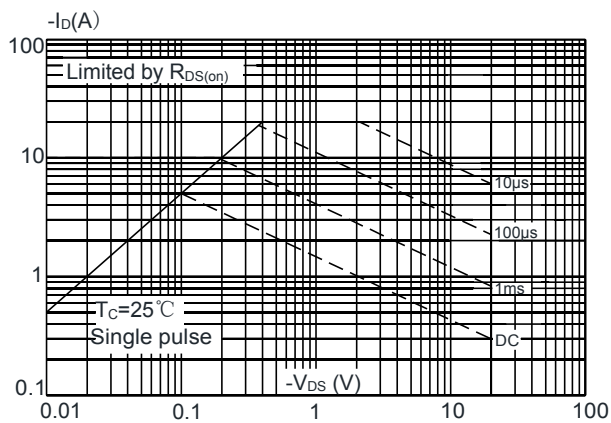


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

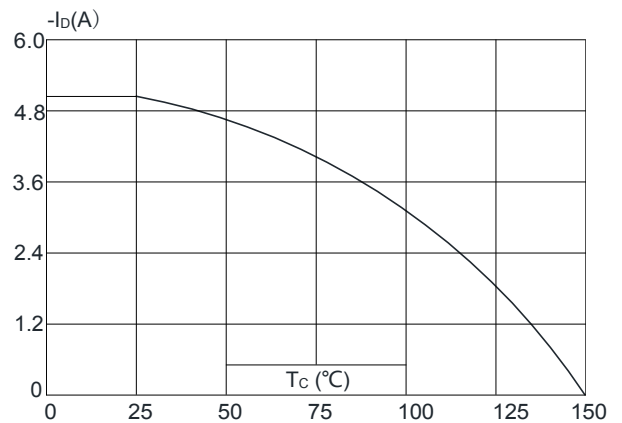
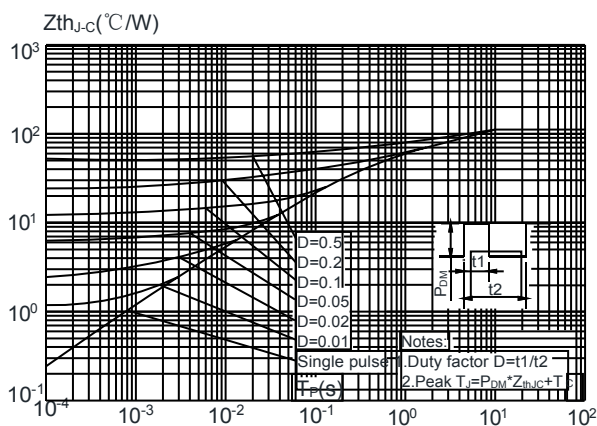
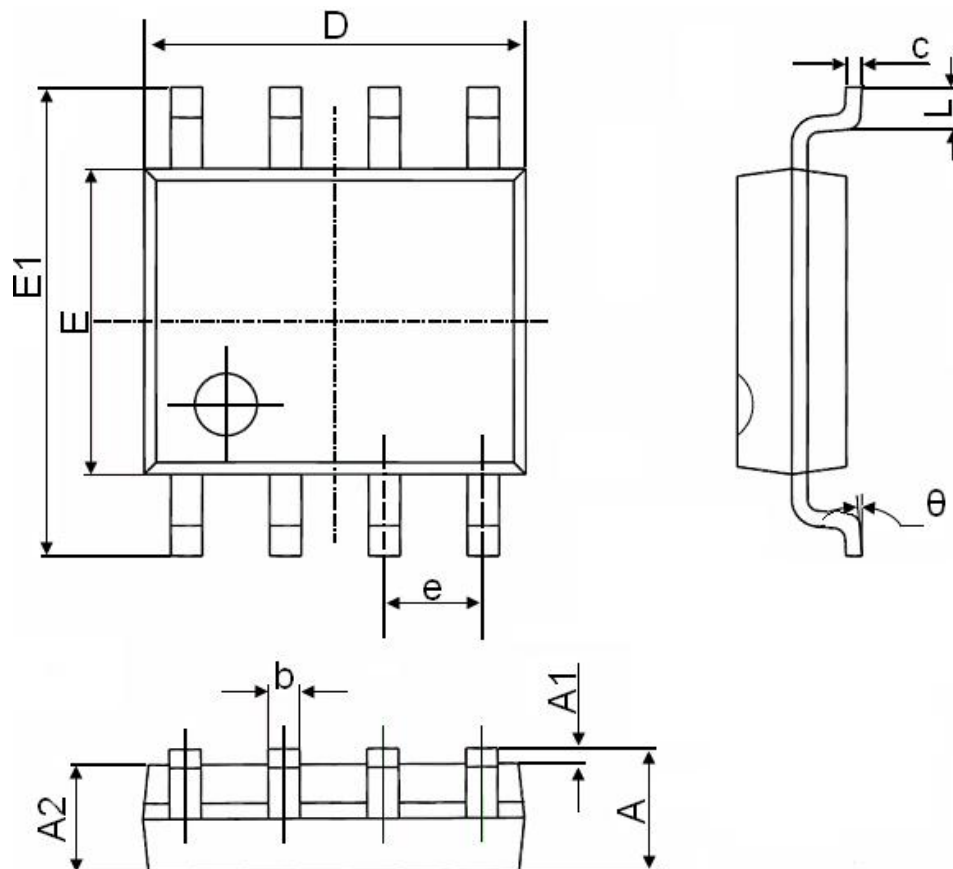


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



SOP-8 Package Information



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°