

## Features

- Energy Efficient
- ESD Protected up to 2KV (HBM)
- Low Threshold Voltage
- High Speed Switching
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

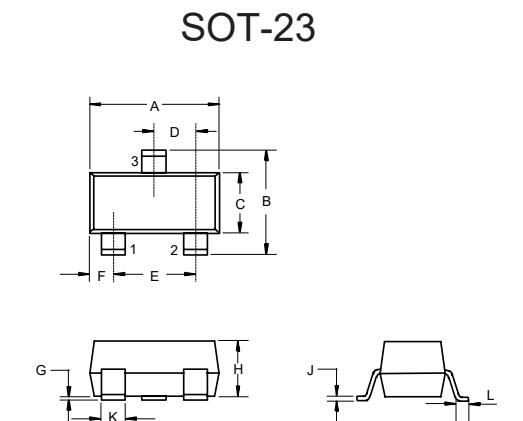
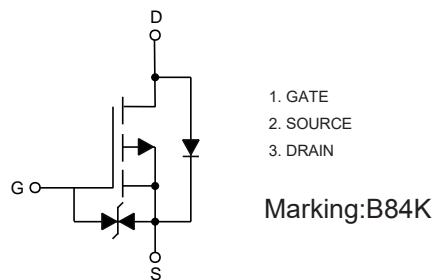
## P-Channel MOSFET

## Maximum Ratings

- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Maximum Thermal Resistance: 556°C/W Junction to Ambient<sup>(Note3)</sup>

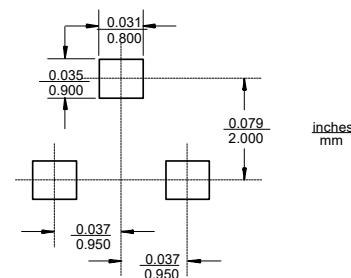
Parameter	Symbol	Rating	Unit
Drain -source Voltage	$V_{DS}$	-60	V
Gate -Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	-0.13	A
Plused Drain Current @ $t_p < 100\mu s$ <sup>(Note2)</sup>	$I_{DM}$	-0.52	A
Power Dissipation	$P_D$	0.225	W

## Internal Structure



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.110	0.120	2.80	3.04	
B	0.083	0.104	2.10	2.64	
C	0.047	0.055	1.20	1.40	
D	0.034	0.041	0.85	1.05	
E	0.067	0.083	1.70	2.10	
F	0.018	0.024	0.45	0.60	
G	0.0004	0.006	0.01	0.15	
H	0.035	0.043	0.90	1.10	
J	0.003	0.007	0.08	0.18	
K	0.012	0.020	0.30	0.51	
L	0.007	0.020	0.20	0.50	

## Suggested Solder Pad Layout



**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-60			V
Gate-Threshold Voltage <sup>(Note 4)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.8	-1.5	-2.5	V
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±10	μA
Drain Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-48V, V <sub>GS</sub> =0V			-1	μA
Drain-Source On-Resistance <sup>(Note 4)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-0.5A		2.2	6.0	Ω
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.2A		2.5	7.0	
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-0.5A			-1.3	V
<b>Dynamic Characteristics<sup>(Note 4)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-5V, V <sub>GS</sub> =0V, f=1MHz		30		pF
Output Capacitance	C <sub>oss</sub>			10		
Reverse Transfer Capacitance	C <sub>rss</sub>			5		
<b>Switching Characteristics<sup>(Note 5)</sup></b>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-15V, I <sub>D</sub> =-2.5A, R <sub>L</sub> =50Ω		2.5		ns
Turn-On Rise Time	t <sub>r</sub>			1.0		
Turn-Off Delay Time	t <sub>d(off)</sub>			16		
Turn-Off Fall Time	t <sub>f</sub>			8.0		

- Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.  
 2. Repetitive rating: Pulse width limited by junction temperature.  
 3. Surface mounted on FR4 board, t≤10s.  
 4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%.  
 5. Guaranteed by design, not subject to production.

## Curve Characteristics

Fig. 1 - Output Characteristics

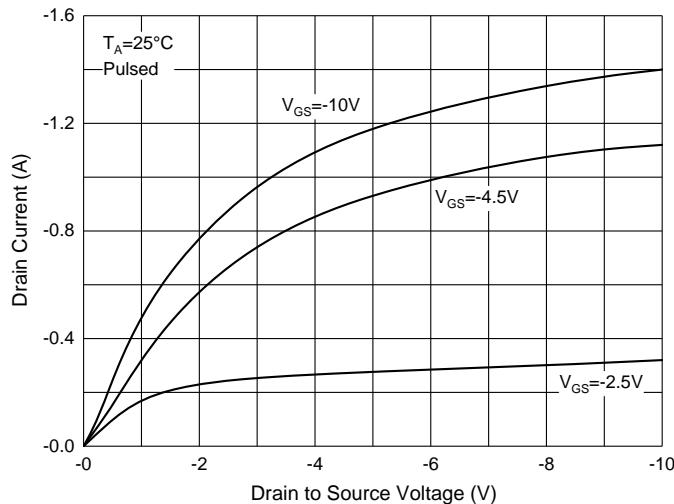


Fig. 2 - Transfer Characteristics

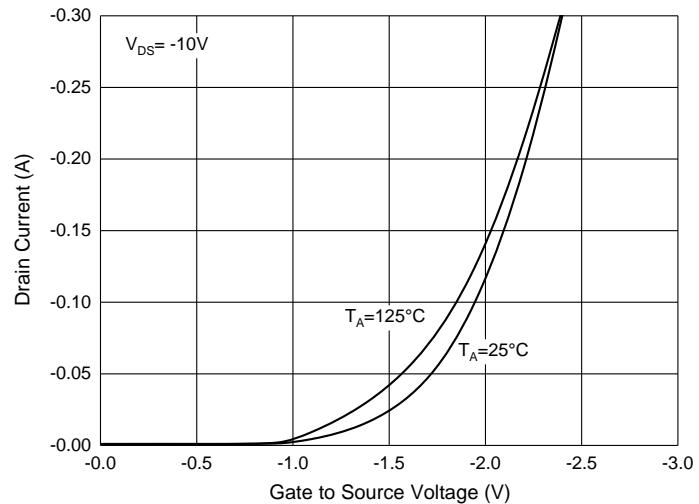


Fig. 3 -  $R_{DS(ON)} - I_D$

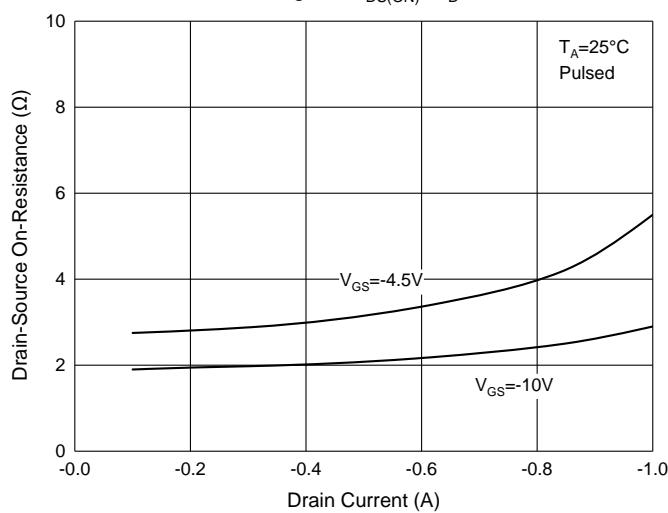


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

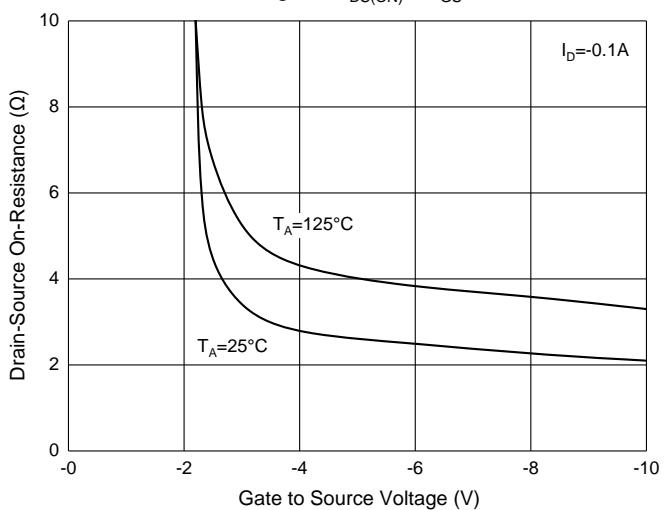


Fig. 5 -  $I_S - V_{SD}$

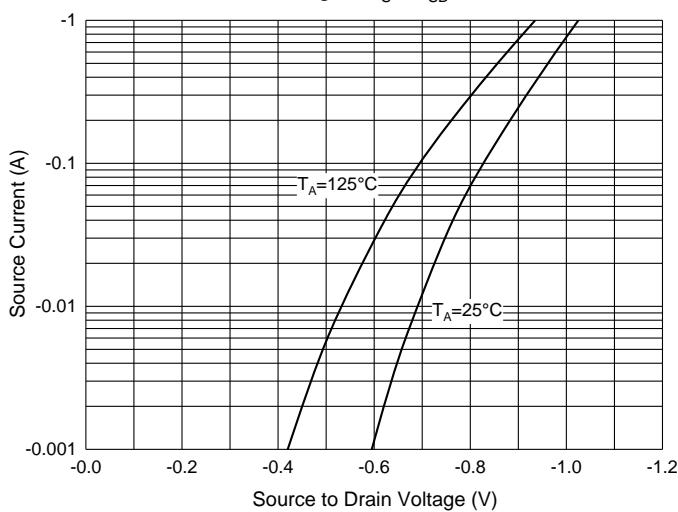
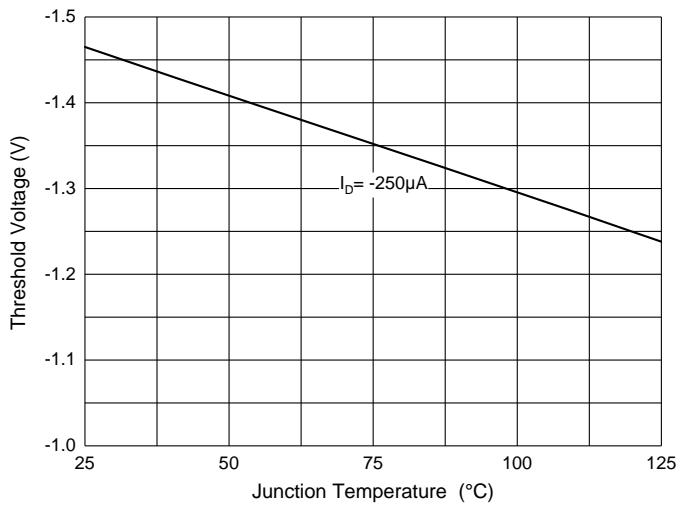
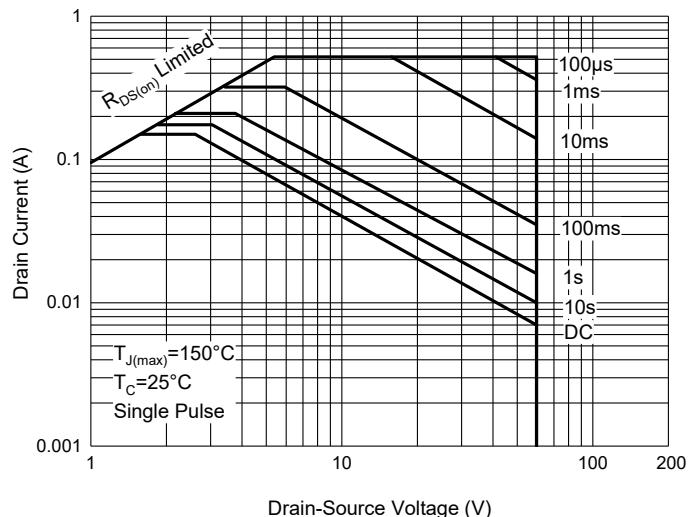


Fig. 6 - Threshold Voltage



## Curve Characteristics

Fig. 7 - Safe Operation Area



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel:3Kpcs/Reel

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