Features

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology
- ★ 100% EAS Guaranteed

Product Summery

RoHS

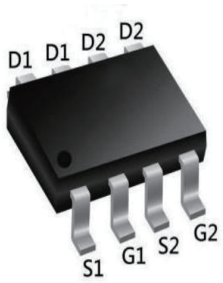
BVDSS	RDSON	ID
40V	17mΩ	8.5A
-40V	39mΩ	-7.5A

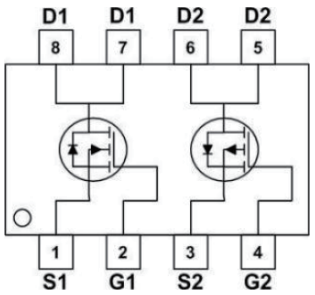
Description

THE 4614 is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

THE 4614 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

SOP8 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter		Max. N-Channel	Max. P-Channel	Units
V_{DSS}	Drain-Source Voltage		40	-40	V
V_{GSS}	Gate-Source Voltage		±20	±20	V
I_D	Continuous Drain Current	T_A = 25℃	8.5	-7.5	A
		T_A = 100℃	5.2	-3.9	A
I_{DM}	Pulsed Drain Current note1		32	-24	A
E_{AS}	Single Pulsed Avalanche Energy note2		13	17.6	mJ
P_D	Power Dissipation	T_A = 25℃	2	3.2	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		62.5	39	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150		℃

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V, V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS}=10V, I_D=8A	-	17	22	mΩ
		V_{GS}=4.5V, I_D=5A	-	25	35	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1.0MHz	-	633	-	pF
C_{oss}	Output Capacitance		-	67	-	pF
C_{rss}	Reverse Transfer Capacitance		-	58	-	pF
Q_g	Total Gate Charge	V_{DS}=20V, I_D=8A, V_{GS}=10V	-	12	-	nC
Q_{gs}	Gate-Source Charge		-	3.2	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	3.1	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}= 20V, R_L =2.5Ω, V_{GS}=10V, R_{REN} =3Ω	-	4	-	ns
t_r	Turn-on Rise Time		-	3	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	15	-	ns
t_f	Turn-off Fall Time		-	2	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	8.5	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	32	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= 8A	-	-	1.2	V

Note :
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2.EAS condition : T_J=25°C,V_{DD}=20V,V_G=10V,L=0.5mH,Rg=25Ω,IAS=7.2A
T_J=25°C,V_{DD}=-20V,VG= -10V,L=0.5mH,Rg=25Ω,IAS=-8.4A
3.Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D= -250μA	-40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= -40V, V_{GS}=0V	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D= -250μA	-1	-1.6	-2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS}= -10V, I_D= -6A	-	39	53	mΩ
		V_{GS}= -4.5V, I_D= -4A	-	58	81	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}= -20V, V_{GS}=0V, f=1.0MHz	-	860	-	pF
C_{oss}	Output Capacitance		-	87	-	pF
C_{rss}	Reverse Transfer Capacitance		-	70	-	pF
Q_g	Total Gate Charge	V_{DS}= -20V, I_D= -6A, V_{GS}= -10V	-	13	-	nC
Q_{gs}	Gate-Source Charge		-	3.8	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	3.1	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}= -20V, R_L =2.3Ω V_{GS}=-10V,R_{REN} =6Ω	-	7.5	-	ns
t_r	Turn-on Rise Time		-	5.5	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	19	-	ns
t_f	Turn-off Fall Time		-	7	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-7.5	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-24	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= -6A	-	-	-1.2	V

Note :
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2.EAS condition : T_J=25°C,V_{DD}=20V,V_G=10V,L=0.5mH,Rg=25Ω,IAS=7.2A
T_J=25°C,V_{DD}=-20V,VG= -10V,L=0.5mH,Rg=25Ω,IAS=-8.4A
3.Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

N-Channel Typical Performance Characteristics

Figure1:Typical Output Characteristics

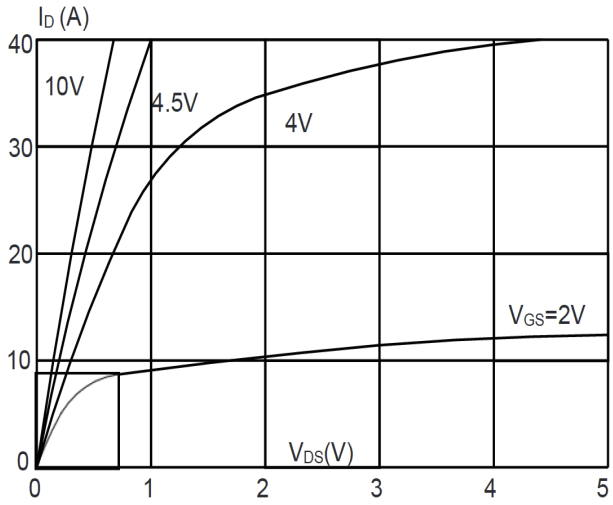


Figure 2: Typical Transfer Characteristics

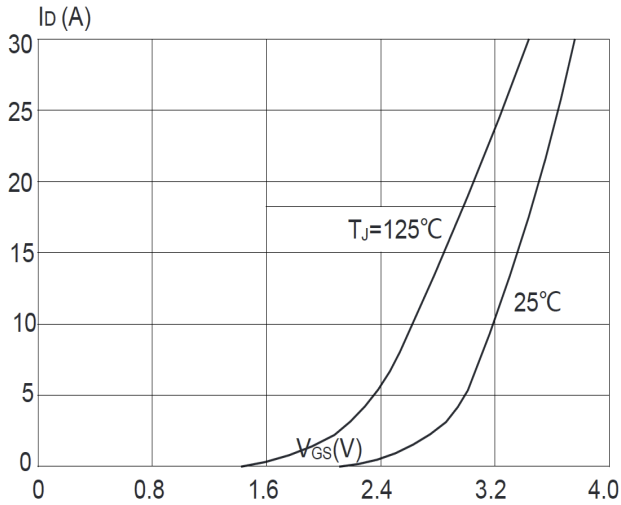


Figure 3:On-resistance vs. Drain Current

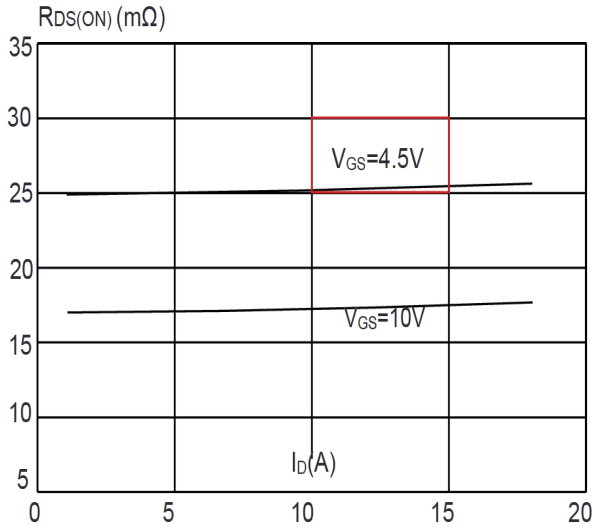


Figure 4: Body Diode Characteristics

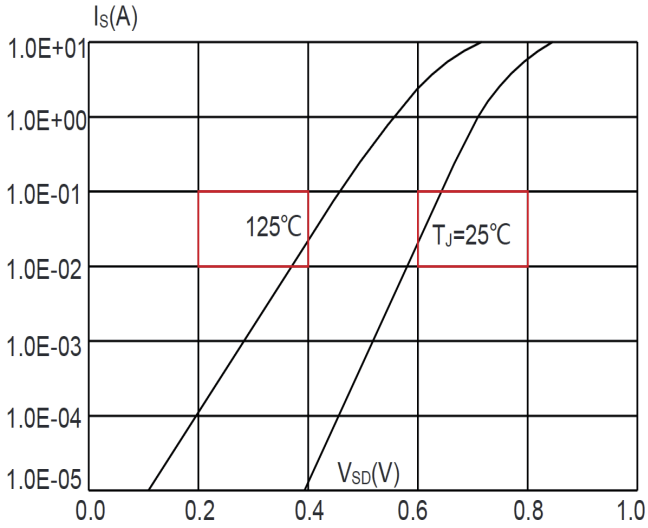


Figure 5: Gate Charge Characteristics

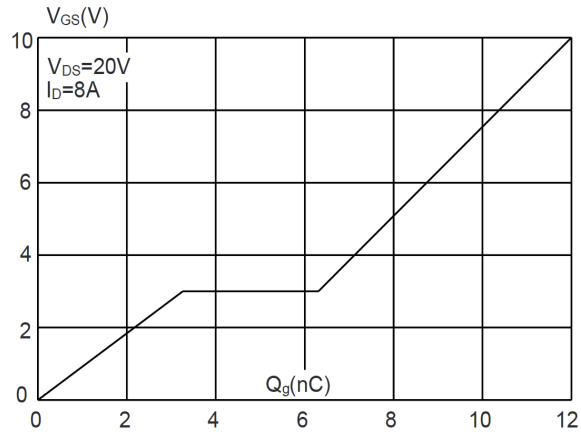
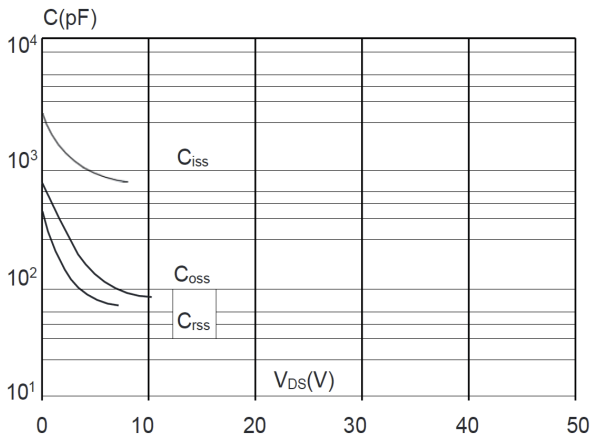


Figure 6:Capacitance Characteristics



N-Channel Typical Performance Characteristics

Figure7:Normalized Breakdown Voltage

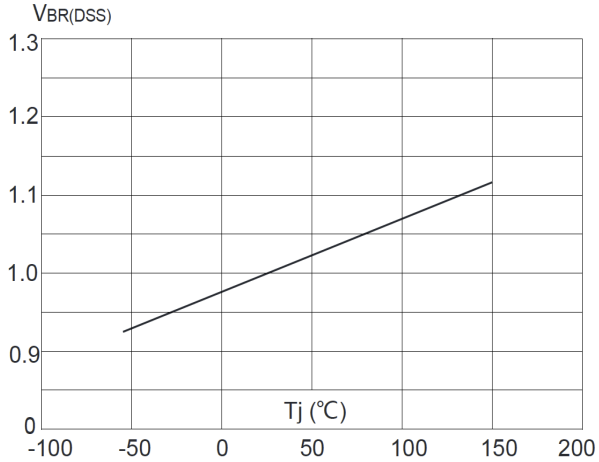


Figure 8: Normalized on Resistance vs.

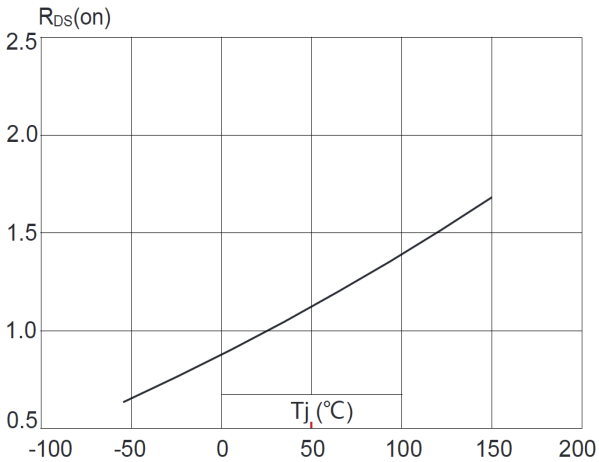


Figure9:Maximum Safe Operating Area

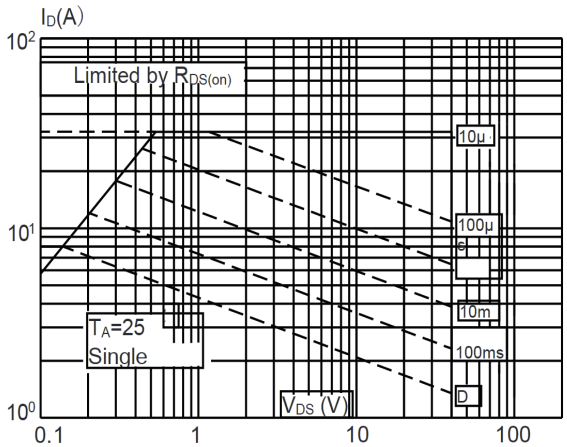


Figure 10: Maximum Continuous Drain C

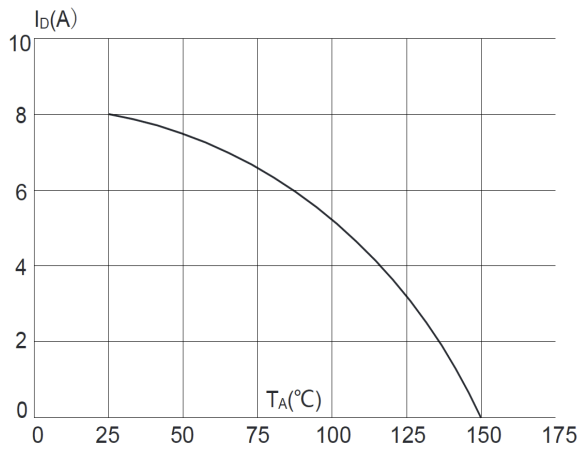
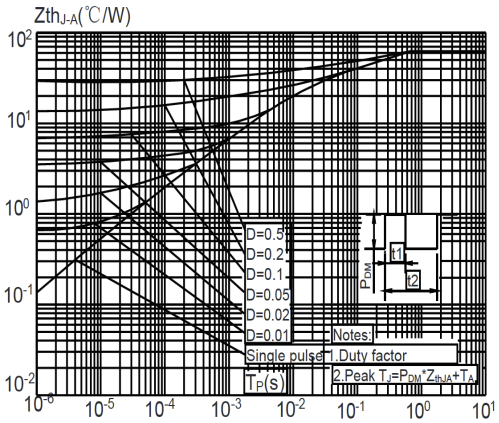


Figure11:Maximum Effective Transient T

Transient Thermal Impedance, Junction-to-Ambient



P-Channel Typical Performance Characteristics

Figure1:Typical Output Characteristics

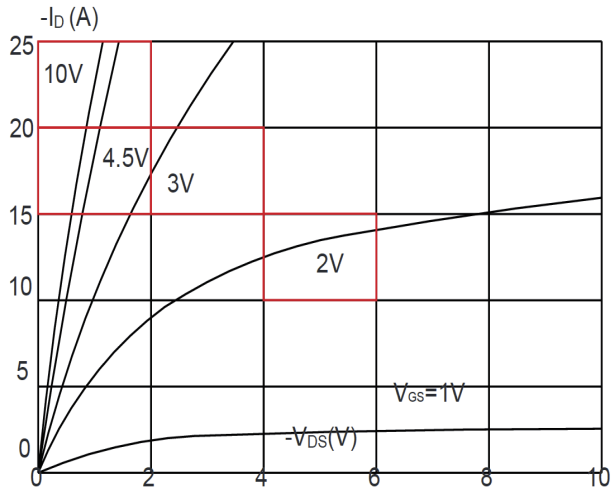


Figure 2: Typical Transfer Characteristics

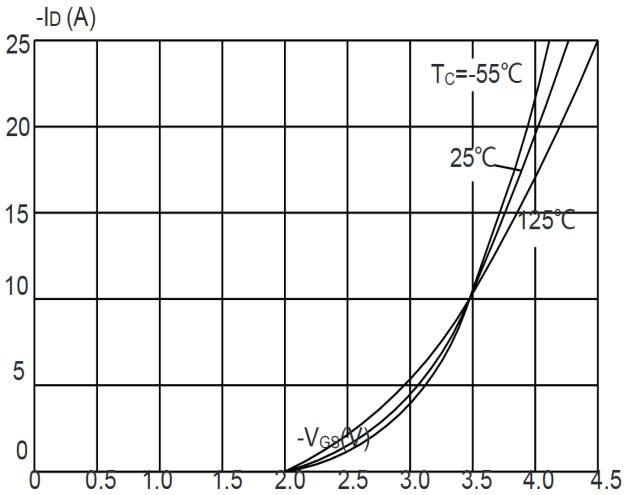


Figure 3:On-resistance vs. Drain Current

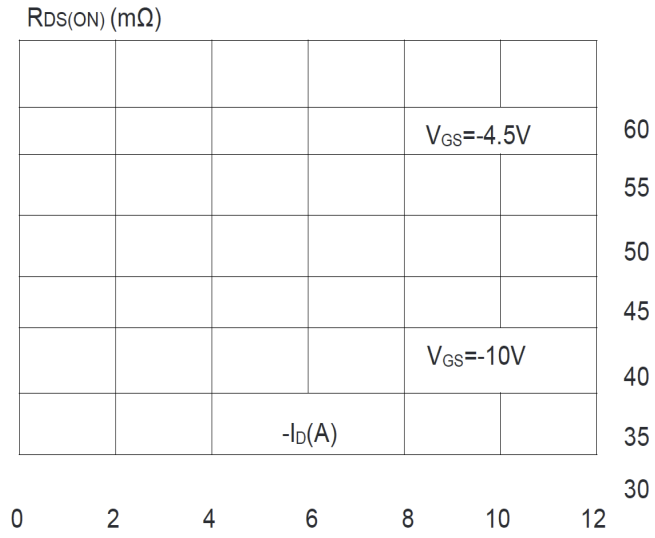


Figure 4: Body Diode Characteristics

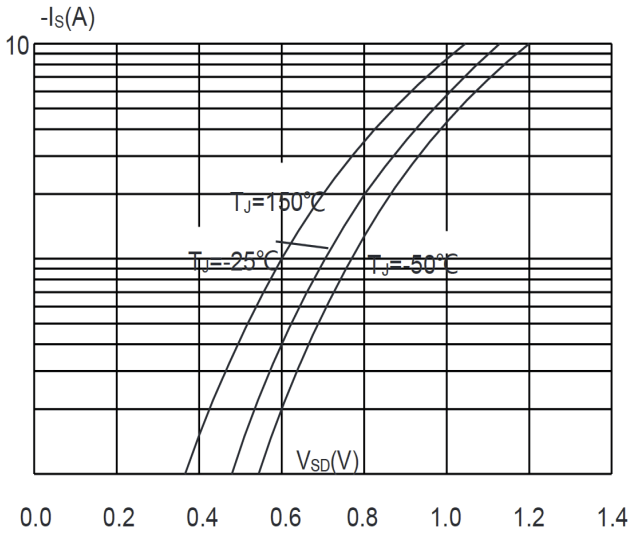


Figure 5: Gate Charge Characteristics

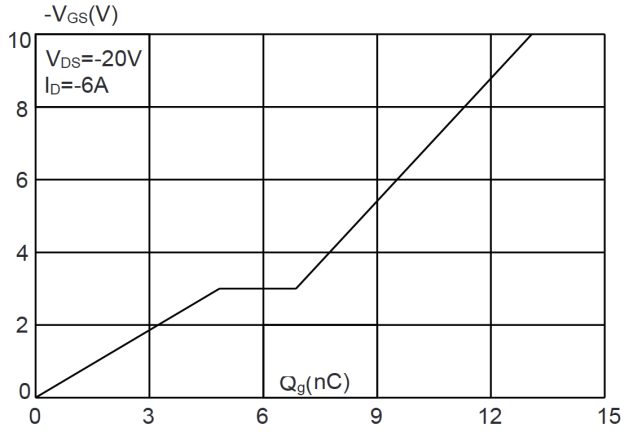
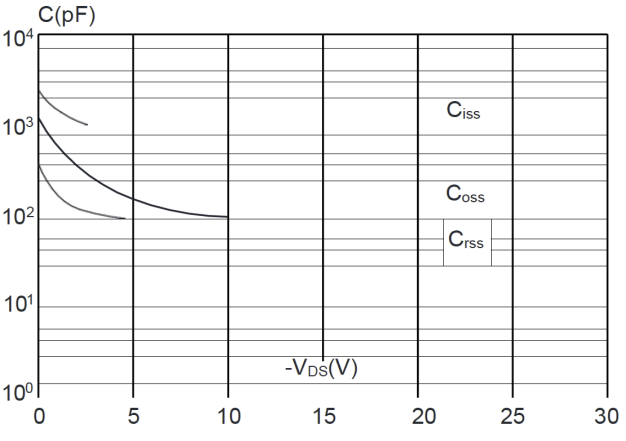


Figure 6: Capacitance Characteristics



P-Channel Typical Performance Characteristics

Figure7:Normalized Breakdown Voltage vs. Junction Temperature

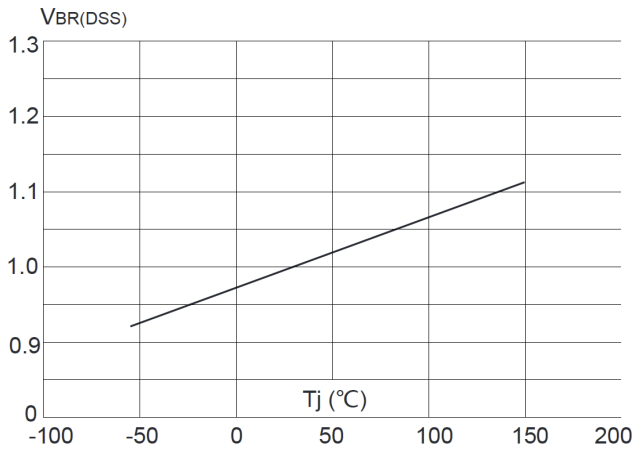


Figure 8: Normalized on Resistance vs. Junction Temperature

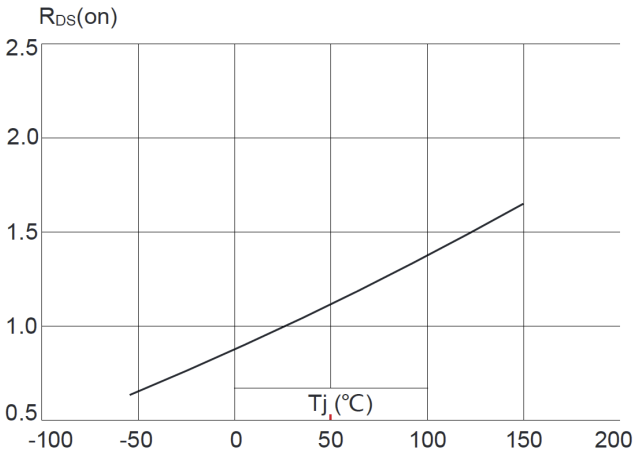


Figure9:Maximum Safe Operating Area

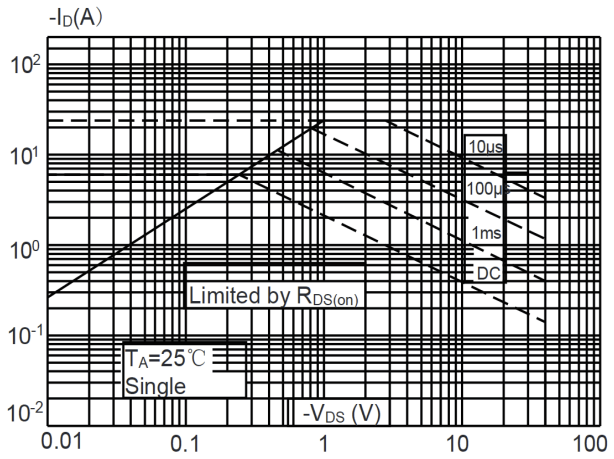


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

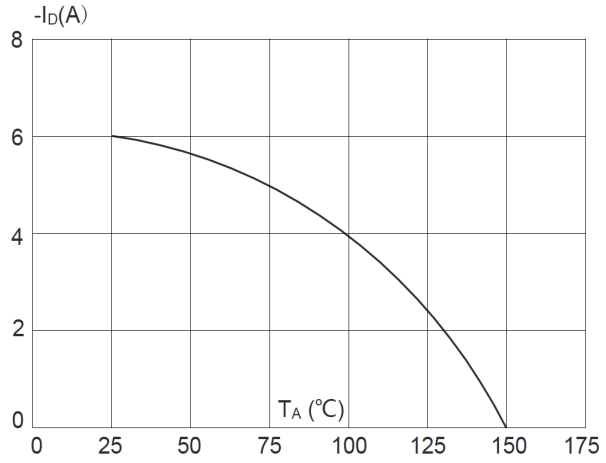
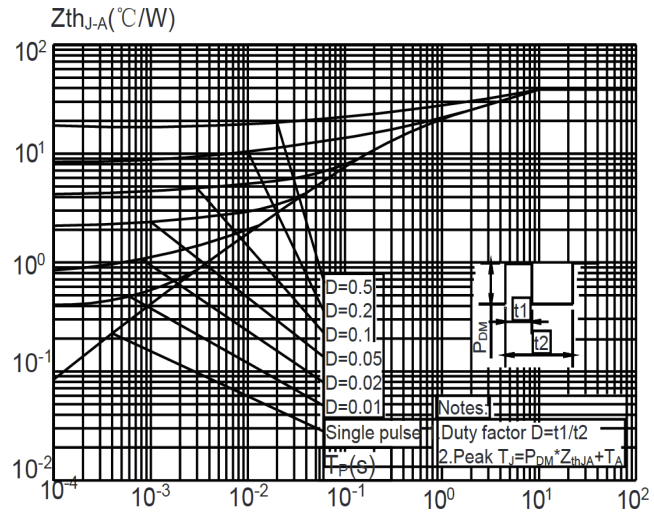
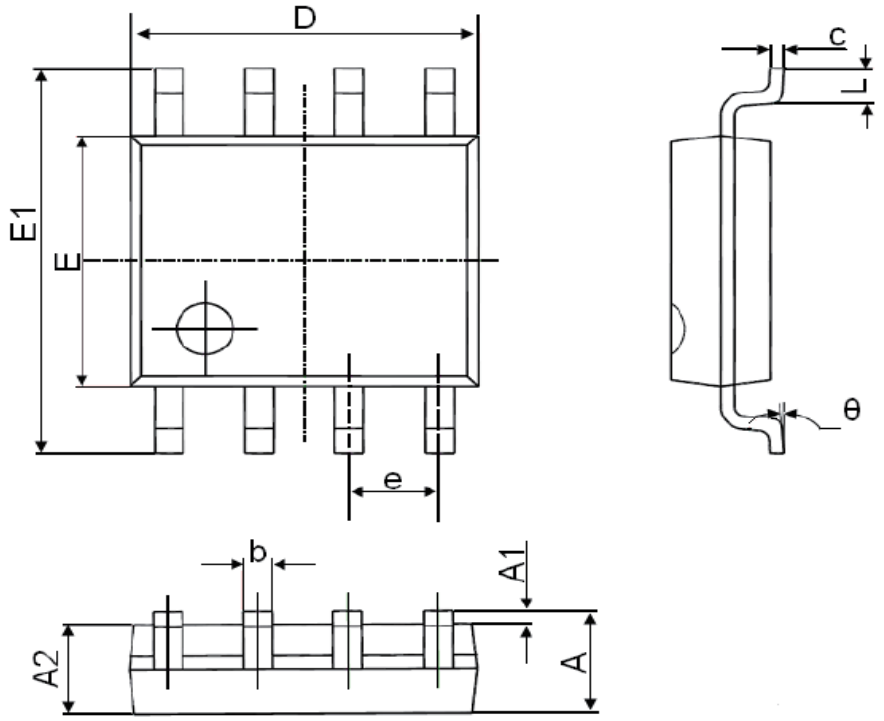


Figure11:Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Package Mechanical Data- SOP-8



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°