



BYD Microelectronics Co., Ltd.

AM4502C

P & N-Channel MOSFET

General Description

The AM4502C uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for used as DC-DC converters and power managements in portable and battery-powered products.

Features

- N-Channel: V_{DS} (V) =30V
P-Channel: V_{DS} (V) =-30V

- Low on-state resistance

N-Channel:

$R_{DS(on)} = 16 \text{ m}\Omega$ MAX ($V_{GS} = 10\text{V}$, $I_D = 10\text{A}$)

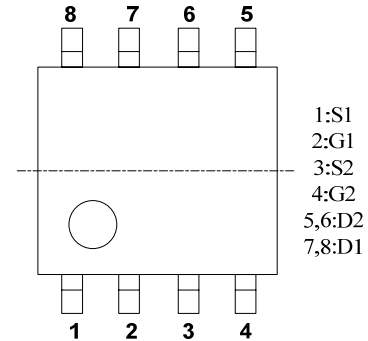
$R_{DS(on)} = 20 \text{ m}\Omega$ MAX ($V_{GS} = 4.5\text{V}$, $I_D = 8.4\text{A}$)

P-Channel:

$R_{DS(on)} = 23 \text{ m}\Omega$ MAX ($V_{GS} = -10\text{V}$, $I_D = -8.5\text{A}$)

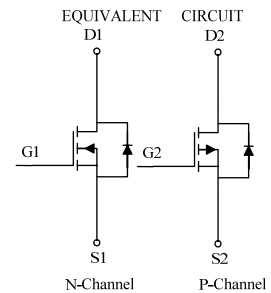
$R_{DS(on)} = 33 \text{ m}\Omega$ MAX ($V_{GS} = -4.5\text{V}$, $I_D = -6.8\text{A}$)

- Fast switching speed



Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

PARAMETER	SYMBOL	N-Channel	P-Channel	UNIT
Drain to Source Voltage	V_{DSS}	30	-30	V
Gate to Source Voltage	V_{GSS}	20	-25	V
Drain Current (DC) ^a	$T_A=25^\circ\text{C}$	10	-8.5	A
	$T_A=70^\circ\text{C}$	8.1	-6.8	
Drain Current (pulse) ^b	$I_{D(pulse)}$	± 50	± 50	A
Continuous Source Current (Diode Conduction) ^a	I_S	2.3	-2.1	A
Total Power Dissipation ^a	$T_A=25^\circ\text{C}$	2.1	2.1	W
	$T_A=70^\circ\text{C}$	1.3	1.3	
Channel Temperature	T_{ch}	150		$^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_{stg}	-55~+150		$^\circ\text{C}$



THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient	$t \leq 10\text{sec}$	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
	Steady State		110	$^\circ\text{C/W}$

Note a. Mounted on FR4 Board of 1"x1".

b. Pulse width limited by maximum junction temperature

Caution: These values must not be exceeded under any conditions.

Ordering Information

- Part Number: AM4502C
- Package: SOIC8

Electrical Characteristics ($T_A = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	Ch	MIN	TYP	MAX	UNIT
Gate Cut-off Votage	$V_{GSS(off)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	N	1			V
		$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	P	-1			
Gate-Body Leakage	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=20\text{V}$	N			± 100	nA
		$V_{DS}=0\text{V}, V_{GS}=-20\text{V}$	P			± 100	
Zero Gate Votage Drain Current	I_{DSS}	$V_{DS}=24\text{V}, V_{GS}=0\text{V}$	N			1	μA
		$V_{DS}=-24\text{V}, V_{GS}=0\text{V}$	P			-1	
On-State Drain Current	$I_{D(on)}$	$V_{DS}=5\text{V}, V_{GS}=10\text{V}$	N	20			A
		$V_{DS}=-5\text{V}, V_{GS}=-10\text{V}$	P	-50			
Drain -Source On-Restance	$r_{DS(on)}$	$V_{GS}=10\text{V}, I_D=10\text{A}$	N			16	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=8.4\text{A}$				20	
		$V_{GS}=-10\text{V}, I_D=-8.5\text{A}$	P			23	
		$V_{GS}=-4.5\text{V}, I_D=-6.8\text{A}$				33	
Forward Transconductance	g_{fs}	$V_{DS}=15\text{V}, I_D=10\text{A}$	N		40		S
		$V_{DS}=-15\text{V}, I_D=-9.5\text{A}$	P		31		
Pulsed Source Current (Body Diode)	I_{SM}				5		A
Total Gate Charge	Q_g	N-Channel $V_{DS}=15\text{V}, V_{GS}=4.5\text{V},$ $I_D=10\text{A}$ P-Channel $V_{DS}=-15\text{V}, V_{GS}=-4.5\text{V},$ $I_D=-10\text{A}$	N		12		nC
Gate-Source Charge	Q_{gs}		P		13		
Gate-Drain Charge	Q_{gd}		N		3.3		
			P		5.8		
Turn-On Delay Time	$t_{d(on)}$	N-Channel $V_{DD}=15\text{V}, V_{GS}=10\text{V}, I_D=1\text{A}, R_{GEN}=25\Omega$ P-Channel $V_{DD}=-15\text{V}, V_{GS}=-10\text{V},$ $I_D=-1\text{A}, R_{GEN}=15\Omega$	N		20		nS
Rise Time	t_r		P		15		
Turn-Off Delay Time	$t_{d(off)}$		N		9		
Fall-Time	t_f		P		16		
			N		70		
			P		62		
			N		20		
			P		46		

Typical characteristics (25°C unless noted)

Typical Electrical Characteristics(P-Channel)

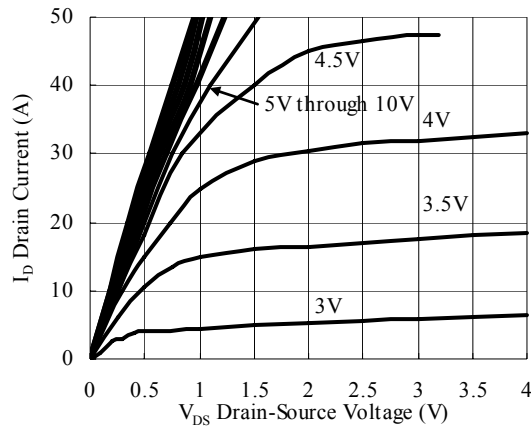


Figure1. On-Region Characteristics

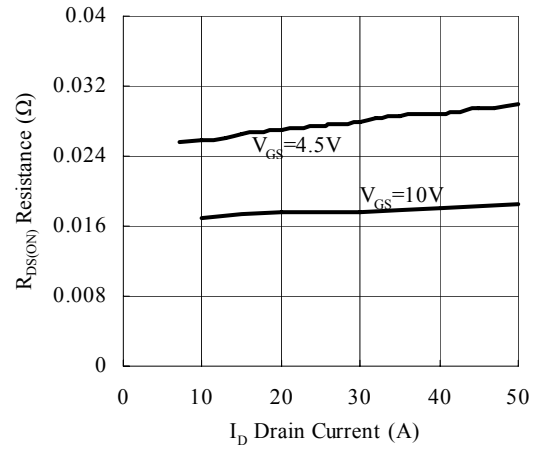


Figure 2. On-Resistance with Drain Current

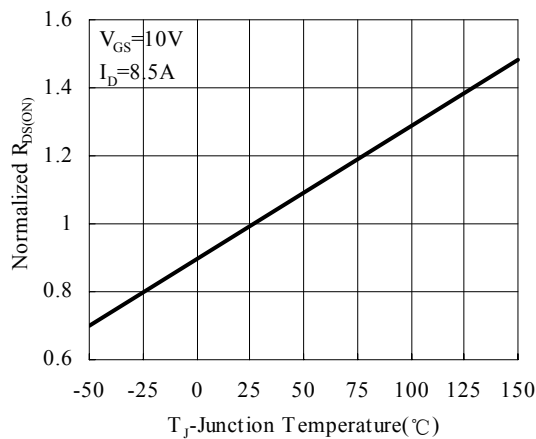


Figure 3. On-Resistance Variations With Temperature

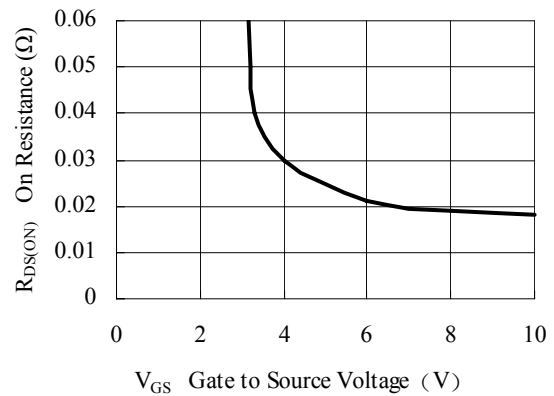


Figure 4. On-Resistance Variation VS Gate to Source Voltage

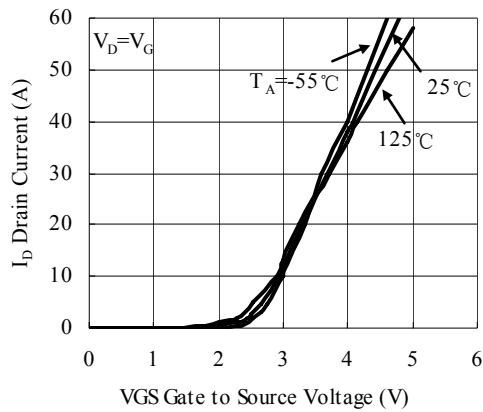


Figure 5. Transfer Characteristics

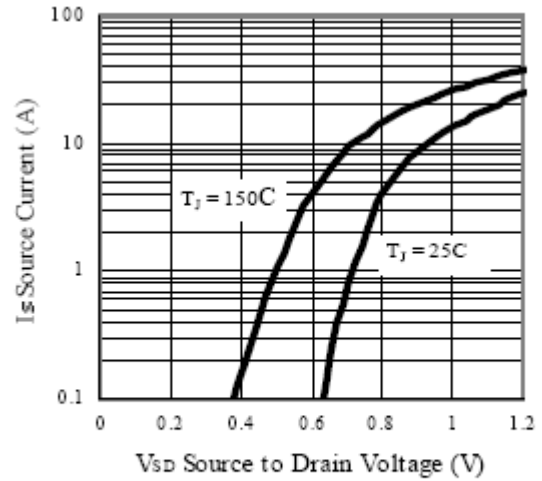


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

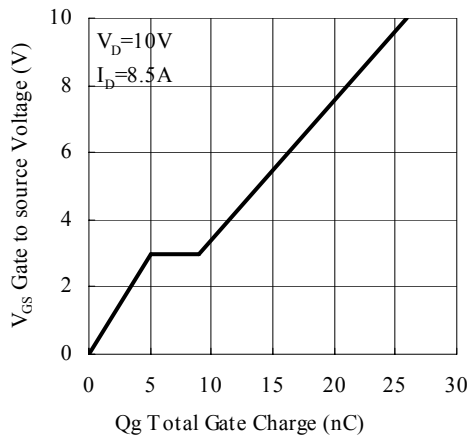


Figure 7. Gate Charge Characteristic

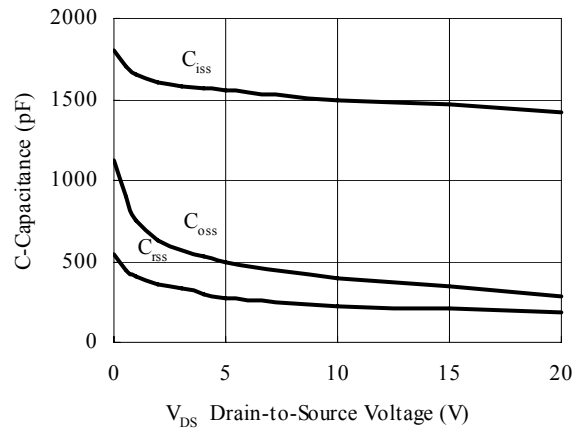


Figure 8. Capacitance Characteristics

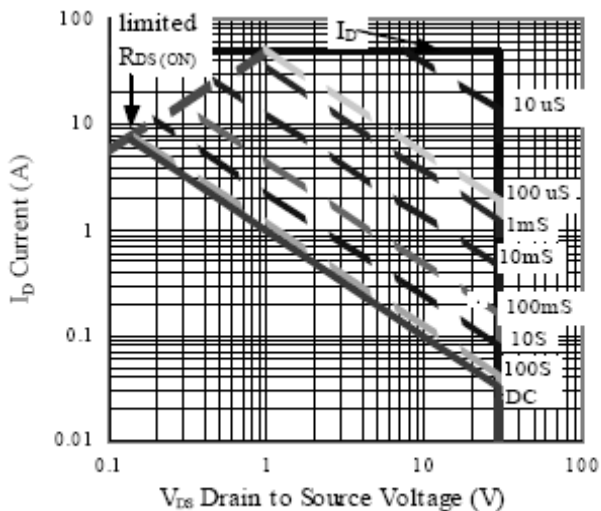


Figure 9. Maximum Safe Operating Area

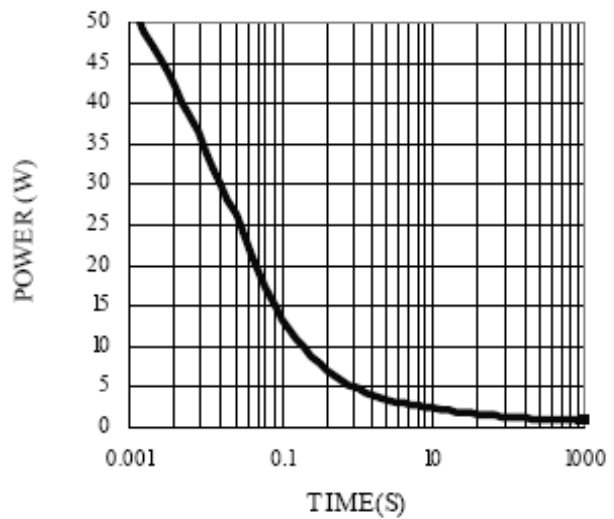


Figure 10. Single Pulse Maximum Power Dissipation

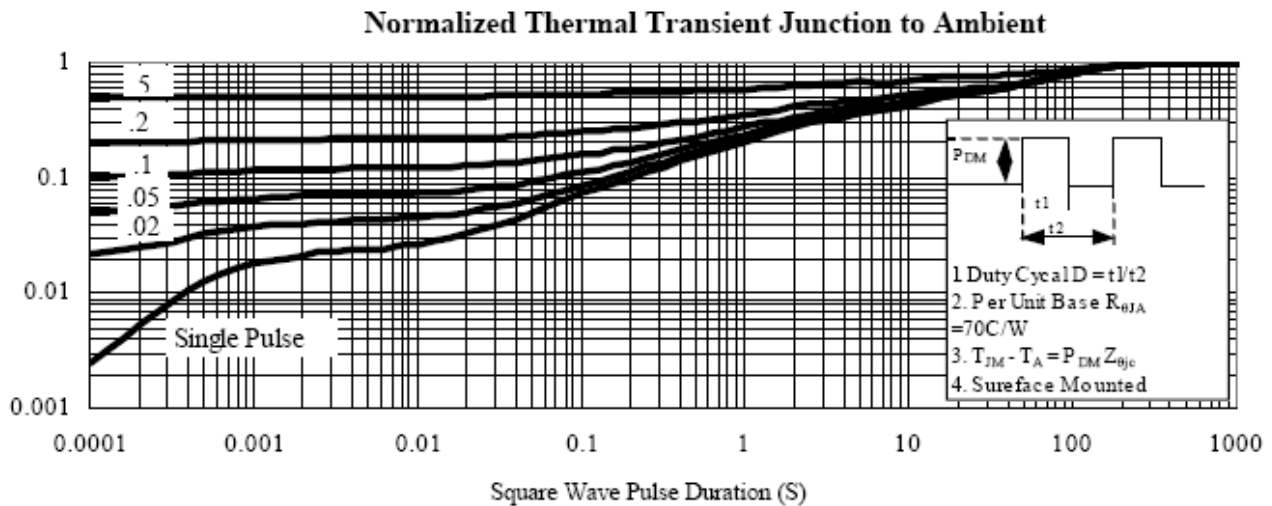


Figure 11. Transient Thermal Response Curve

Typical Electrical Characteristics(N-Channel)

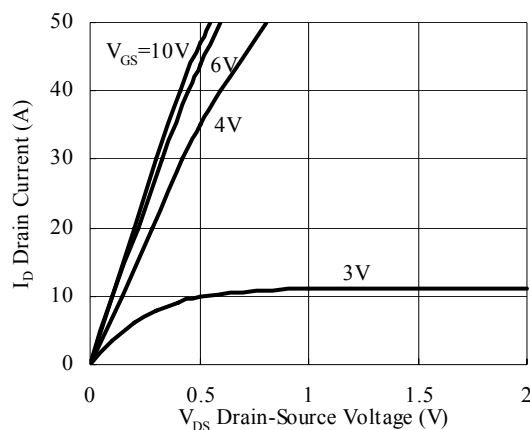


Figure 1. On-Region Characteristics

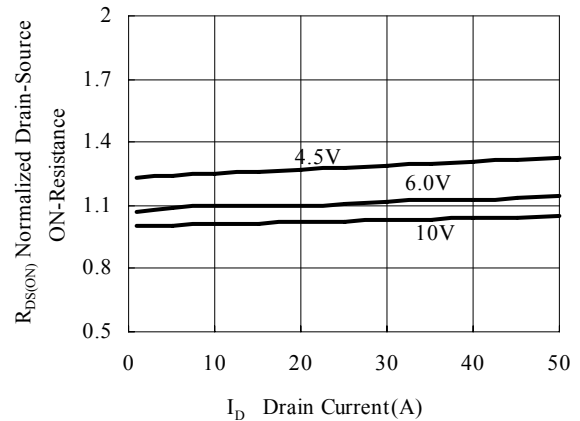


Figure 2. On-Resistance vs Drain Current

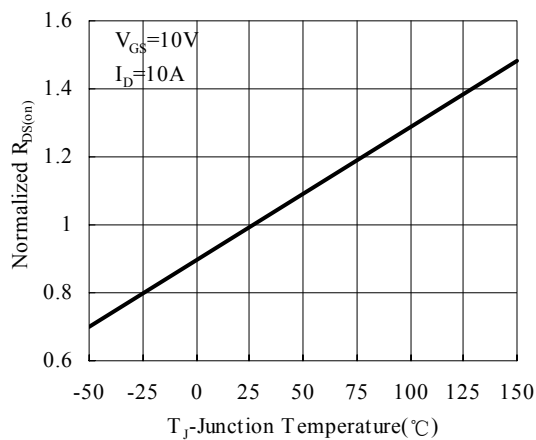


Figure 3. On-Resistance Variations With Temperature

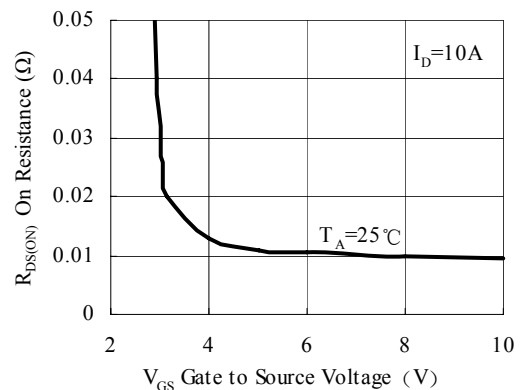


Figure 4. On-Resistance Variation VS Gate to Source Voltage

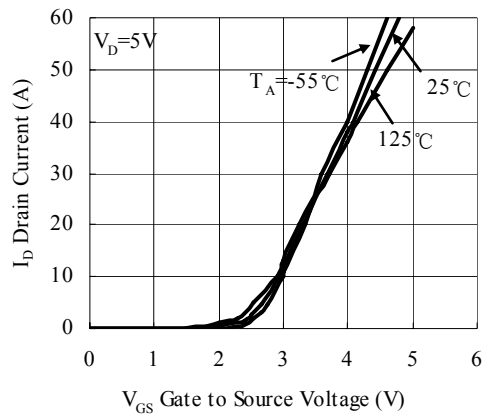


Figure 5. Transfer Characteristics

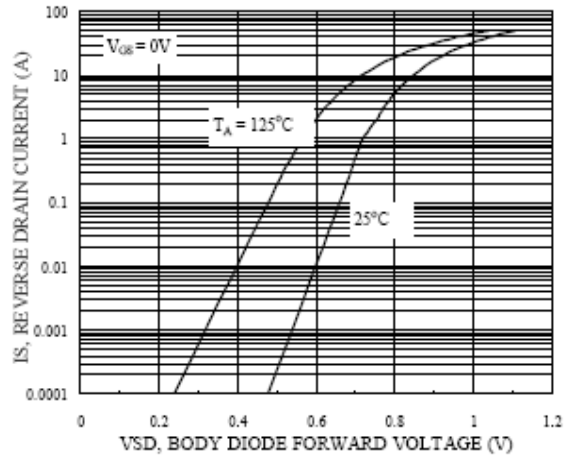


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

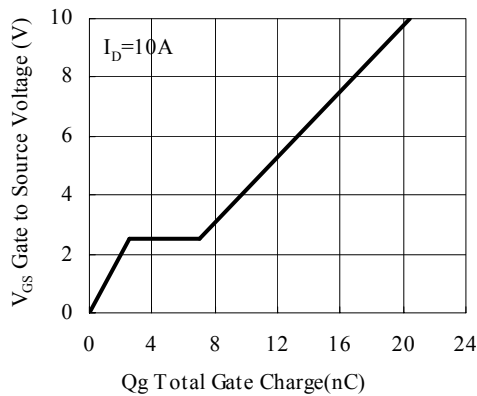


Figure 7. Gate Charge Characteristic

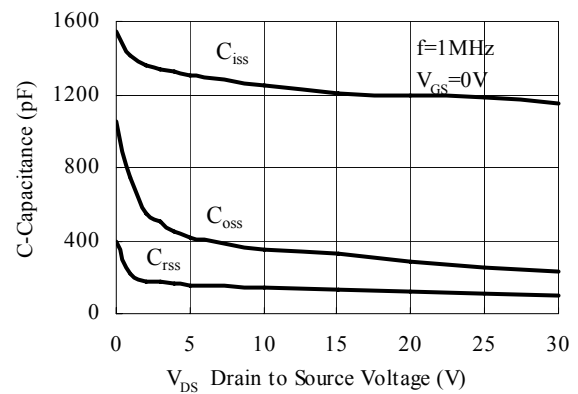


Figure 8. Capacitance Characteristics

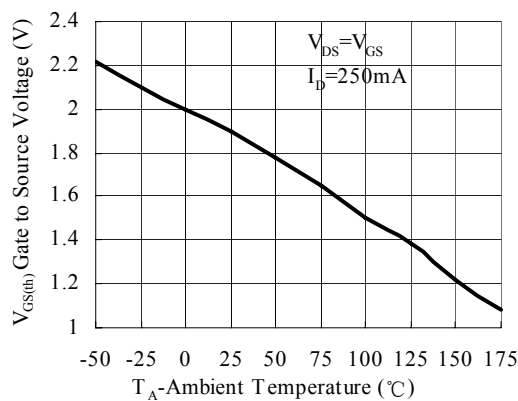


Figure 9. Threshold VS Ambient Temperature

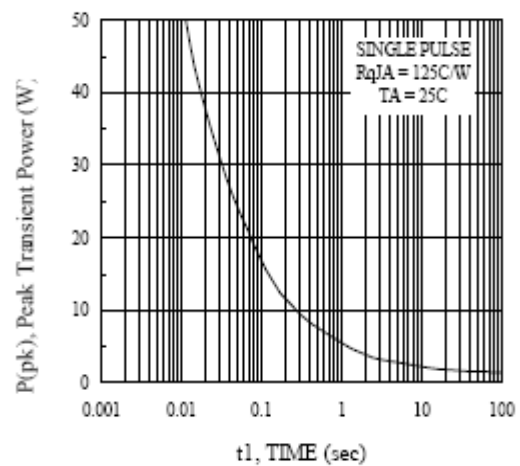
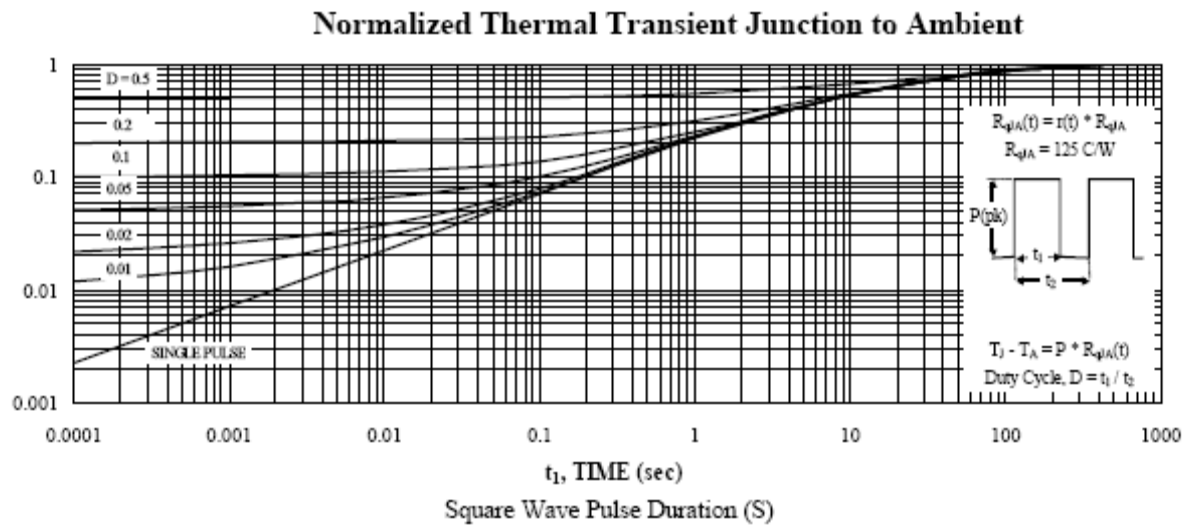


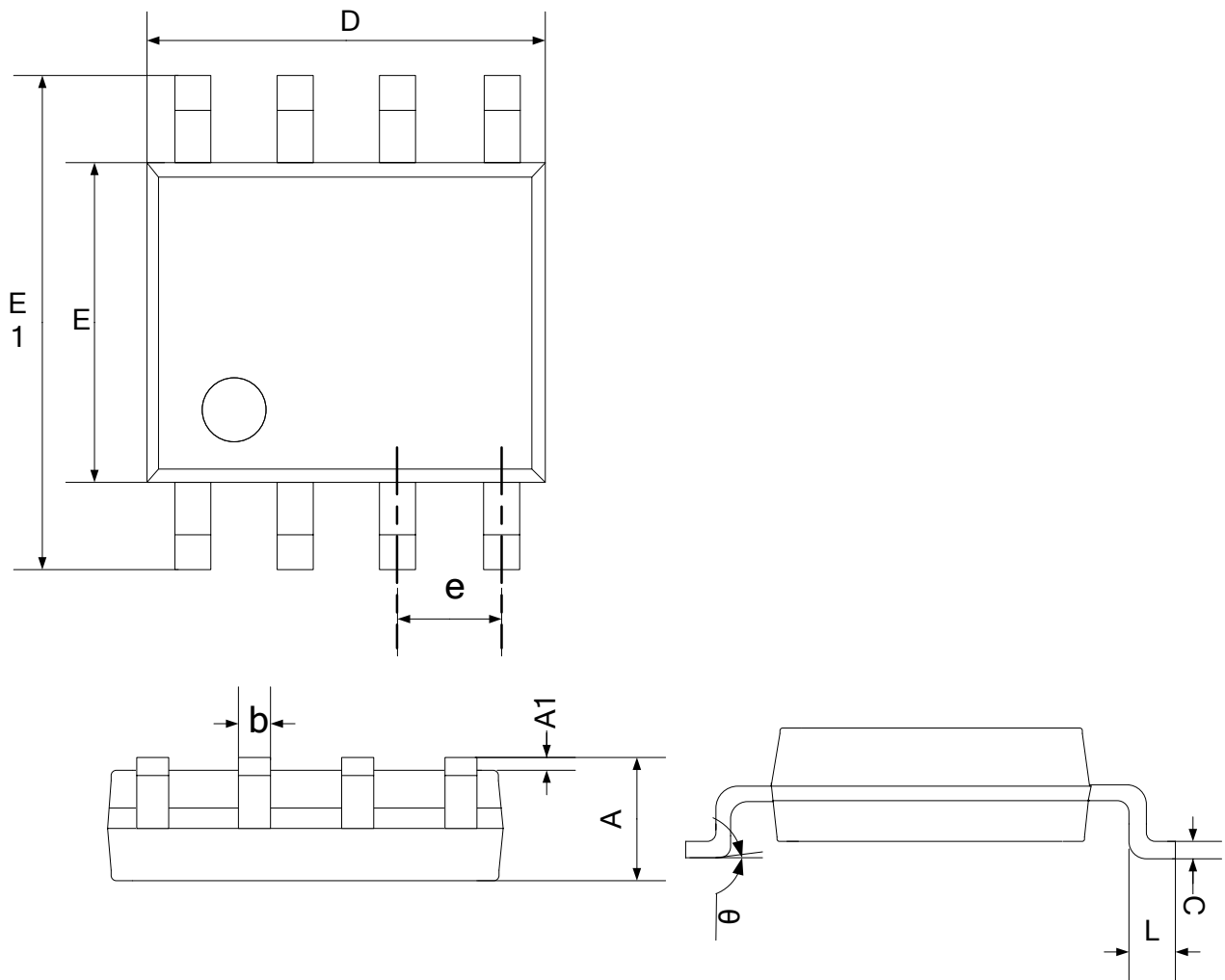
Figure 10. Single Pulse Maximum Power Dissipation



Package Drawing

SOIC8

UNIT (mm)



Dimensions

	D	E	A	E1	A1	C	L	b	e	θ
Min.	4.80	3.80	1.35	5.80	0.100	0.19	0.500	0.380	1.27 BSC	0°
Nom.	4.90	3.90	1.55	6.00	0.175	0.22	0.715	0.445		4°
Max.	5.00	4.00	1.75	6.20	0.250	0.25	0.930	0.510		8°