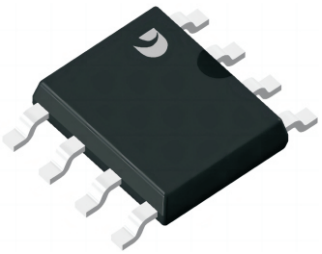
23A 30V N-channel enhanced MOSFET

SOP-8



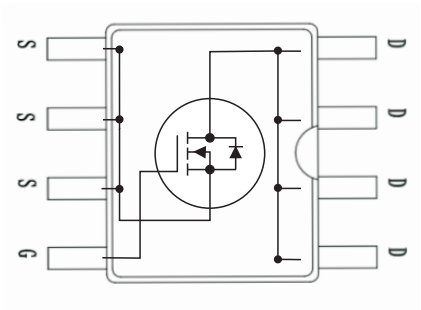
RoHS COMPLIANT

Description

This N-Channel specified MOSFET is a ruggedgate version of Fairchild's Semiconductor's advancedPowerTrench process. It has been optimized for powermanagement applications with a wide range of gatedrive voltage

Features

- $R_{DS(ON)}$ < 6.0mΩ @ V_{GS}=10V, I_D=20A
- Optimized for use in battery circuit applications
- High performance trench technology for extremelylow RDS(ON)
- Low profile SOP-8 package



Mechanical data

- Case: SOP-8
- RoHS compliant
- Case Material: "Green" molding compound, UL flammability classification 94V-0,"Halogen-free".

Absolute Maximum Ratings (Ta=25°C, Unless Otherwise Specified)

Parameter	Symbols	Ratings	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current Ta=25℃	I_D	23	A
Pulsed Drain Current Ta=25 °C	I_{DM}	69	A
Power dissipation Ta=25 °C	P_{tot}	3.1	W
Operating junction and storage temperature	T_j,T_{stg}	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbols	Ratings	Units
Device on PCB cooling area (Note1)	R_{thJA}	80	°C/W

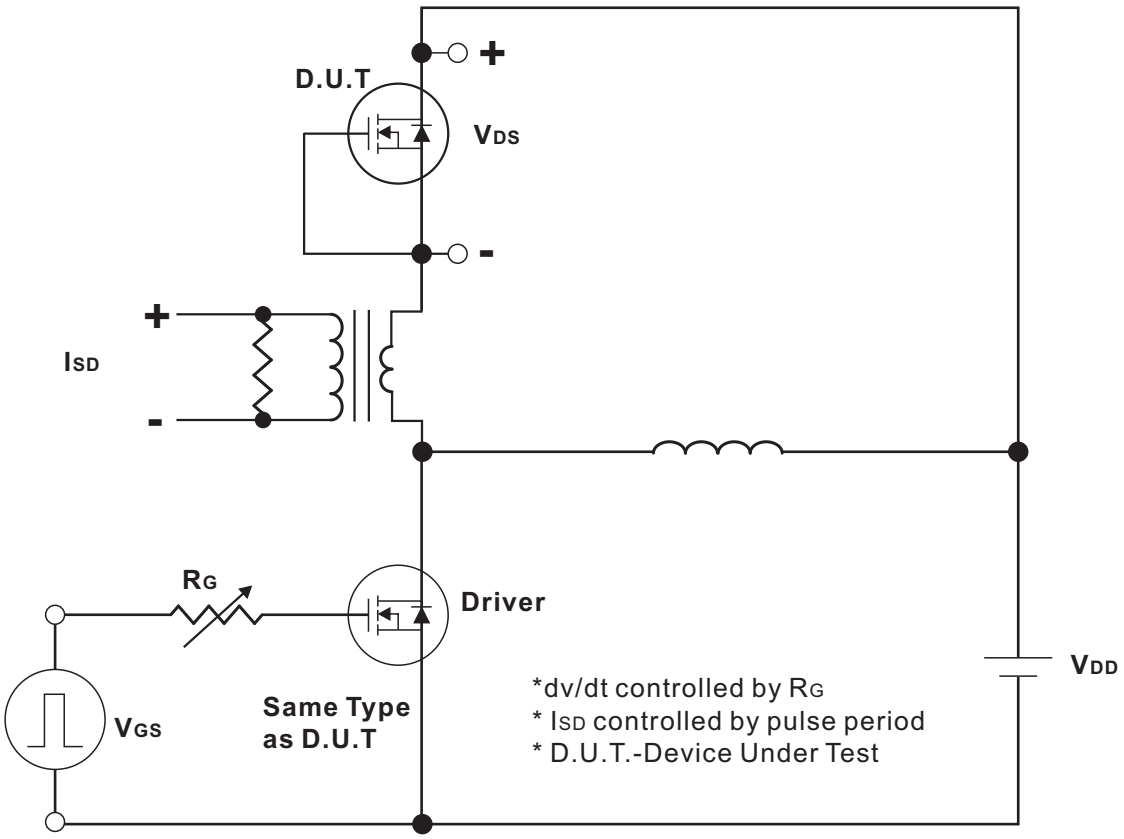
NOTE:
1.Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR-4 with 6 cm2 (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

Electrical Characteristics (TA=25°C, Unless Otherwise Specified)

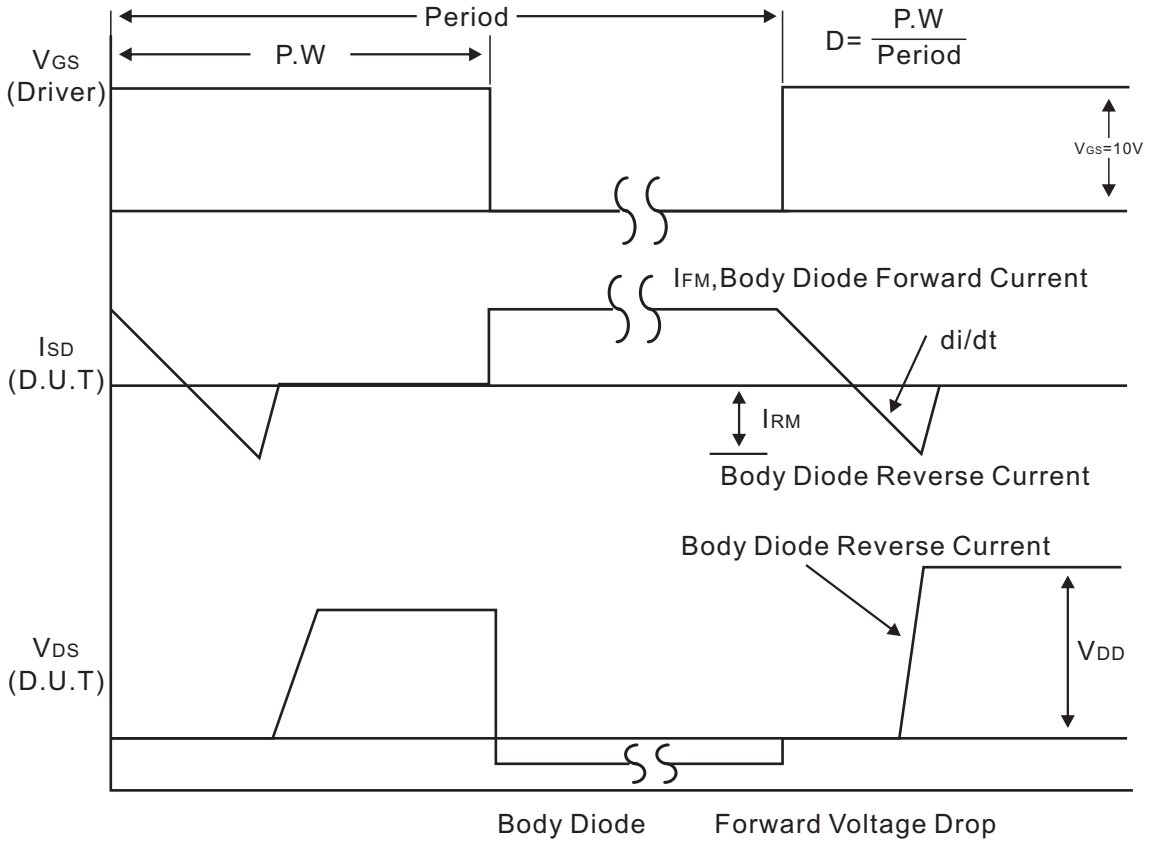
Parameter	Symbols	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V			±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	1.0		2.5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=20A V_{GS}=4.5V,I_D=15A		4.7 8.0	6.0 10.0	mΩ
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=25V,		1769		pF
Output Capacitance	C_{OSS}	V_{GS}=0V,		200		pF
Reverse Transfer Capacitance	C_{RSS}	f=1.0MHz		167		pF
Gate resistance	R_G	VDS=0V,FREQ=1.00MHz		3.3		Ω
Switching Characteristics						
Total Gate Charge (Note 1)	Q_G	V_{DS}=15V,V_{GS}=4.5V,		32		nC
Gate-Source Charge	Q_{GS}	I_D=20A(NOTE1,2)		13		nC
Gate-Drain Charge	Q_{GD}			13		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	V_{DS}=15V,V_{GS}=10V,		13		ns
Turn-On Rise Time	t_R	R_G=6Ω,I_D=20A		15		ns
Turn-Off Delay Time	$t_{D(OFF)}$	R_L=0.8Ω		75		ns
Turn-Off Fall Time	t_F	(NOTE1,2)		25		ns
Drain-source Diode Characteristics And Maximum Ratings						
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	I_{SD}=2.5A,V_{GS}=0V			1.2	V
Diode continuous forward current	I_S				23	A
Reverse Recovery time	trr	I_F=20A di/dt=100A/us		11		nS
Reverse Recovery Charge	Qrr			1.6		nC

Notes:
1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

Test Circuits and waveforms

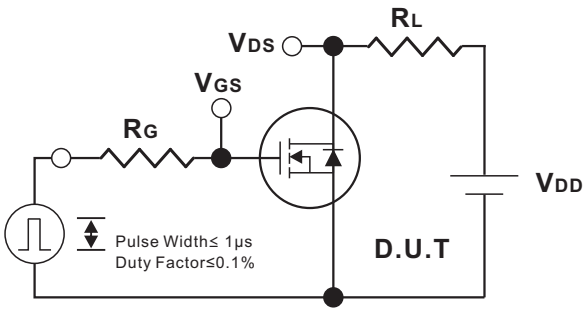


Peak Diode Recovery dv/dt Test Circuit

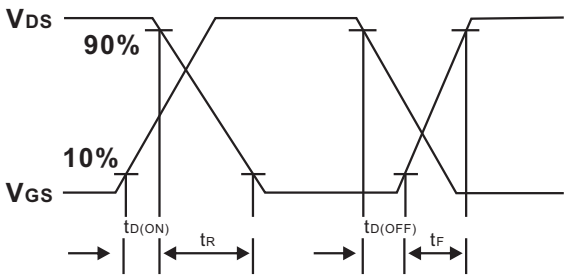


Peak Diode Recovery dv/dt Waveforms

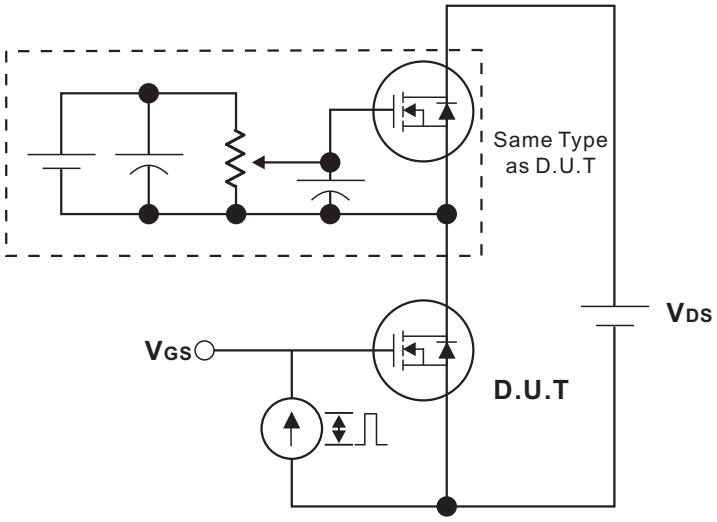
Test Circuits and waveforms



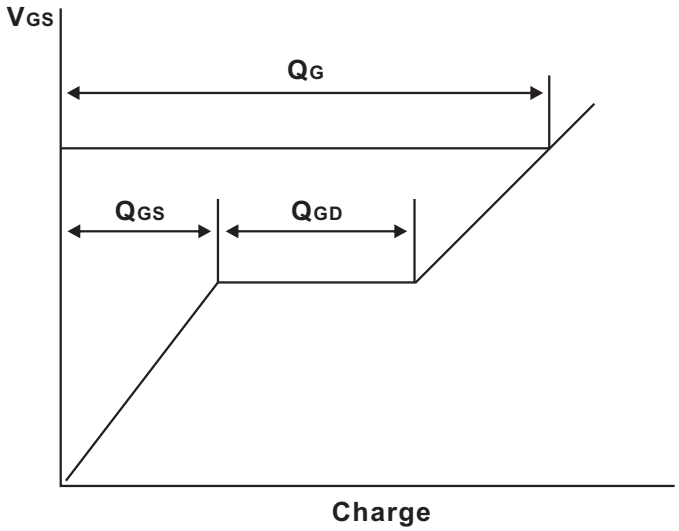
Switching Test Circuit



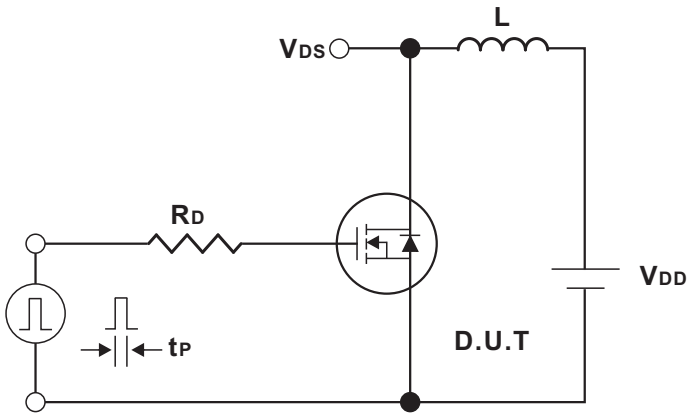
Switching Waveforms



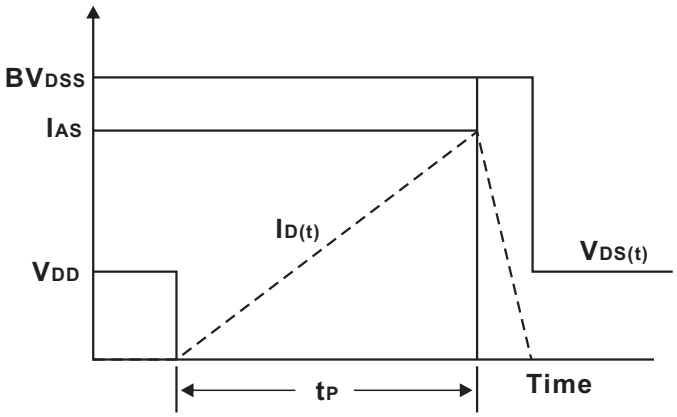
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Typical Characteristics

Fig.1 Output characteristics

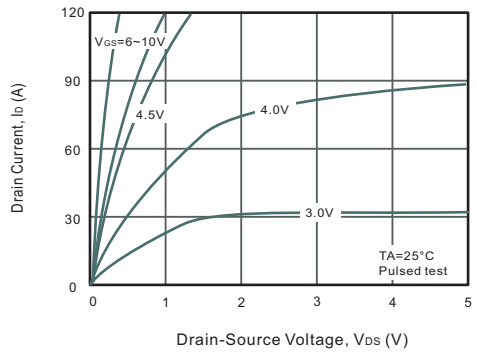


Fig.2 Power Dissipation

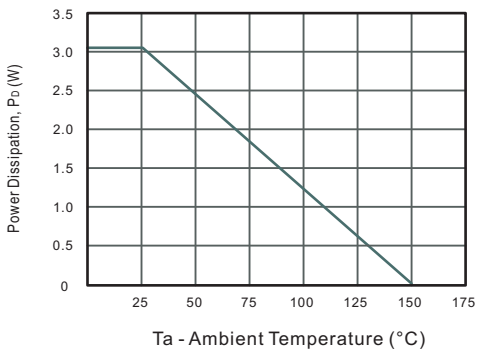


Fig.3 Drain Current Derating

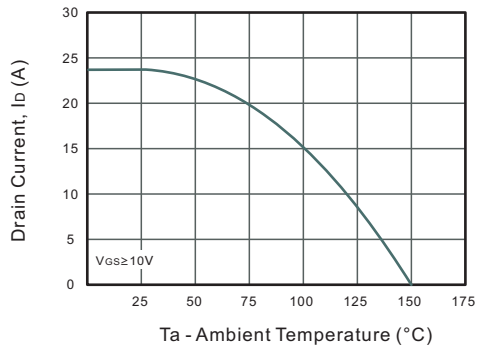


Fig.4 Drain-Source On-Resistance vs. Drain Current

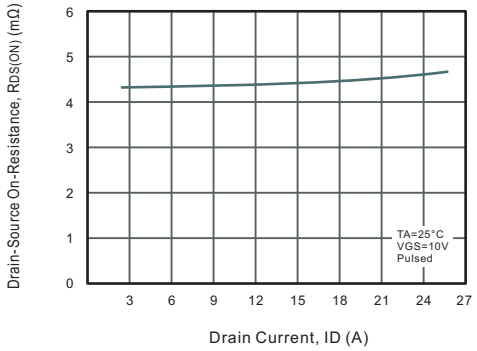


Fig.5 Gate Threshold Voltage vs. Junction Temperature

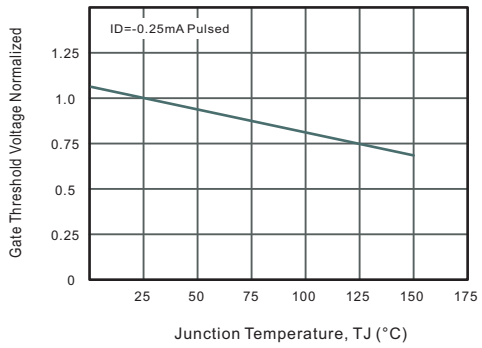


Fig.6 Body-diode Forward Characteristics

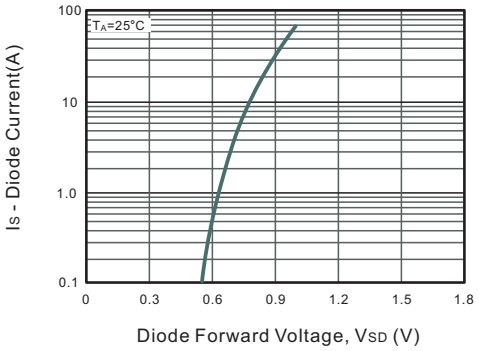


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

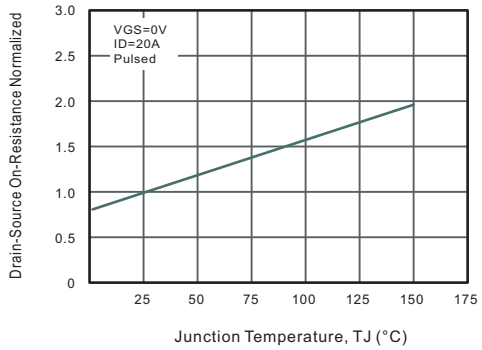
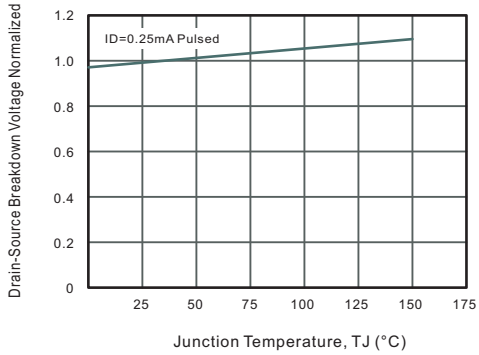


Fig.8 Breakdown Voltage vs. Junction Temperature



Typical Characteristics

Fig.9 Capacitance Characteristics

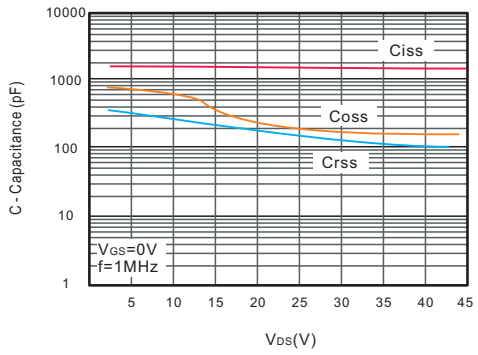


Fig.10 Gate Charge Characteristics

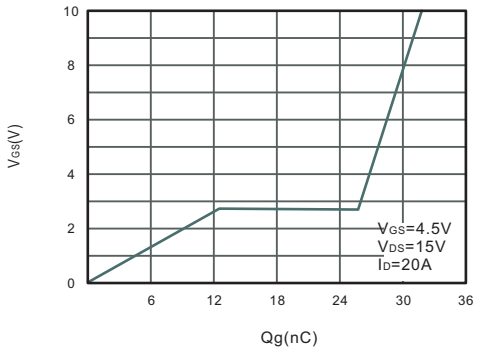


Fig.11 Safe Operating Area

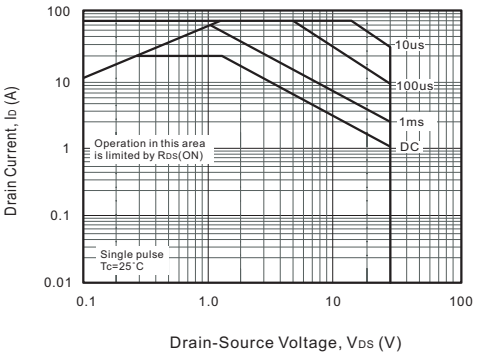
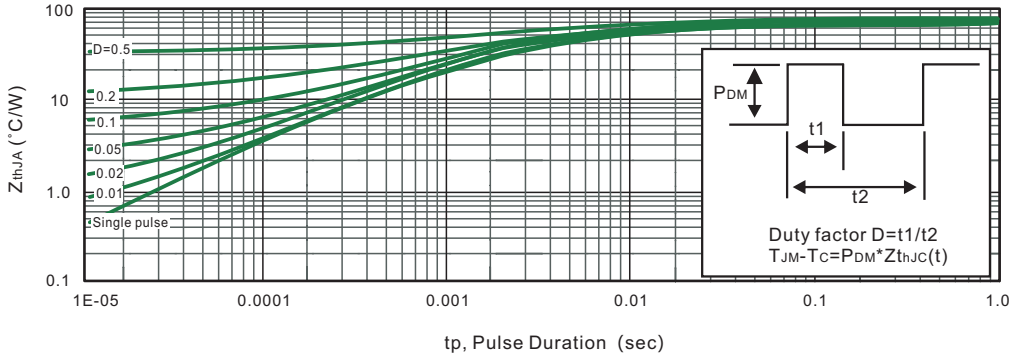
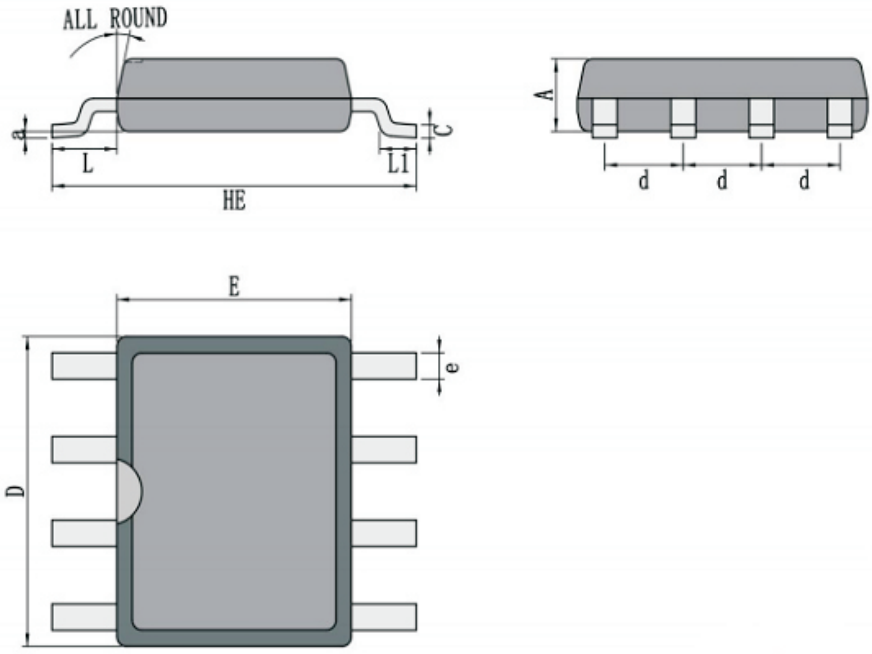


Fig.12 Max. Transient Thermal Impedance



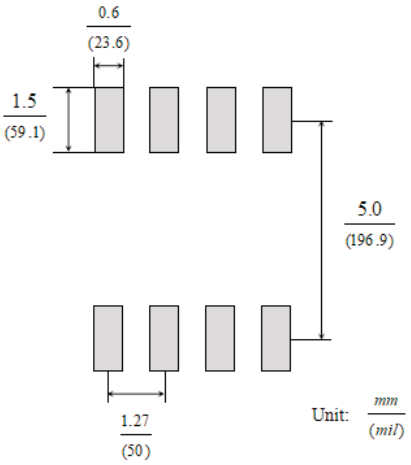
SOP-8封装概述
Plastic surface mounted package; 8 leads



Unit		A	C	D	E	HE	d	e	L	L1	a	∠
mm	max	1.20	0.25	4.90	4.00	6.00	1.32	0.45	1.15	0.80	0.20	12°
	typ	1.10	0.20	4.70	3.80	5.90	1.27	0.40	1.05	/	/	
	min	1.00	0.15	4.50	3.60	5.80	1.22	0.35	0.95	0.40	0	
mil	max	47	10	193	157	236	52	18	45	31	8	
	typ	43	8	185	150	232	50	16	41	/	/	
	min	39	6	177	142	228	48	14	37	16	0	

Marking

Type number	Marking code
S4R7N30XR8	S4R7N30XR8



SUGGESTED SOLDER PAD LAYOUT

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