

Description:

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

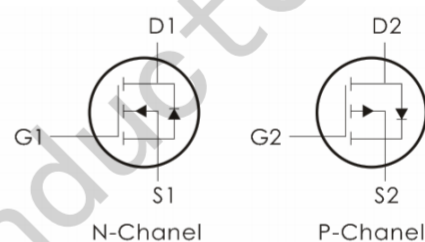
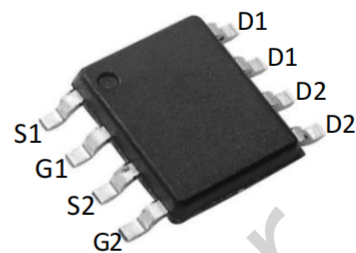
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=30V, I_D=10A, R_{DS(on)} < 15m\Omega @ V_{GS}=10V$

P-Channel: $V_{DS}=-30V, I_D=-8A, R_{DS(on)} < 20m\Omega @ V_{GS}=-10V$

- 1)
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 5) Excellent package for good heat dissipation.



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

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_A=25^\circ C$	10	-8	A
	Continuous Drain Current- $T_A=100^\circ C$	6.5	-5	
I_{DM}	Pulsed Drain Current ^{note1}	40	-37	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	17	24	mJ
P_D	Power Dissipation - $T_A=25^\circ C$	2.2	3.3	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		$^\circ C$

Thermal Characteristics:

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	57	37.9	$^{\circ}\text{C}/\text{W}$

N-Channel Electrical Characteristics: ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

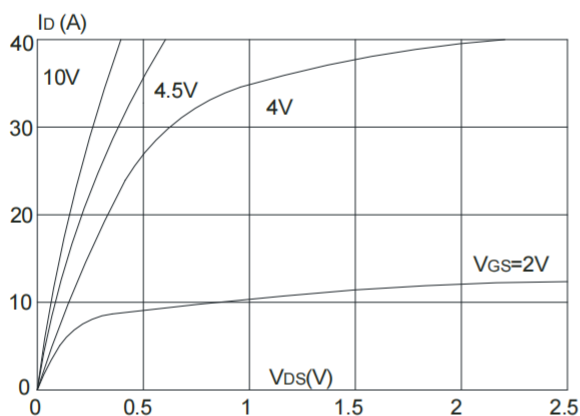
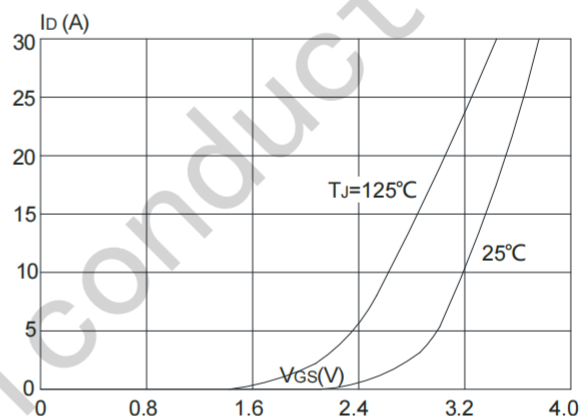
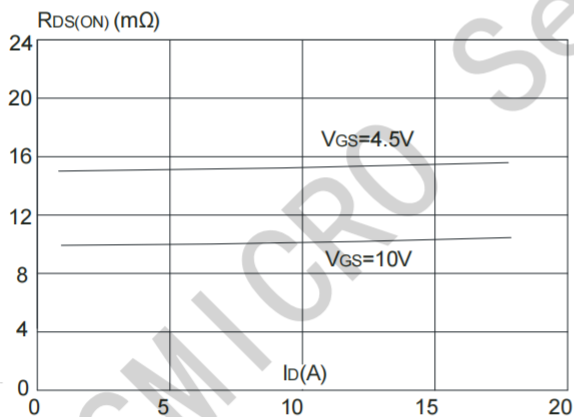
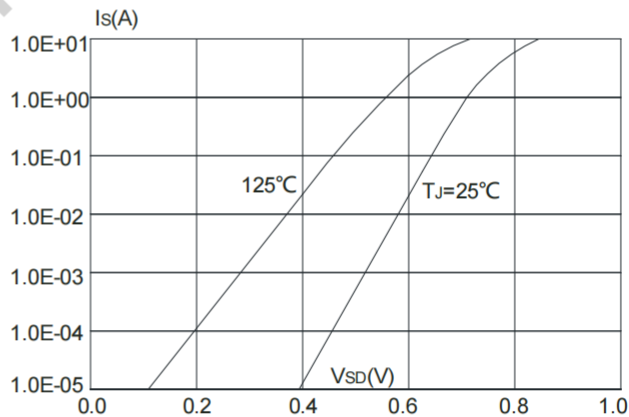
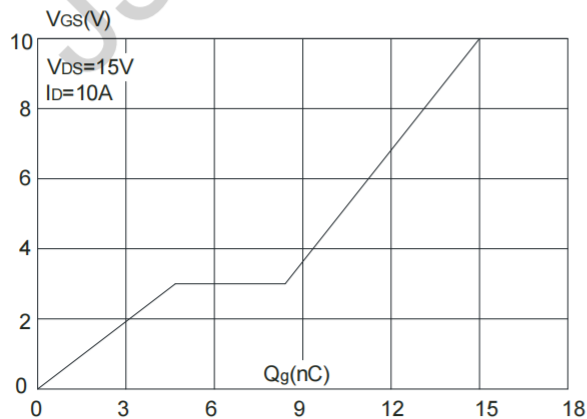
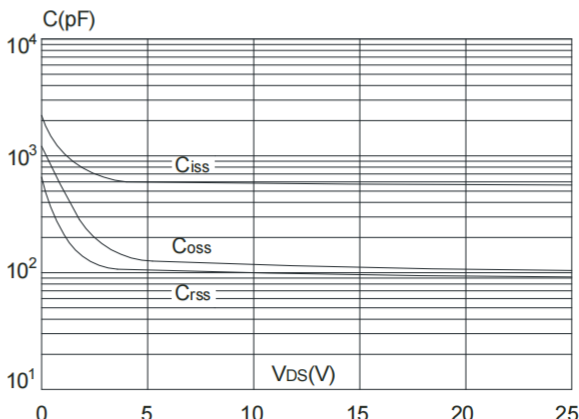
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourtce Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =30V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ± 20V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	1	1.4	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ^{note3}	V _{GS} =10V, I _D =10A	---	12	15	m Ω
		V _{GS} =4.5V, I _D =5A	---	16	20	
Dynamic Characteristics						
C _{iSS}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	580	---	pF
C _{oss}	Output Capacitance		---	110	---	
C _{rSS}	Reverse Transfer Capacitance		---	92	---	
Q _g	Gate Charge	V _{GS} =10V V _{DS} =15V I _D =10A		15	---	nC
Q _{gs}	Gate-Source Charge			4.7	---	
Q _{gd}	Gate-Drain Charge			3.6	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} =30V, I _D = 20A, R _{REN} =3 Ω ,V _{GS} =10V	---	5	---	ns
t _r	Rise Time		---	8	---	ns
t _{d(off)}	Turn-Off Delay Time		---	21	---	ns
t _f	Fall Time		---	7	---	ns
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	---	---	----	10	A
I _{SM}	Pulsed Drain to Source Diode	---	---	---	40	A

V_{SD}	Source-Drain Diode Forward Voltage	$V_{GS}=0V, I_S=10A$	---	---	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20A, di/dt=100A/\mu s$	---	7	---	ns
Q_{rr}	Body Diode Reverse Recovery		---	5.9	---	nC

Notes:

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

2. EAS condition : $T_J=25^\circ C, V_{DD}=15V, V_G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=8.3A$
 $T_J=25^\circ C, V_{DD}=-15V, V_G=-10V, L=0.5mH, R_g=25\Omega, I_{AS}=-9.8A$

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycles $\leq 2\%$
N-Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

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

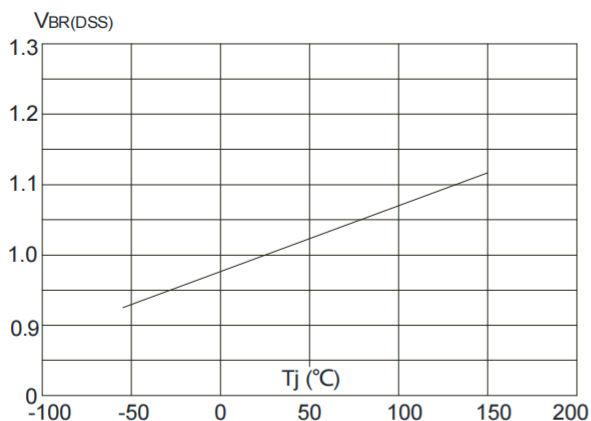


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

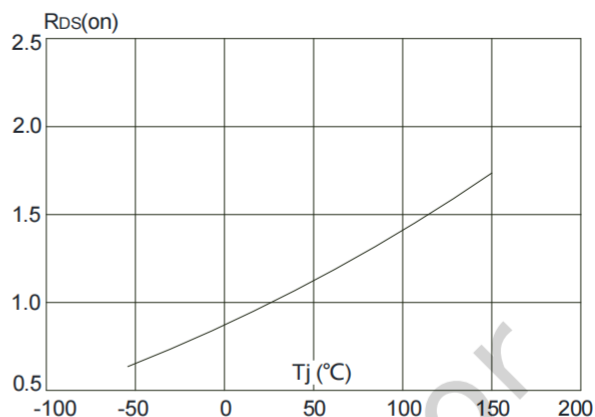


Figure 8: Normalized on Resistance vs. Junction Temperature

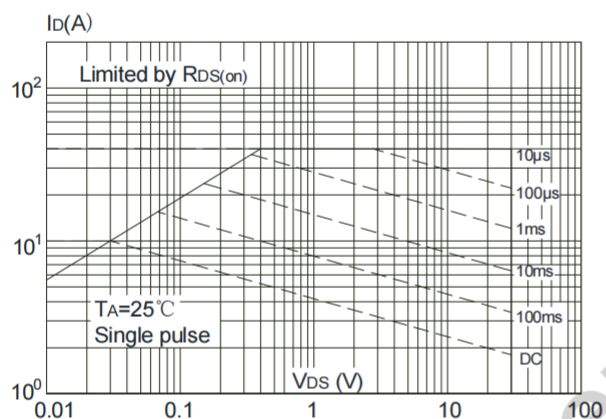


Figure 9: Maximum Safe Operating Area

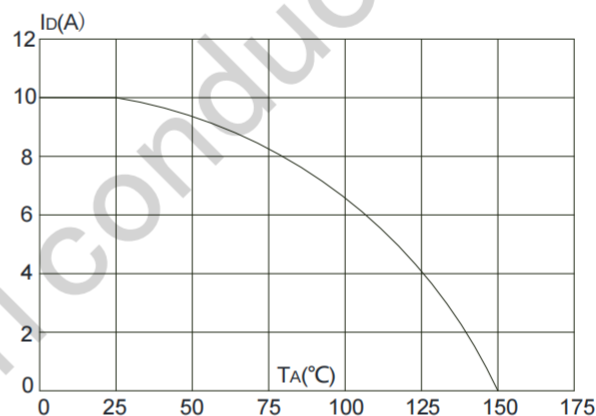


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

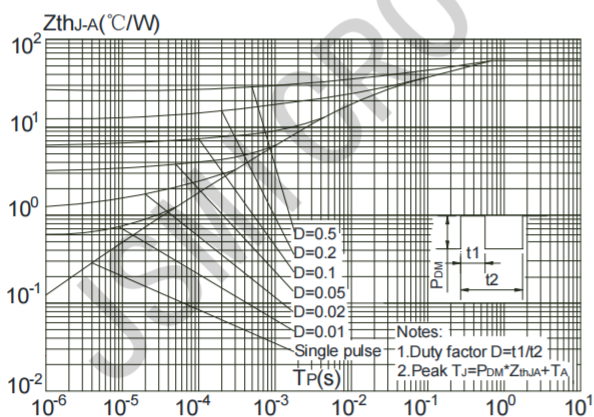


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

P-Channel Electrical Characteristics: ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	-30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-30V	---	---	-1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0A	---	---	±100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	-1	-1.5	-2.4	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =-10V, I _D =-10A	---	16	20	m Ω
		V _{GS} =-4.5V, I _D =-5A	---	25	34	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	1540	---	pF
C _{oss}	Output Capacitance		---	325	---	
C _{rss}	Reverse Transfer Capacitance		---	275	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time ^{3,4}	V _{DD} =-15V, V _{GS} =-10V I _D =-6A, R _{GEN} =2.5 Ω	---	13	---	ns
t _r	Rise Time ^{3,4}		---	18	---	ns
t _{d(off)}	Turn-Off Delay Time ^{3,4}		---	93	---	ns
t _f	Fall Time ^{3,4}		---	63	---	ns
Q _g	Total Gate Charge ^{3,4}	V _{DS} =-15V , V _{GS} =-10V , I _D =-9.1A	---	28	---	nC
Q _{gs}	Gate-Source Charge ^{3,4}		---	5.2	---	nC
Q _{gd}	Gate-Drain “Miller” Charge ^{3,4}		---	7.5	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-10A	---	-0.8	-1.2	V
I _S	Maximum Continuous Drain to Source Diode Forward Current	VD=VG=0V	---	---	-8	A
I _{SM}	Max. Pulsed Forward Currentt		---	---	-37	A

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

P-Typical Characteristics: ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

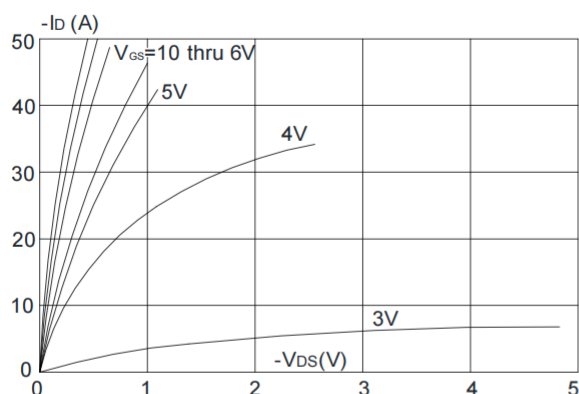


Figure1: Output Characteristics

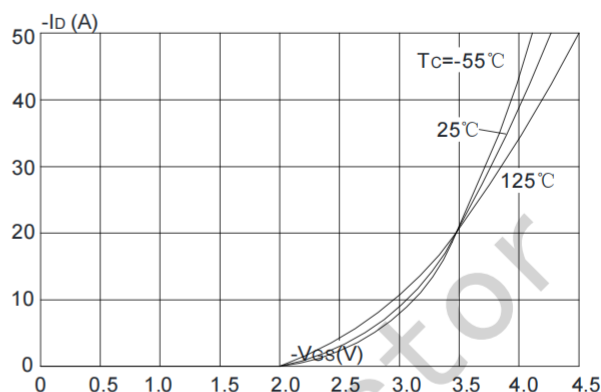


Figure 2: Typical Transfer Characteristics

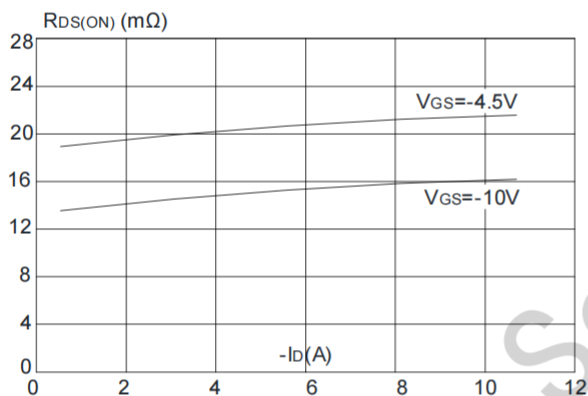


Figure 3: On-resistance vs. Drain Current

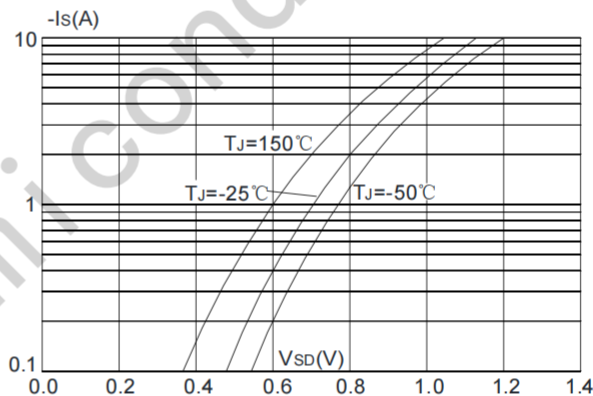


Figure 4: Body Diode Characteristics

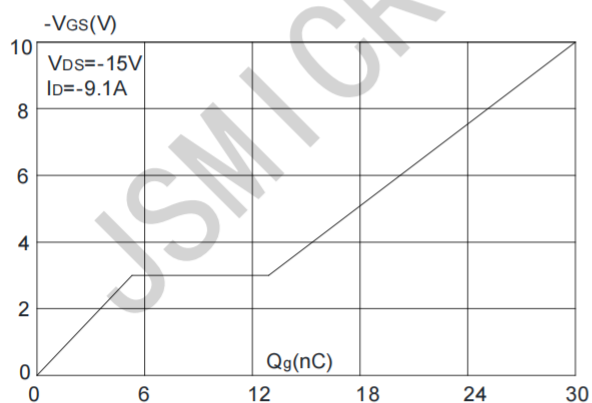


Figure 5: Gate Charge Characteristics

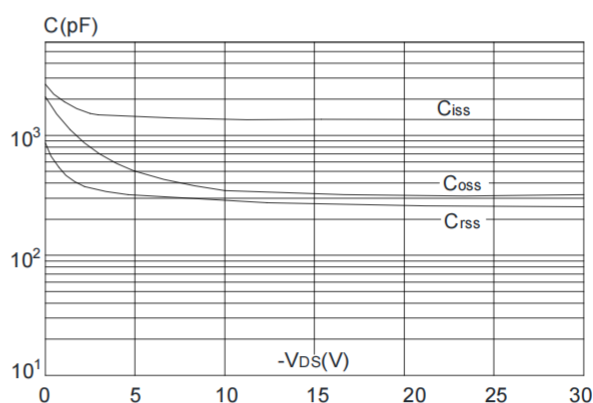


Figure 6: Capacitance Characteristics

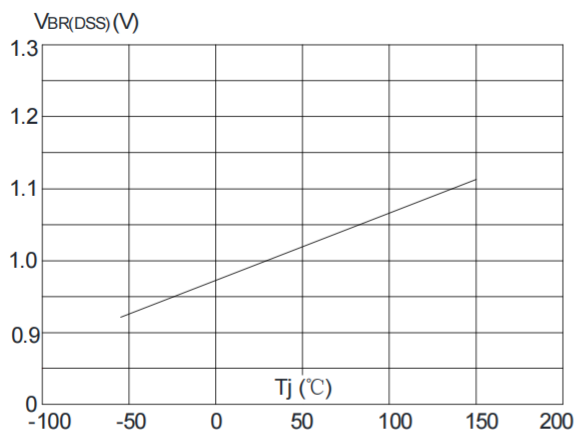


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

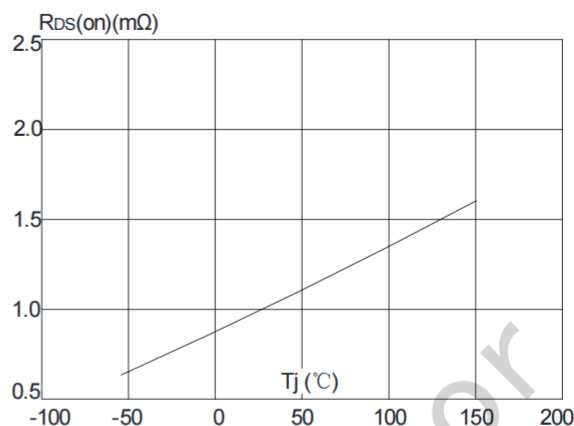


Figure 8: Normalized on Resistance vs. Junction Temperature

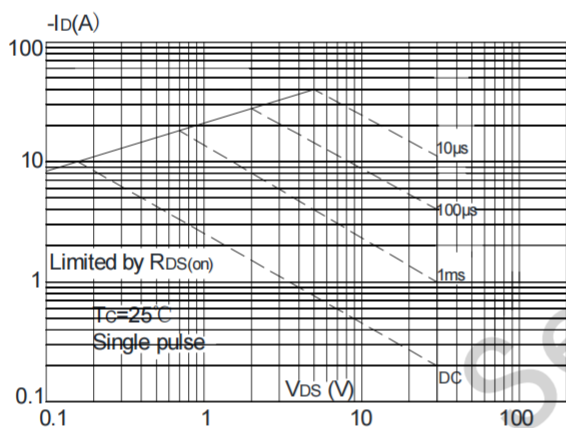


Figure 9: Maximum Safe Operating Area

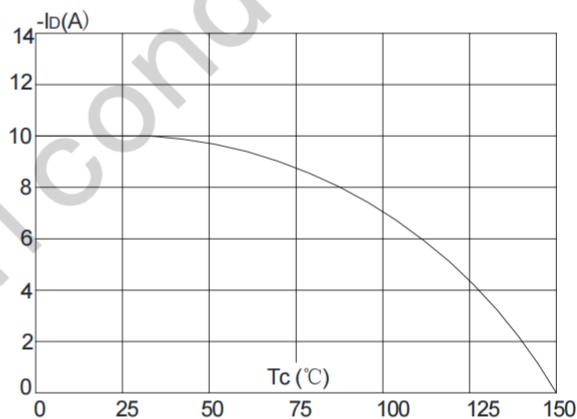


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

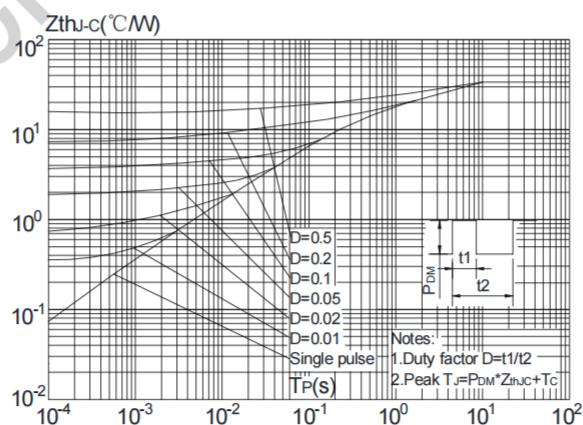
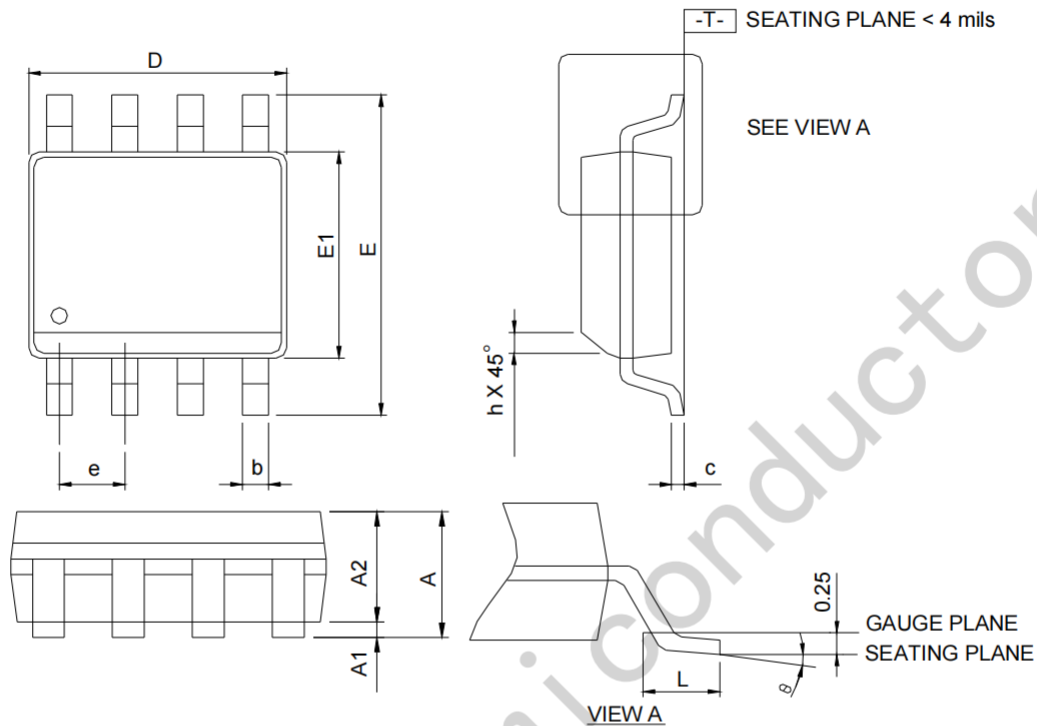


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

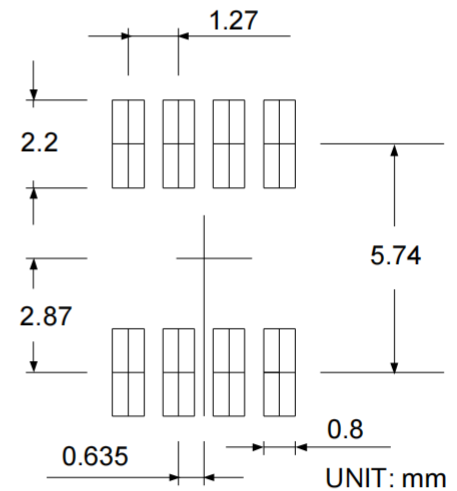
Package Information

SOP-8



SYMBOL	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	-	1.75	-	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	-	0.049	-
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



Note: 1. Follow JEDEC MS-012 AA.

2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.

3. Dimension "E" does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.