

Features

- Trench LV MOSFET Technology
- High Dense Cell Design for Extremely Low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

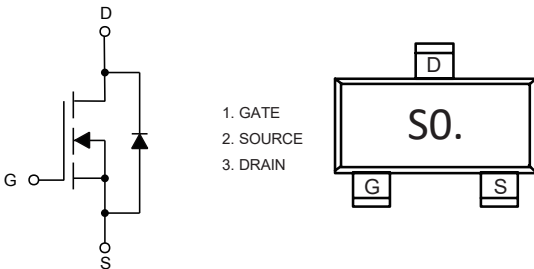
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 112°C/W Junction to Ambient (Note 2)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Continuous Drain Current	I_D	$T_A=25^\circ\text{C}$	5.2
		$T_A=100^\circ\text{C}$	3.3
Pulsed Drain Current (Note 3)	I_{DM}	20.8	A
Total Power Dissipation (Note 4)	P_D	1.1	W

Note:

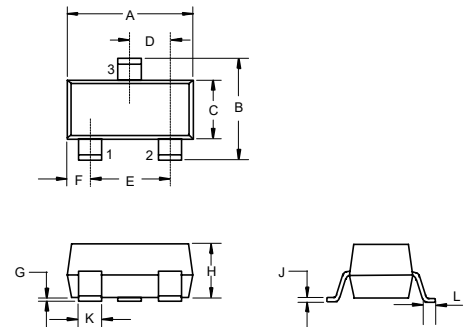
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.
3. Repetitive rating; pulse width limited by max. junction temperature.
4. P_D is based on max. junction temperature, using junction-ambient thermal resistance.

Internal Structure and Marking Code



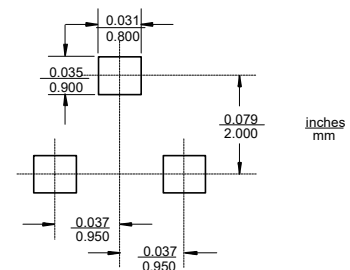
N-CHANNEL MOSFET

SOT-23



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 @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 10V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$			1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.7	0.9	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=4.5A$		18	25	m Ω
		$V_{GS}=2.5V, I_D=3A$		22	32	
Gate Resistance	R_g	f=1 MHz, Open drain		2.3		Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=4A$		21		S
Diode Characteristics						
Continuous Body Diode Current	I_S				5.2	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=4.5A$			1.2	V
Reverse Recovery Time	t_{rr}	$I_F=4A, di/dt=100A/\mu s$		12		ns
Reverse Recovery Charge	Q_{rr}			3.6		nC
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V, f=1MHz$		387		pF
Output Capacitance	C_{oss}			70		
Reverse Transfer Capacitance	C_{rss}			62		
Total Gate Charge	Q_g	$V_{DS}=10V, V_{GS}=4.5V, I_D=4A$		5.4		nC
Gate-Source Charge	Q_{gs}			0.6		
Gate-Drain Charge	Q_{gd}			1.5		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=10V, V_{GS}=4.5V, R_G=3\Omega, I_D=4A$		4.4		ns
Turn-On Rise Time	t_r			6.5		
Turn-Off Delay Time	$t_{d(off)}$			16		
Turn-Off Fall Time	t_f			5.1		

Curve Characteristics

Fig. 1 - Typical Output Characteristics

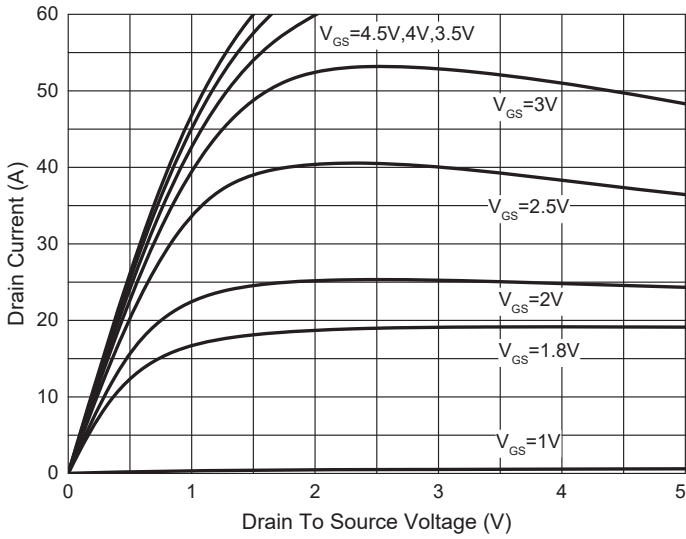


Fig. 2 - Transfer Characteristics

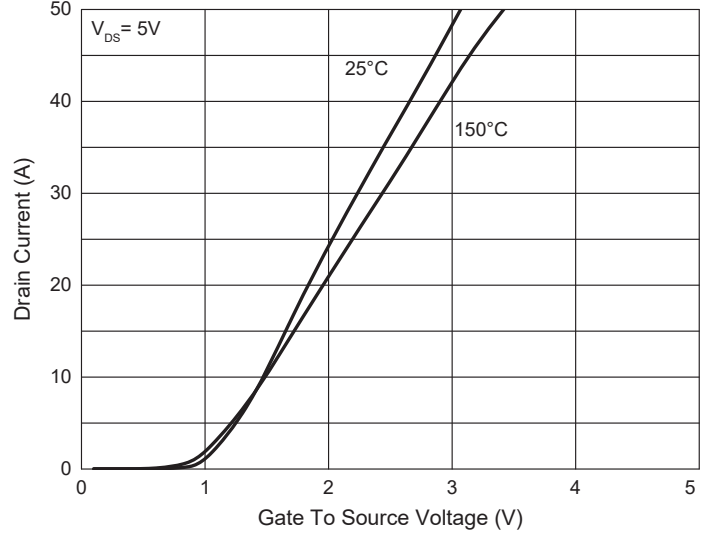


Fig.3- $R_{DS(ON)}$ - V_{GS}

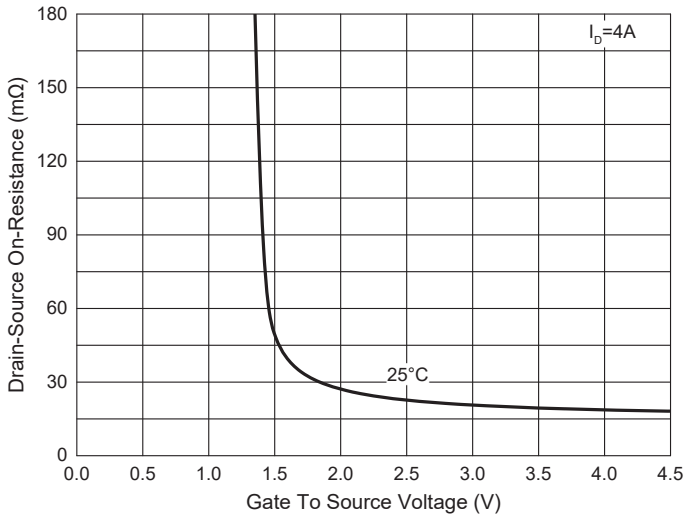


Fig.4- $R_{DS(ON)}$ - I_D

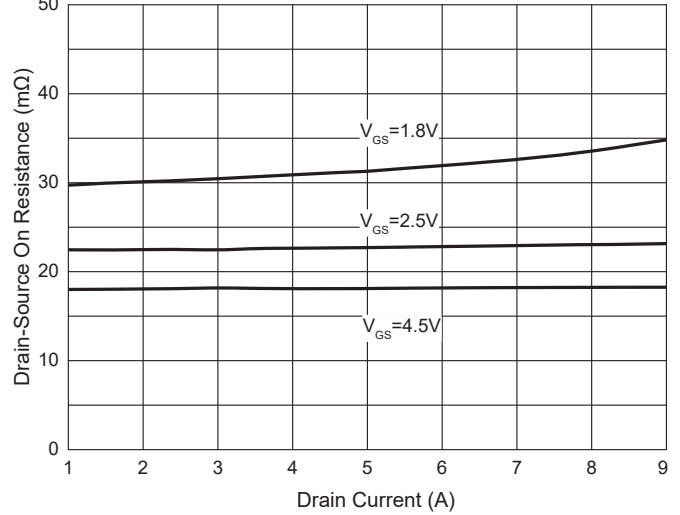


Fig. 5 - Capacitance Characteristics

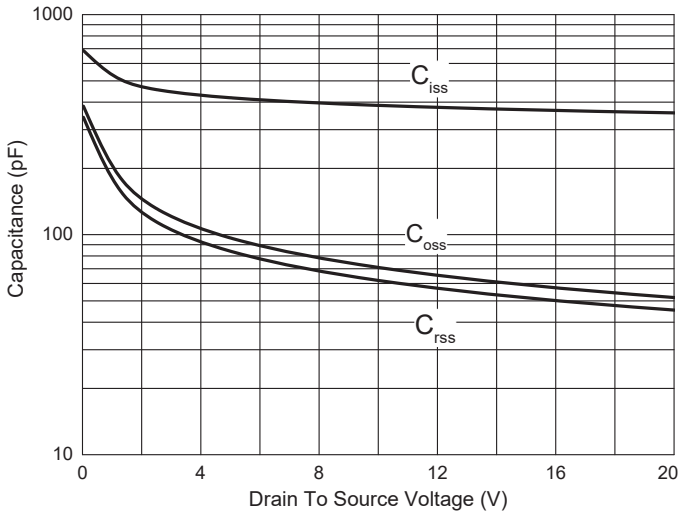
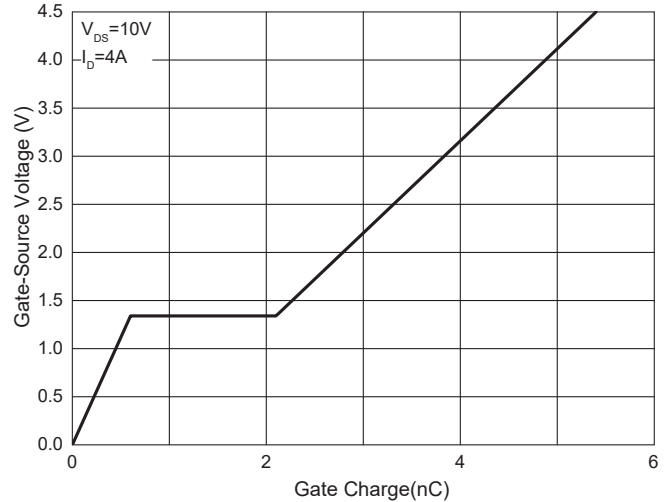


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

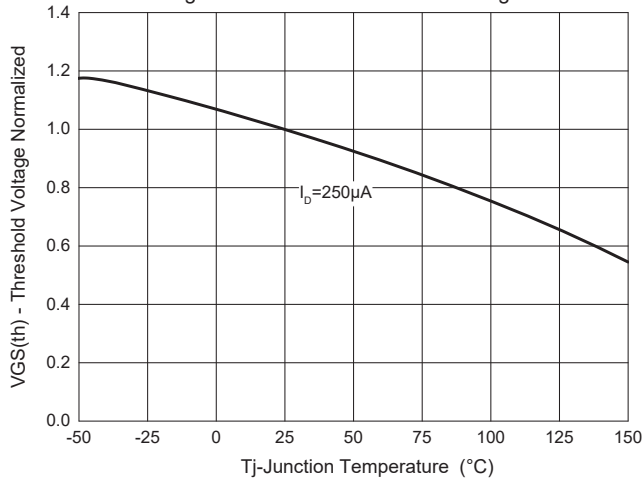


Fig. 8 - Normalized On Resistance Characteristics

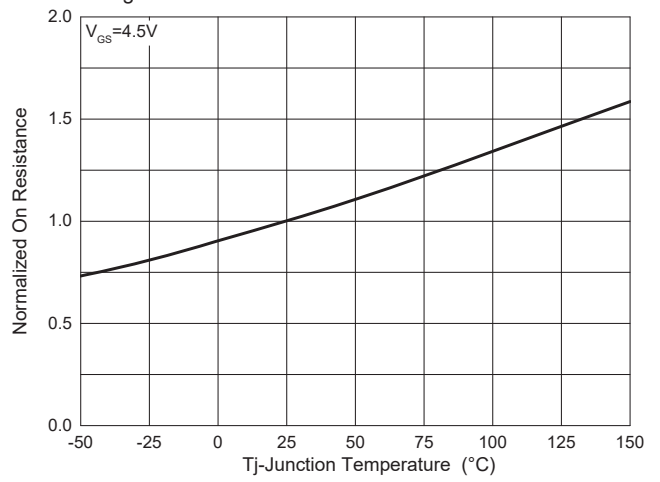


Fig.9-I_s-V_{SD}

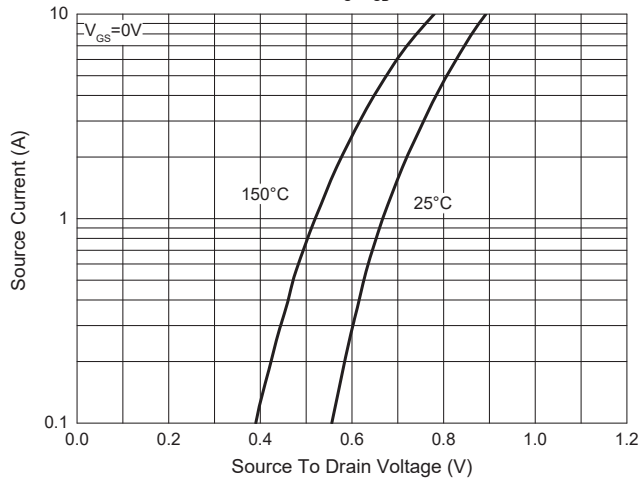


Fig. 10 - Drain Current

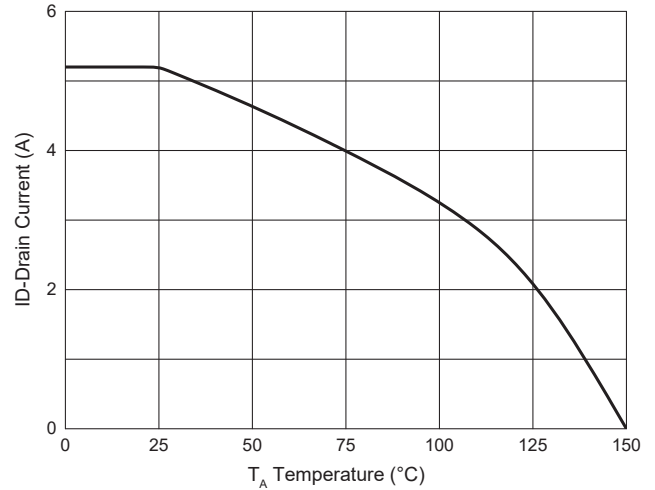
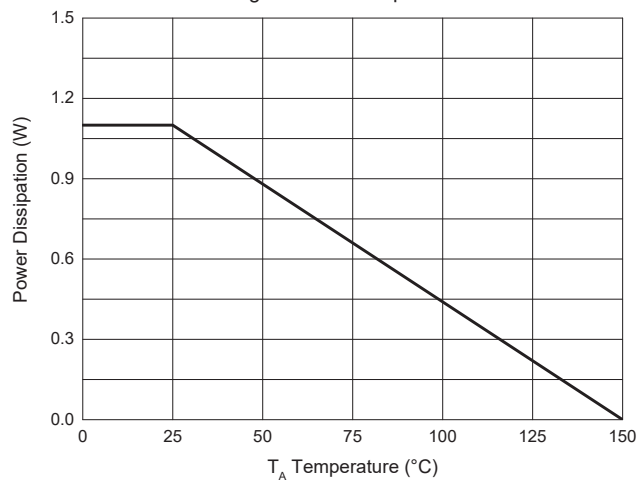


Fig. 11 - PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

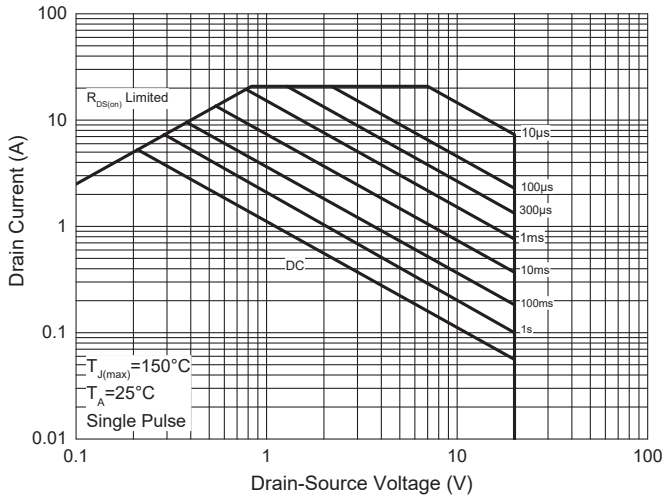
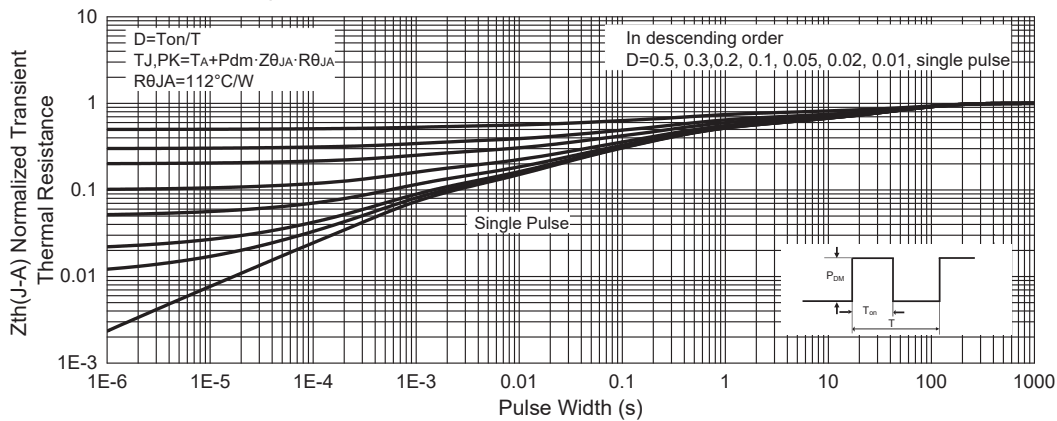


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel
Part Number-13P	Tape&Reel: 10Kpcs/Reel

For packaging details, go to our website at <https://www.mccsemi.com/pdf/productpackaging/SOT-23%20Package.pdf>

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