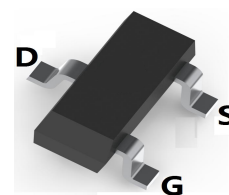


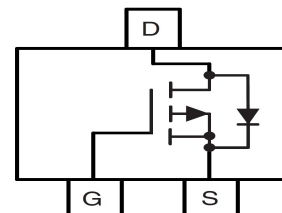
## LOW VOLTAGE MOSFET (P-CHANNEL)

### FEATURES

- $V_{DS} = -60V, R_{DS(ON)} \leq 200m\Omega @ V_{GS} = -10V, I_D = -2.0A$
- Low on-resistance
- For DC to DC converter and Load switch applications
- Surface Mount device



SOT-23



### MECHANICAL DATA

- Case: SOT-23
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.008 grams (approximate)

### MAXIMUM RATINGS ( $T_A = 25^\circ C$ unless otherwise noted)

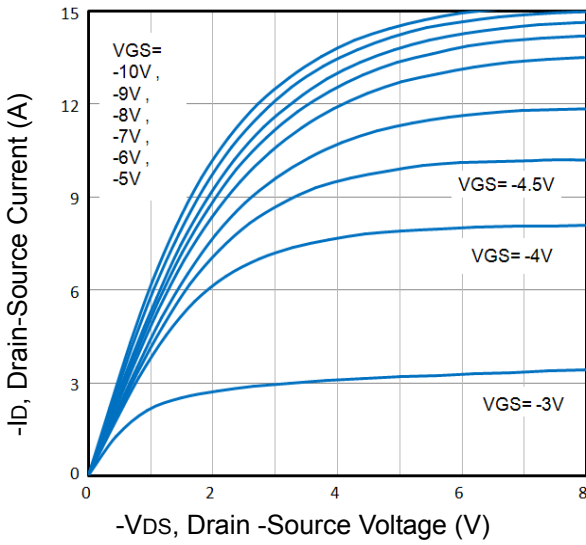
Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	-60	V
Gate-source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current	$I_D$	-2.0	A
Pulsed Drain Current(10 $\mu$ s Pulse Width)	$I_{DM}$	-8	A
Power dissipation	$P_D$	1.0	W
Thermal resistance from Junction to ambient	$R_{\theta JA}$	125	$^\circ C/W$
Junction temperature	$T_J$	150	$^\circ C$
Storage temperature	$T_{STG}$	-50 ~ +150	$^\circ C$

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ C$ unless otherwise specified)

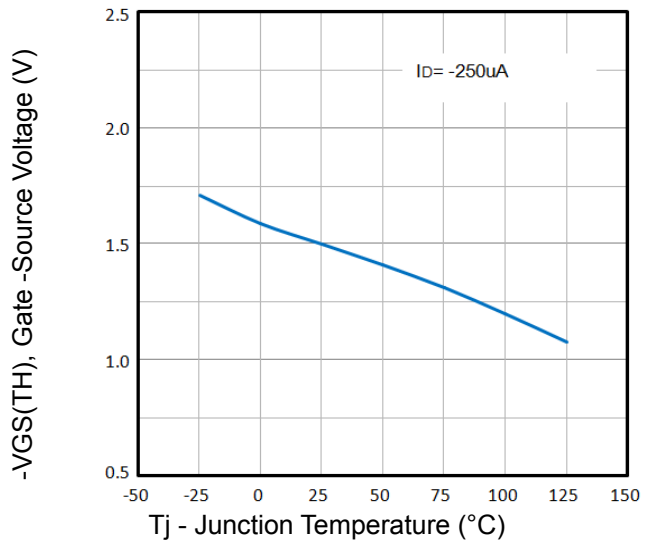
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Drain-Source breakdown voltage	$V_{(BR)DSS}$	-60			V	$V_{GS} = 0V, I_D = -250\mu A$
Zero gate voltage drain current	$I_{DSS}$			-1	$\mu A$	$V_{DS} = -60V, V_{GS} = 0V$
Gate-body leakage current	$I_{GSS}$			$\pm 100$	nA	$V_{DS} = 0V, V_{GS} = \pm 20V$
Gate-threshold voltage (note 1)	$V_{GS(th)}$	-1		-3	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Drain-source on-resistance (note 1)	$R_{DS(ON)}$		150	200	$m\Omega$	$V_{GS} = -10V, I_D = -2.0A$
			200	300	$m\Omega$	$V_{GS} = -4.5V, I_D = -1.0A$
Forward transconductance (note 1)	$g_{FS}$		2.8		S	$V_{DS} = -10V, I_D = -1.0A$
Gate resistance	$R_g$		7		$\Omega$	$f = 1MHz$
Input capacitance	$C_{iss}$		310		pF	$V_{DS} = -30V, V_{GS} = 0V, f = 1MHz$
Output capacitance	$C_{oss}$		28		pF	
Reverse transfer capacitance	$C_{rss}$		15		pF	
Turn-on delay time	$t_{d(on)}$		40		nS	$V_{DD} = -30V, I_D = -1A, V_{GEN} = -4.5V, R_g = 1\Omega, R_L = 30\Omega$
Turn-on rise time	$t_r$		35		nS	
Turn-off delay time	$t_{d(off)}$		15		nS	
Turn-off fall time	$t_f$		10		nS	
Turn-on delay time	$t_{d(on)}$		5		nS	
Turn-on rise time	$t_r$		10		nS	$V_{DD} = -30V, I_D = -1A, V_{GEN} = -10V, R_g = 1\Omega, R_L = 30\Omega$
Turn-off delay time	$t_{d(off)}$		15		nS	
Turn-off fall time	$t_f$		10		nS	
Total gate charge	$Q_g$		2.7		nC	
Gate-source charge	$Q_{gs}$		0.8		nC	
Gate-drain charge	$Q_{gd}$		1.2		nC	$V_{DD} = -30V, V_{GS} = -4.5V, I_D = -1.25A$
Diode forward voltage (note 1)	$V_{SD}$		-0.8	-1.2	V	$I_S = -1.5A, V_{GS} = 0V$
Diode forward current	$I_S$			-1.4	A	$T_C = 25^\circ C$
Pulse diode forward current	$I_{SM}$			-8	A	
Body diode reverse recovery time	$t_{rr}$		30	60	nS	$I_F = -1.25A, dI/dt = 100A/\mu s, T_J = 25^\circ C$
Body diode reverse recovery charge	$Q_{rr}$		33	60	nC	

Note: 1. Pulse test ; Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$  .

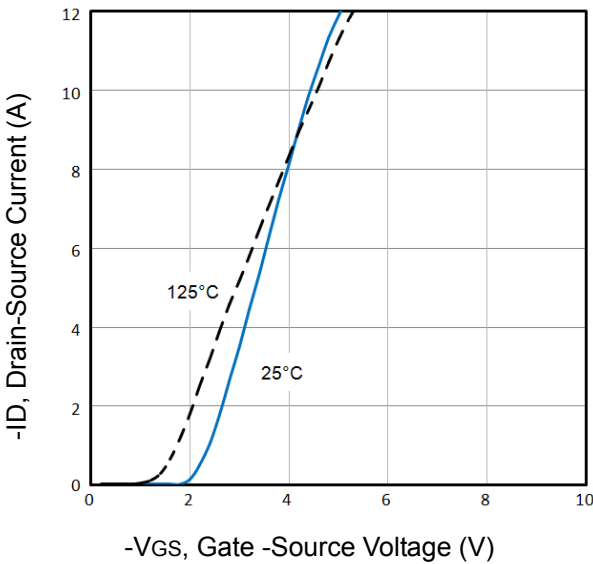
**LOW VOLTAGE MOSFET (P-CHANNEL)  
Typical Characteristics**



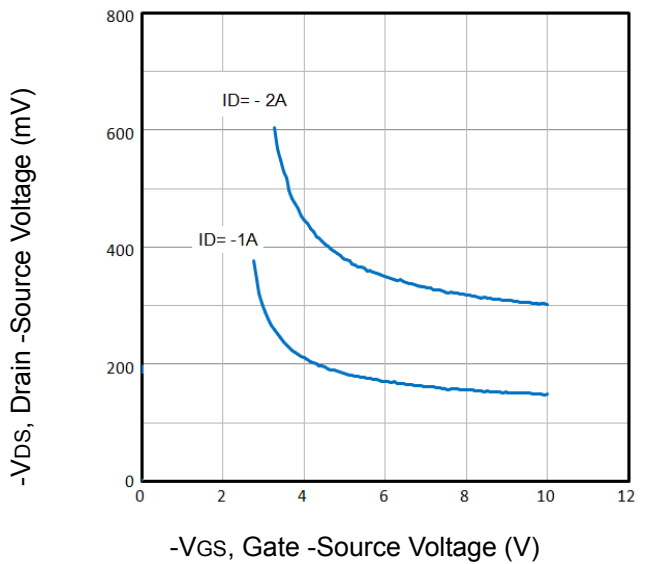
**Fig1.** Typical Output Characteristics



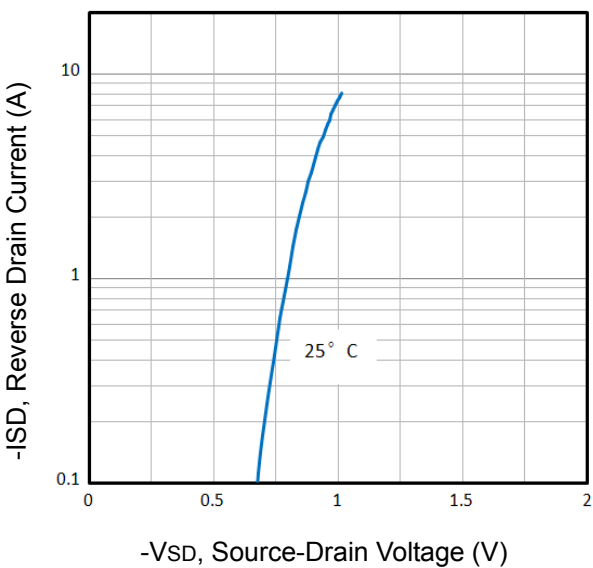
**Fig2.** Normalized Threshold Voltage Vs. Temperature



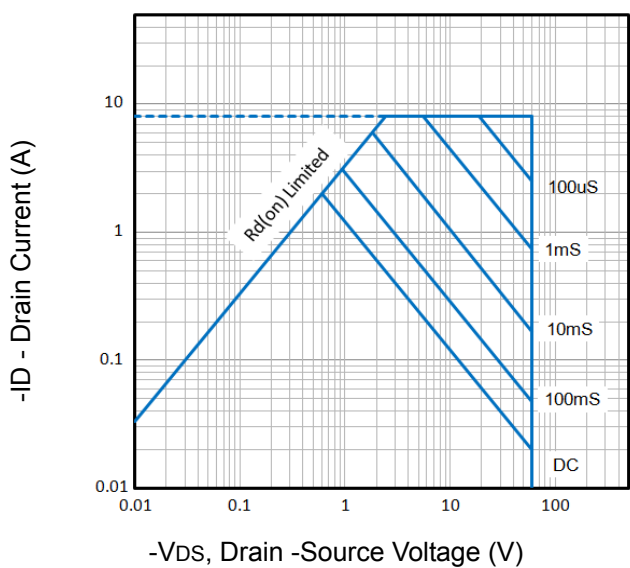
**Fig3.** Typical Transfer Characteristics



**Fig4.** Drain-Source Voltage vs Gate-Source Voltage



**Fig5.** Typical Source-Drain Diode Forward Voltage



**Fig6.** Maximum Safe Operating Area

LOW VOLTAGE MOSFET (P-CHANNEL)

Typical Characteristics

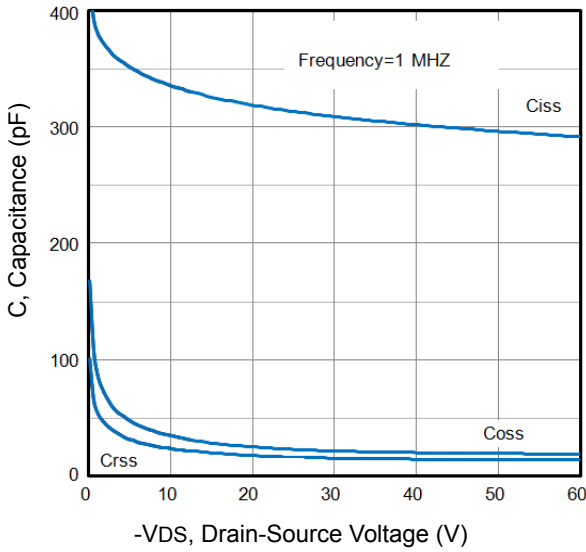


Fig7. Typical Capacitance Vs. Drain-Source Voltage

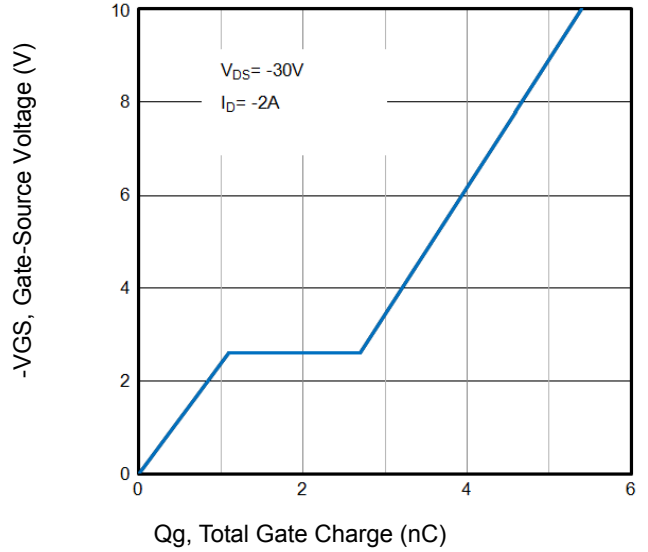


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

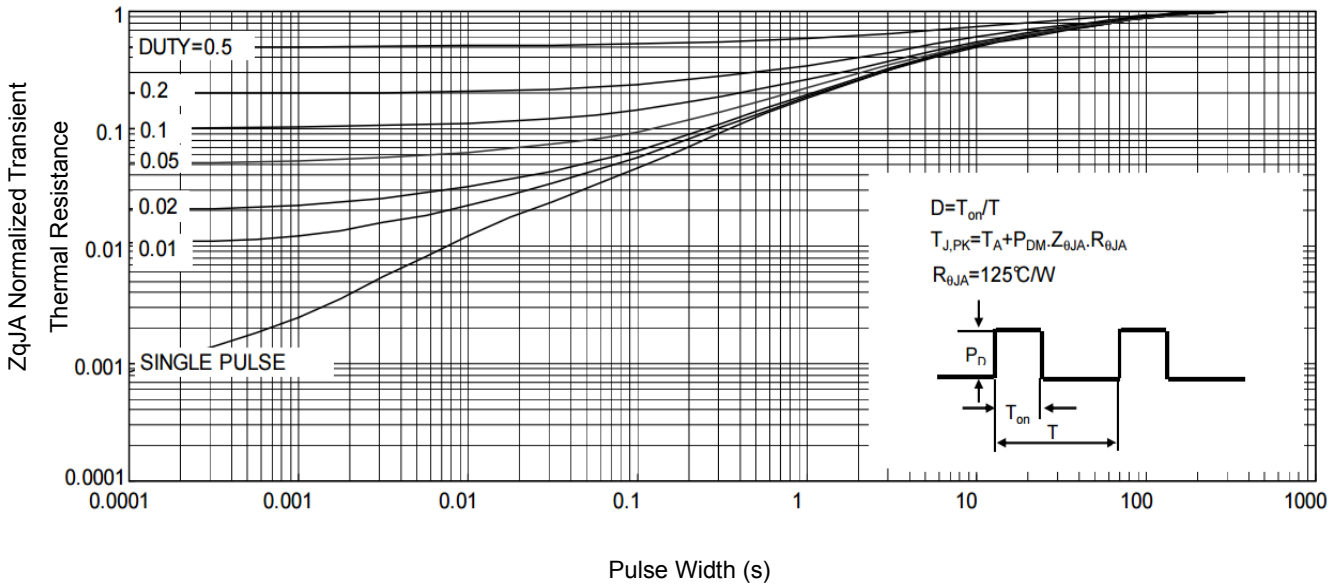


Fig9. Normalized Maximum Transient Thermal Impedance

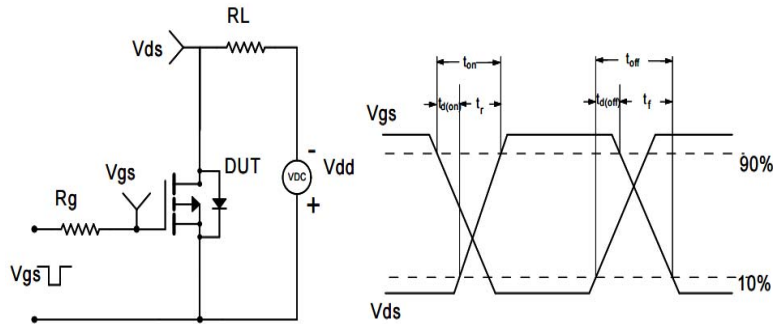
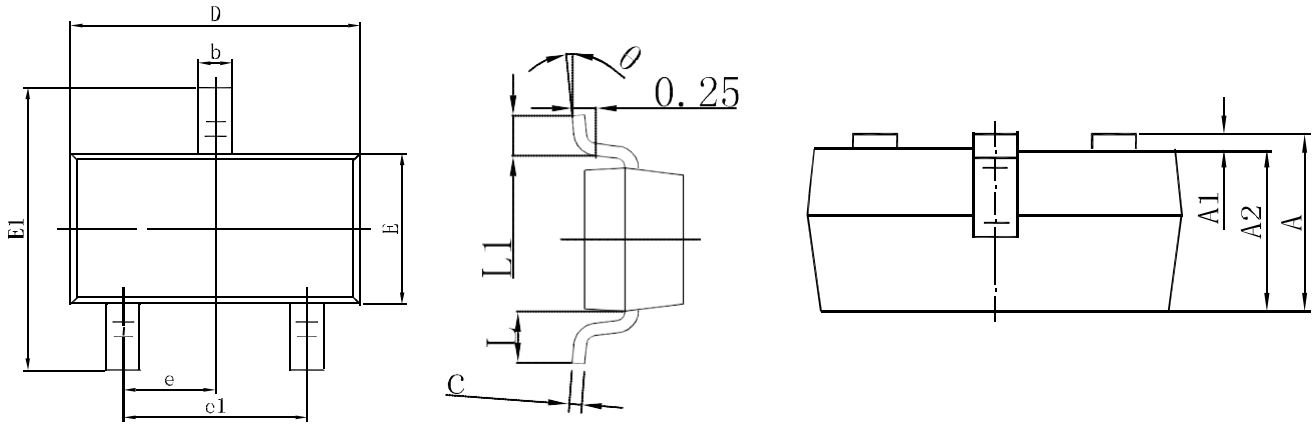


Fig10. Switching Time Test Circuit and waveforms

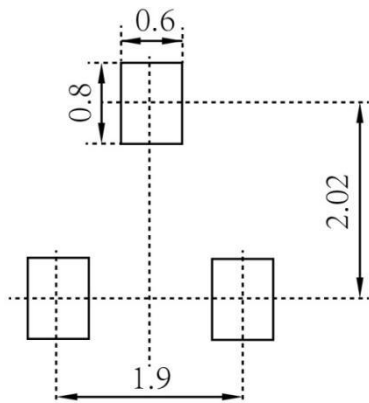
## LOW VOLTAGE MOSFET (P-CHANNEL)

### 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



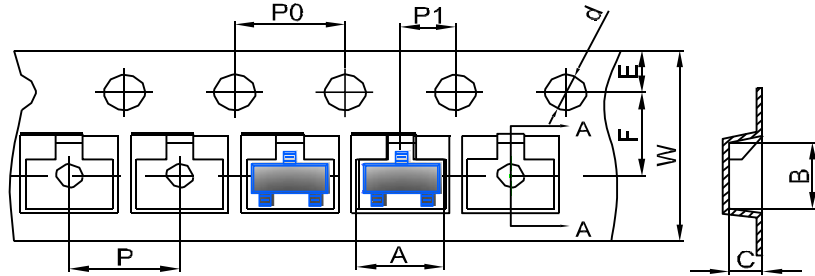
**Note:**

1. Controlling dimension: in millimeters
2. General tolerance:  $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

LOW VOLTAGE MOSFET (P-CHANNEL)

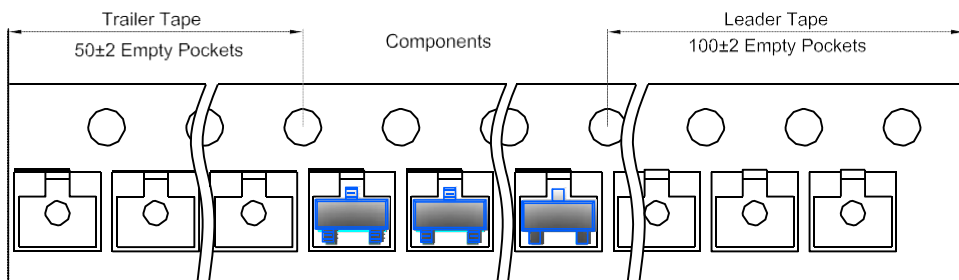
SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

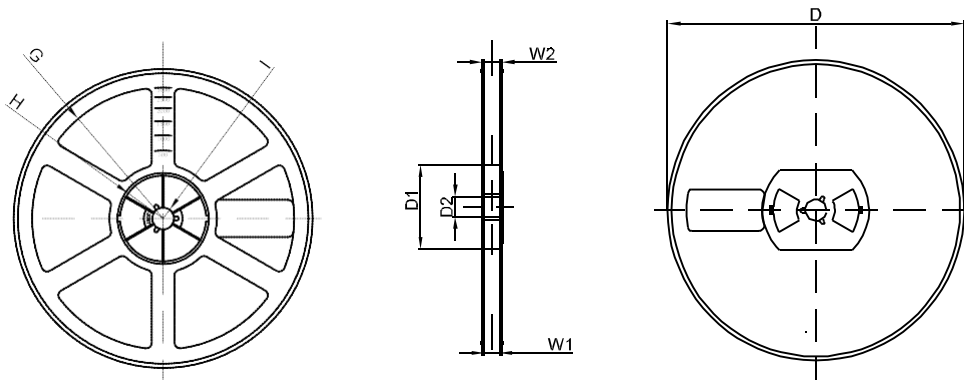


DIMENSIONS ARE IN MILLIMETER										
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

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