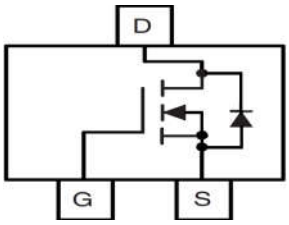
N-CHANNEL POWER MOSFET

FEATURES

- V_{DS} max: 30V
- V_{GS} max: ±12V
- R_{DS}(on) max: 29mΩ @V_{GS}=4.5V
  R_{DS}(on) max: 37mΩ @V_{GS}=2.5V

SOT-23



Equivalent circuit

MECHANICAL DATA

- Case: SOT-23
- Case material: Molded plastic. UL flammability
- Classification rating: 94V-0
- Terminal: Lead free plating, solderable per MIL-STD-202, method 208
- Weight: 0.008 grams (approximate)
- Marking: BOXYE

MAXIMUM RATINGS (T_A= 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	30	V
Continuous drain current @V_{GS}=10V	I_D	5.0	A
Continuous drain current @V_{GS}=10V,T_A=70°C		4.0	
Pulsed drain current	I_{DM}	25	
Maximum power dissipation	P_D	1.3	W
Maximum power dissipation @T_A=70°C		0.8	
Linear derating factor		0.01	W/°C
Gate-to-source voltage	V_{GS}	±12	V
Junction and storage temperature range	T_J,T_{STG}	-55 ~+ 150	°C
Thermal resistance from junction-to-ambient (note 1)	$R_{\theta JA}$	100	°C/W
Thermal resistance from junction-to-ambient (t<10s)		99	

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ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Drain-to-source breakdown voltage	$V_{(BR)DSS}$	30			V	V_{GS}=0V,I_D=250μA
Breakdown voltage temp. coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$		0.02		V/°C	Reference to 25°C,I_D=1mA
Static drain-to-source on-resistance (note 2)	$R_{DS(on)}$		22	29	mΩ	V_{GS}= 4.5V, I_D = 5.0A
			27	37		V_{GS} = 2.5V, I_D = 4.0A
Gate threshold voltage	$V_{GS(th)}$	0.5	0.8	1.1	V	V_{DS} = V_{GS}, I_D = 10μA
Drain-to-source leakage current	I_{DSS}			1.0	μA	V_{DS} =24V, V_{GS} = 0V
				150		V_{DS}=24V,V_{GS}=0V,T_J=125°C
Gate-to-source forward leakage	I_{GSS}			100	nA	V_{GS}= 12V
Gate-to-source reverse leakage				-100		V_{GS}=-12V
Internal gate resistance	R_G		1.7		Ω	
Forward transconductance	g_{fs}	19			S	V_{DS}= 10V, I_D= 5.0A
Total gate charge	Q_g		6.8		nC	I_D=5.0A,V_{DS}=15V,V_{GS}=4.5V (note 2)
Gate-to-source charge	Q_{gs}		0.3			
Gate-to-drain ("Miller") charge	Q_{gd}		2.4			
Turn-on delay time	$t_{d(on)}$		4.2		ns	V_{DD}=15V,I_D=1.0A,R_G=6.8Ω V_{GS}=4.5V (note 2)
Rise time	t_r		5.6			
Turn-off delay time	$t_{d(off)}$		22			
Fall time	t_f		9.1			
Input capacitance	C_{iss}		650		pF	V_{GS}=0V,V_{DS}=25V f=1.0MHz
Output capacitance	C_{oss}		65			
Reverse transfer capacitance	C_{rss}		46			
Continuous source current (body diode)	I_S			1.3	A	Equivalent circuit is showing the integral reverse p-n junction diode
Pulsed source current (body diode,note 1)	I_{SM}			25		
Diode forward voltage (note 2)	V_{SD}			1.2	V	T_J=25°C,I_S=5.0A,V_{GS}=0V
Reverse recovery time (note 2)	t_{rr}		10	15	ns	T_J=25°C,V_R=15V,I_F=1.3A di/dt =100A/μs
Reverse recovery charge (note 2)	Q_{rr}		3.8	5.7	nC	

Notes :

1.Repetitive rating; pulse width limited by max. junction temperature.
2.Pulse width ≤ 400μs; duty cycle ≤ 2%.
3.Surface mounted on 1 in^2 Cu board

N-CHANNEL POWER MOSFET

TYPICAL CHARACTERISTICS

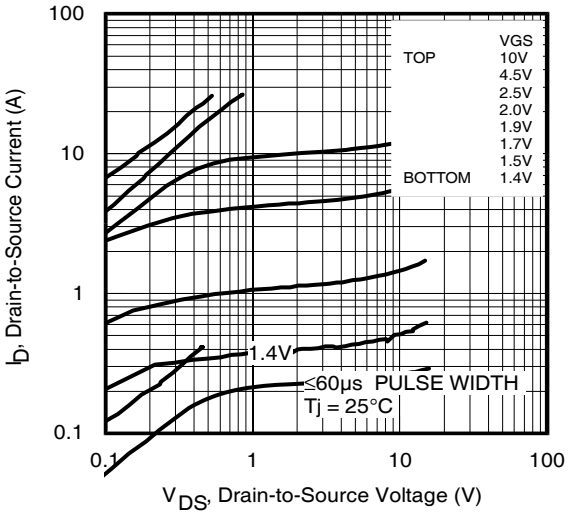

Fig 1. Typical Output Characteristics

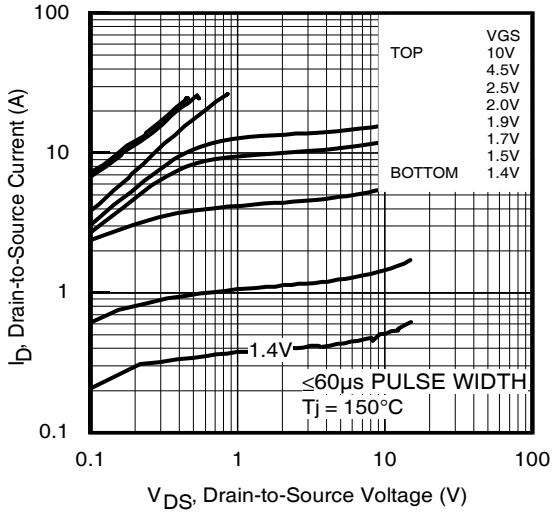

Fig 2. Typical Output Characteristics

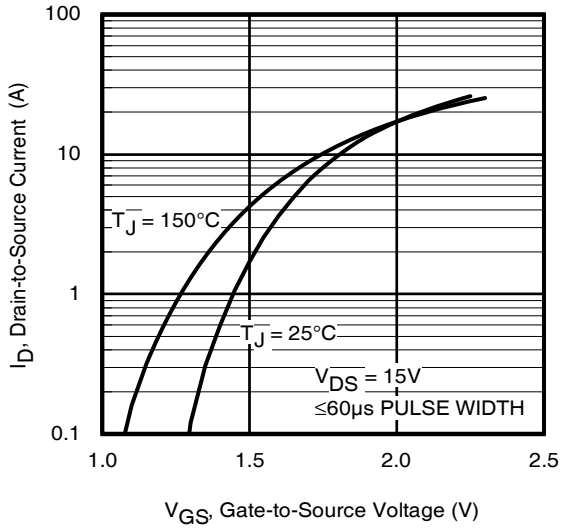

Fig 3. Typical Transfer Characteristics

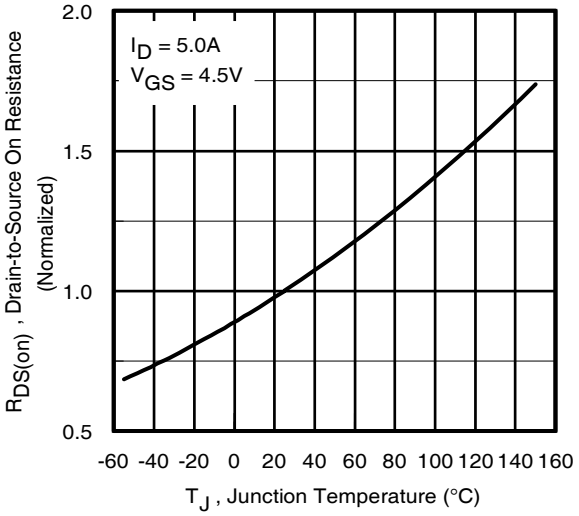

Fig 4. Normalized On-Resistance Vs. Temperature

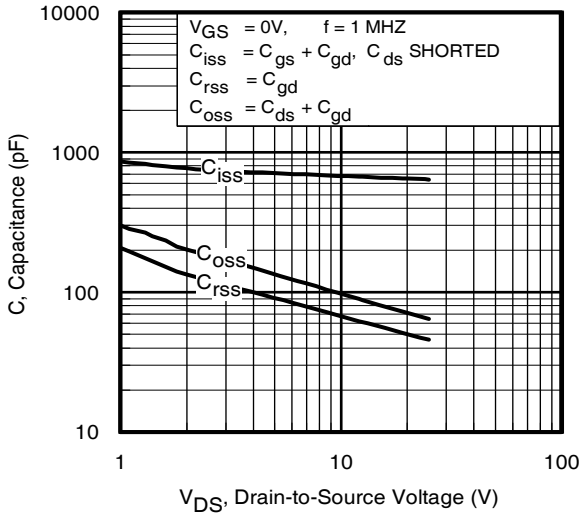

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

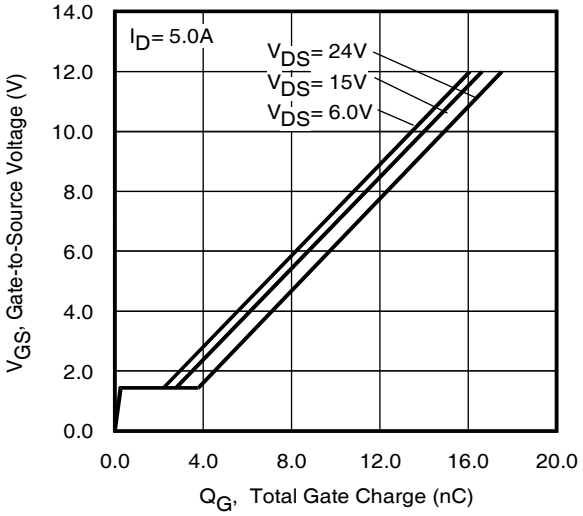

Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

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TYPICAL CHARACTERISTICS (continued)

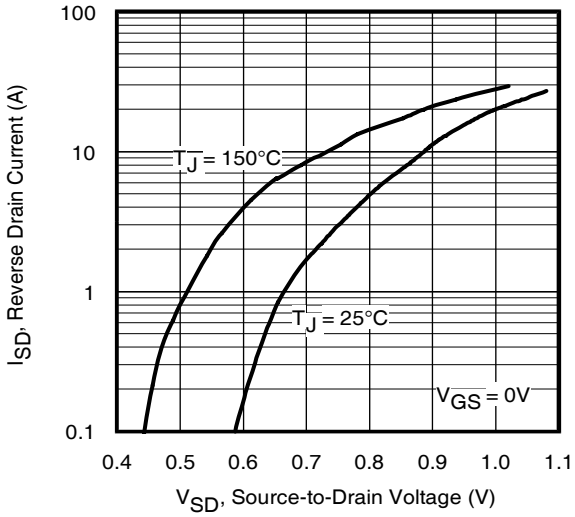


Fig 7. Typical Source-Drain Diode Forward Voltage

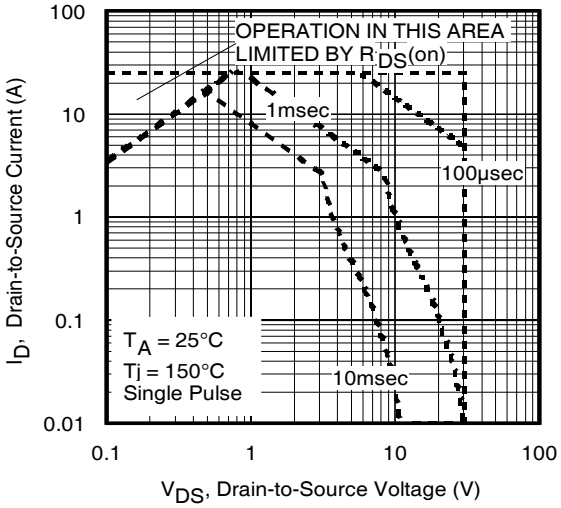


Fig 8. Maximum Safe Operating Area

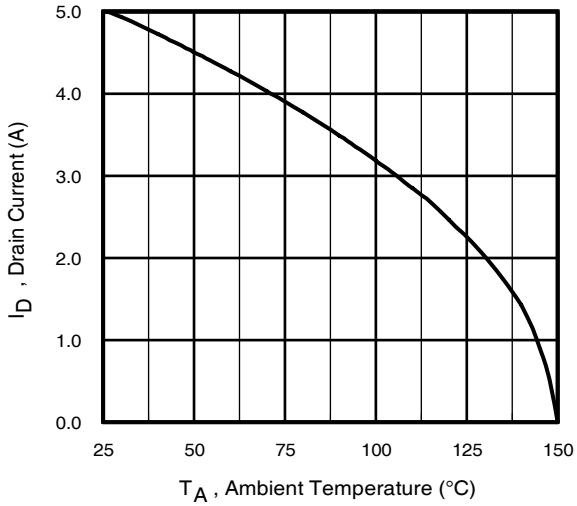


Fig 9. Maximum Drain Current Vs. Ambient Temperature

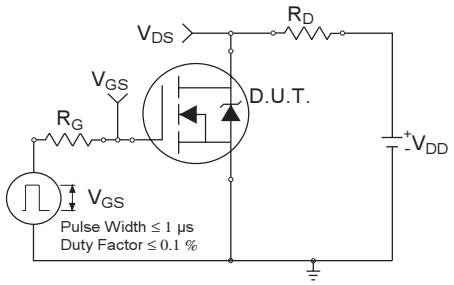


Fig 10a. Switching Time Test Circuit

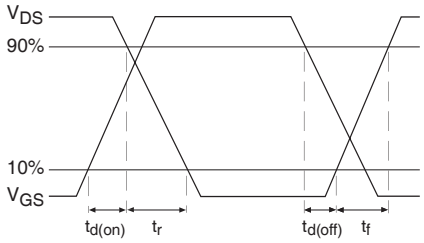


Fig 10b. Switching Time Waveforms

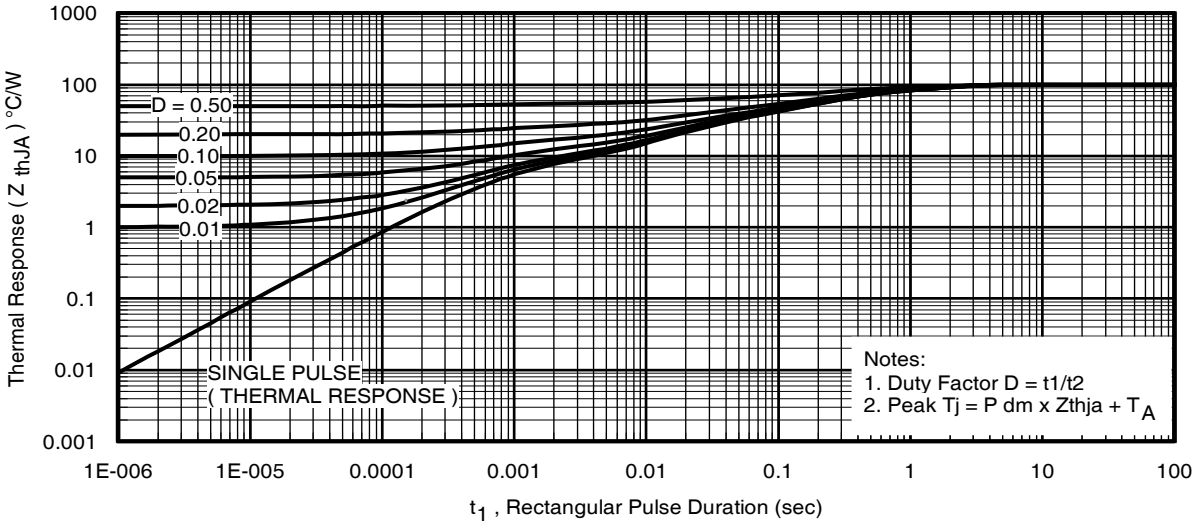
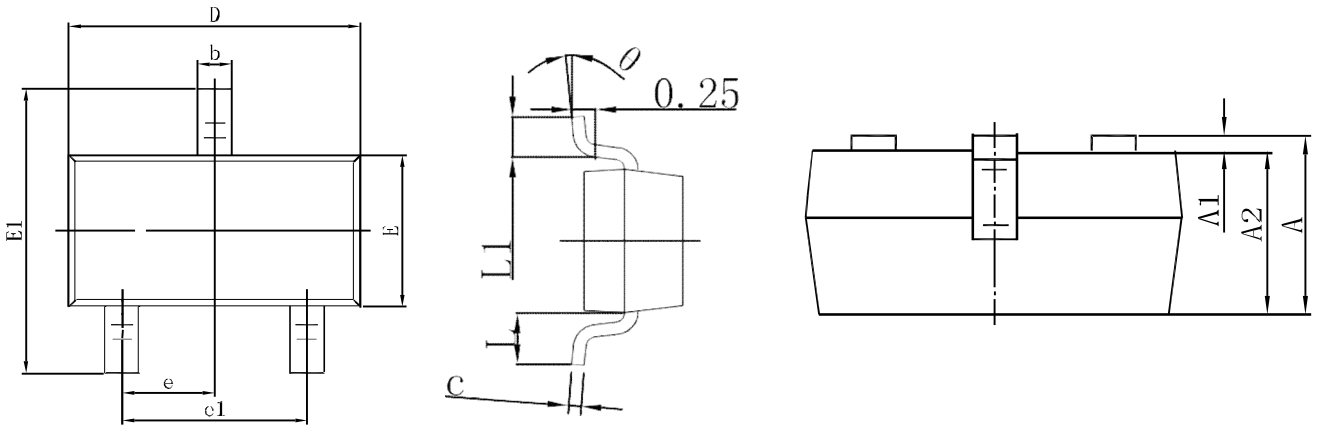


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

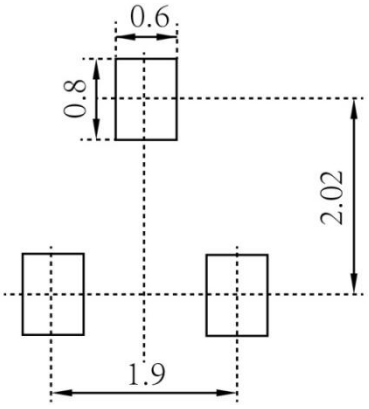
N-CHANNEL POWER MOSFET

SOT-23 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 SUGGESTED PAD LAYOUT



Note:

1.Controlling dimension: in millimeters

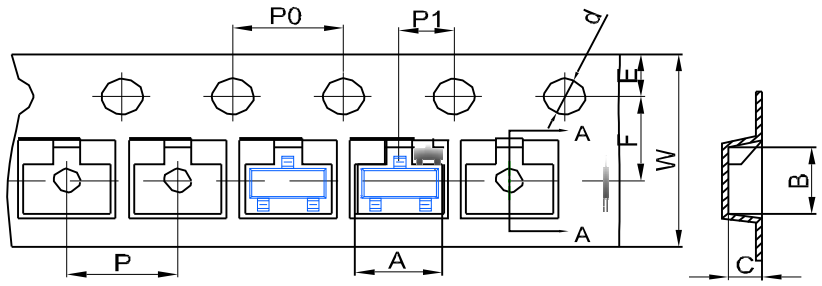
2.General tolerance: ±0.05mm

3.The pad layout is for reference purposes only

N-CHANNEL POWER MOSFET

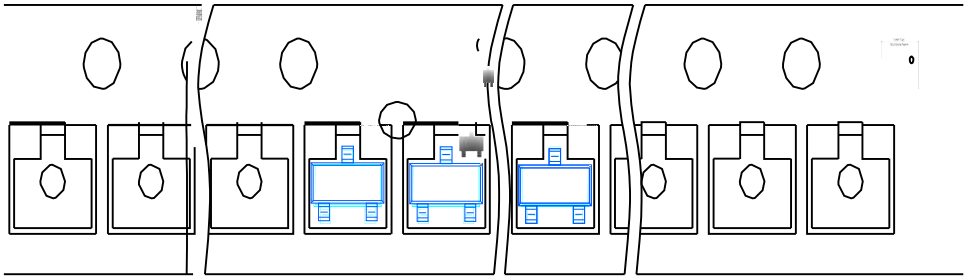
SOT-23 TAPE AND REEL

SOT-23 Embossed Carrier Tape

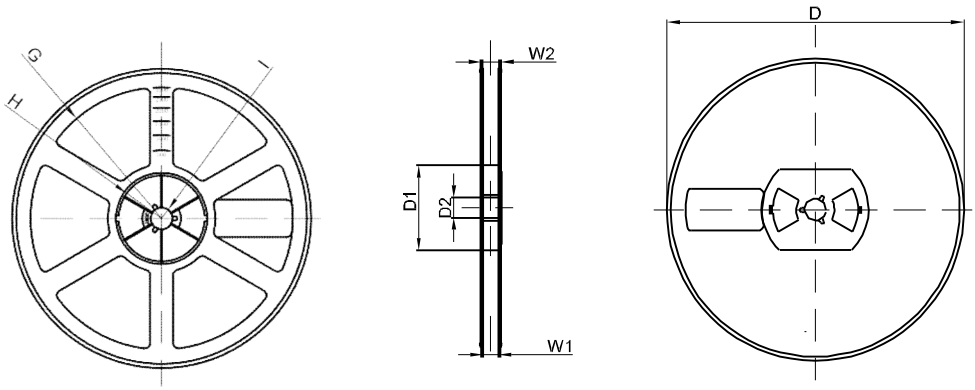


	DIMENSIONS ARE IN MILLIMETER									
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

SOT-23 Tape Leader and Trailer



SOT-23 Reel



	DIMENSIONS ARE IN MILLIMETER							
REEL OPTION	D	D1	D2	G	H	I	W1	W2
7" DIA	Ø178	54.40	13.00	R78	R25.60	R6.50	9.50	12.30
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1