Features

- Operated at Low Logic Level Gate Drive
- P-Channel Switch with Low $R_{DS(on)}$
- 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

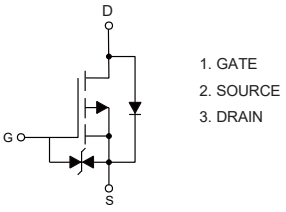
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance:276°C/W Junction to Ambient(Steady-State)(2)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Volltage		V_{GS}	±12	V
Continuous Drain Current	T_A=25°C	I_D	-0.66	A
	T_A=100°C		-0.42	
Pulsed Drain Current(3)		I_{DM}	-2.7	A
Total Power Dissipation(4)		P_D	0.45	W

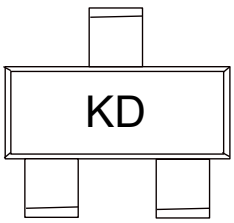
Note:

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 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
3. Repetitive rating; pulse width limited by max. junction temperature.
4. P_D is based on max. junction temperature, using junction to ambient thermal resistance.

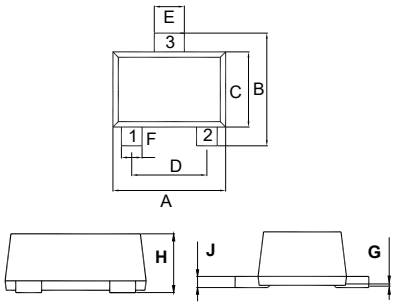
Internal Structure and Marking Code



1. GATE
2. SOURCE
3. DRAIN

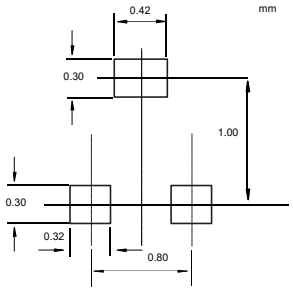


SOT-723



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.043	0.051	1.10	1.30	
B	0.043	0.051	1.10	1.30	
C	0.028	0.035	0.70	0.90	
D	0.031		0.80		TYP.
E	0.009	0.017	0.22	0.42	
F	0.005	0.013	0.12	0.32	
G	0.000	0.002	0.00	0.05	
H	0.017	0.021	0.43	0.54	
J	0.003	0.006	0.08	0.15	

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=-250μA	-20			V
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS} =±10V			±10	μA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V, TJ=25℃			-1.0	
		V_{DS}=-20V, V_{GS}=0V,TJ=125℃			-2.0	
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.35		-0.8	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=-4.5V, I_D=-1000mA			0.52	Ω
		V_{GS}=-2.5V, I_D=-800mA			0.70	
		V_{GS}=-1.8V, I_D=-500mA			0.95	
Gate Resistance	R_g	F=1 MHz, Open drain		82		Ω
Diode Characteristics						
Continuous Body Diode Current	I_S				-0.5	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-500mA			-1.2	V
Reverse Recovery Time	t_{rr}	I_F=-0.2A, dI_F/dt=100A/μs		16		ns
Reverse Recovery Charge	Q_{rr}			3.5		nC
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-16V,V_{GS}=0V,f=1MHz		73.1		pF
Output Capacitance	C_{oss}			15		
Reverse Transfer Capacitance	C_{rss}			9		
Total Gate Charge	Q_g	V_{DS}=-10V,V_{GS}=-4.5V,I_D=-1A		1.5		nC
Gate-Source Charge	Q_{gs}			0.3		
Gate-Drain Charge	Q_{gd}			0.3		
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=-10V, V_{GS}=-4.5V, R_{GEN}=10Ω, I_D=-200mA		9		ns
Turn-On Rise Time	t_r			5.8		
Turn-Off Delay Time	$t_{d(off)}$			32.7		
Turn-Off Fall Time	t_f			20.3		

Curve Characteristics

Fig. 1 - Typical Output Characteristics

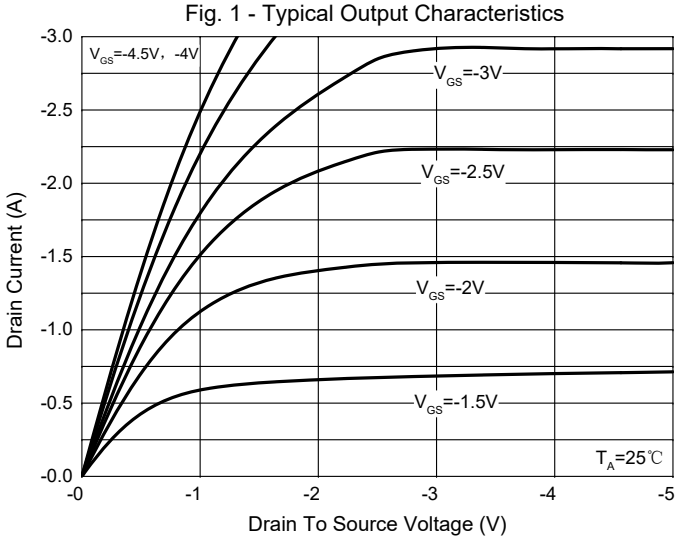


Fig. 2 - Transfer Characteristics

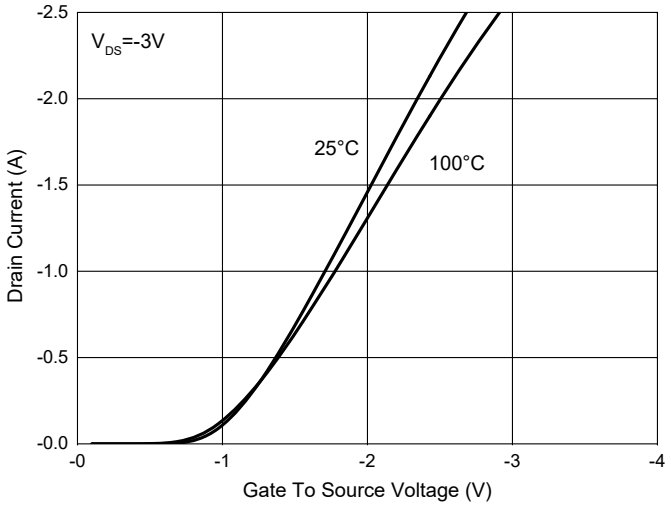


Fig. 3 - $R_{DS(ON)}$—I_D

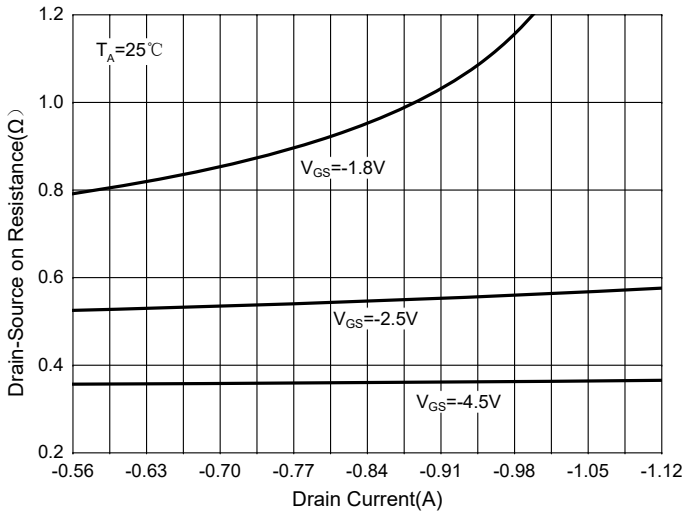


Fig. 4 - $R_{DS(ON)}$—V_{GS}

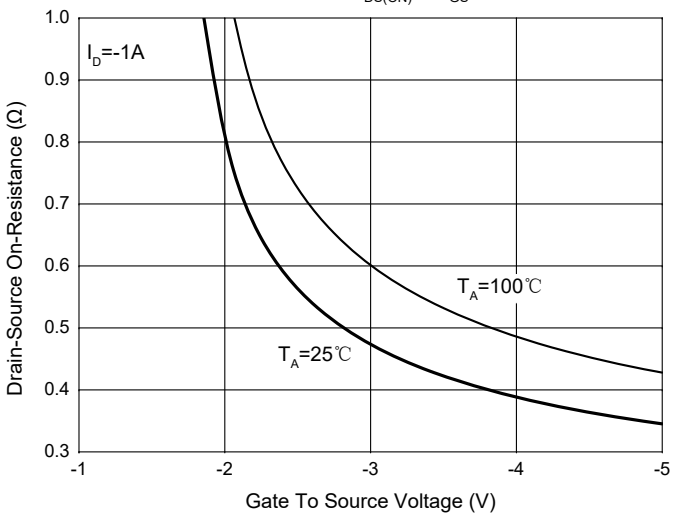


Fig. 5 - I_S—V_{SD}

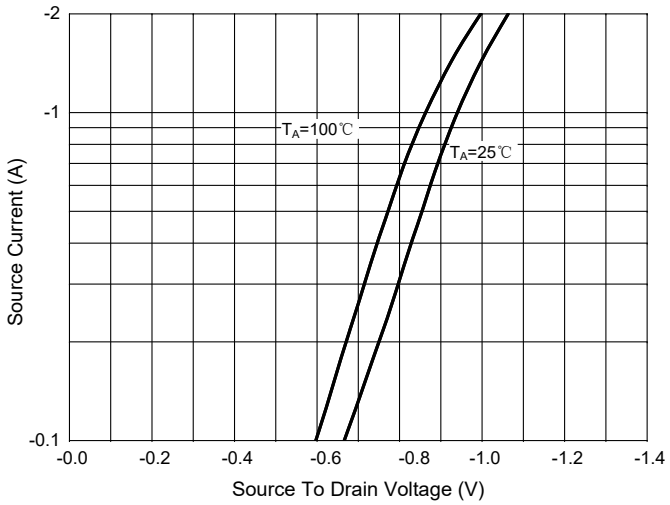
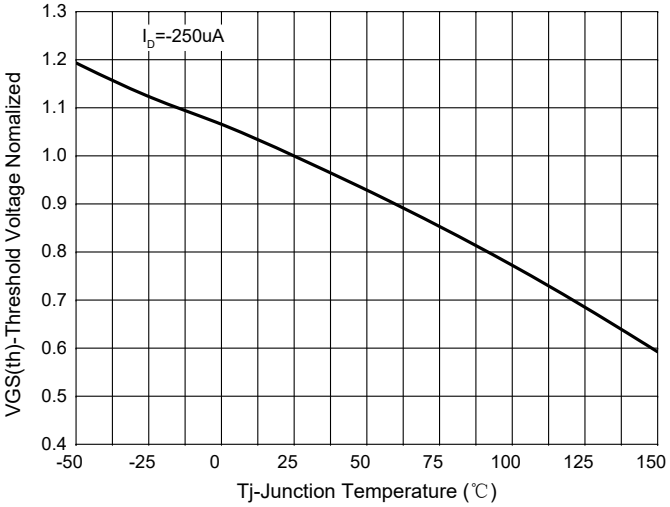


Fig. 6 - Nomalized Threshold voltage



Curve Characteristics

Fig. 7 - Capacitance Characteristics

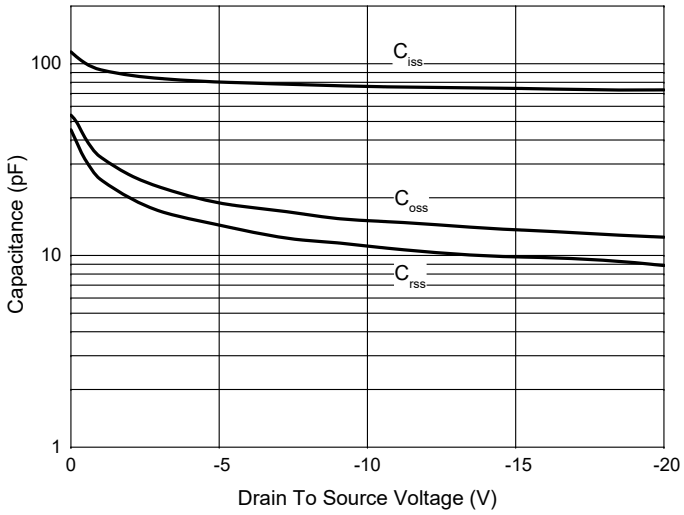


Fig. 8 - GateCharge

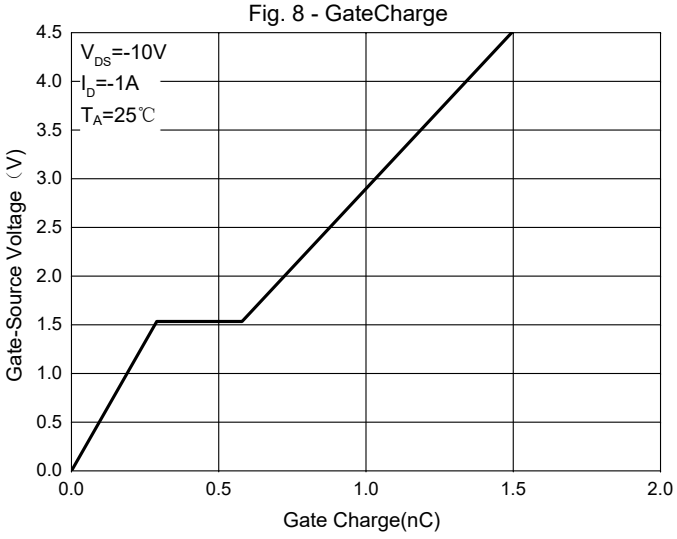


Fig.9-NormalizedOnResistanceCharacteristics

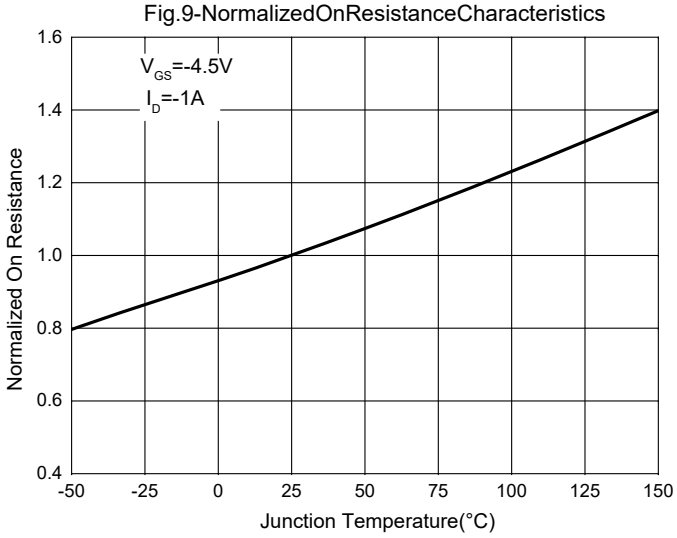


Fig. 10 - Current dissipation

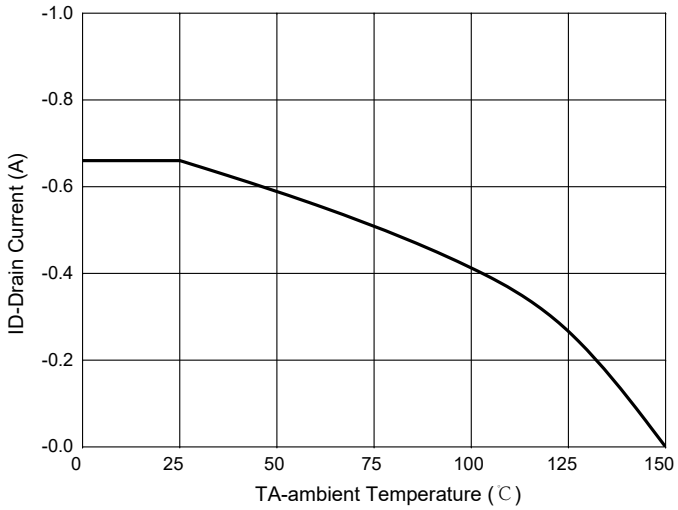
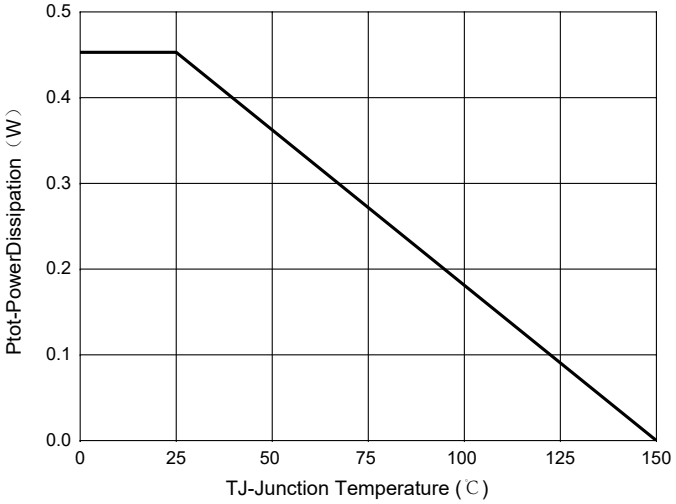


Fig.11-PowerDissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

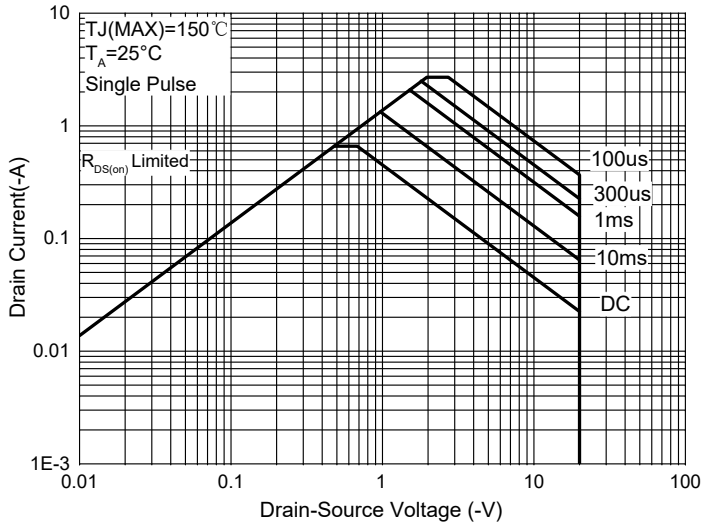
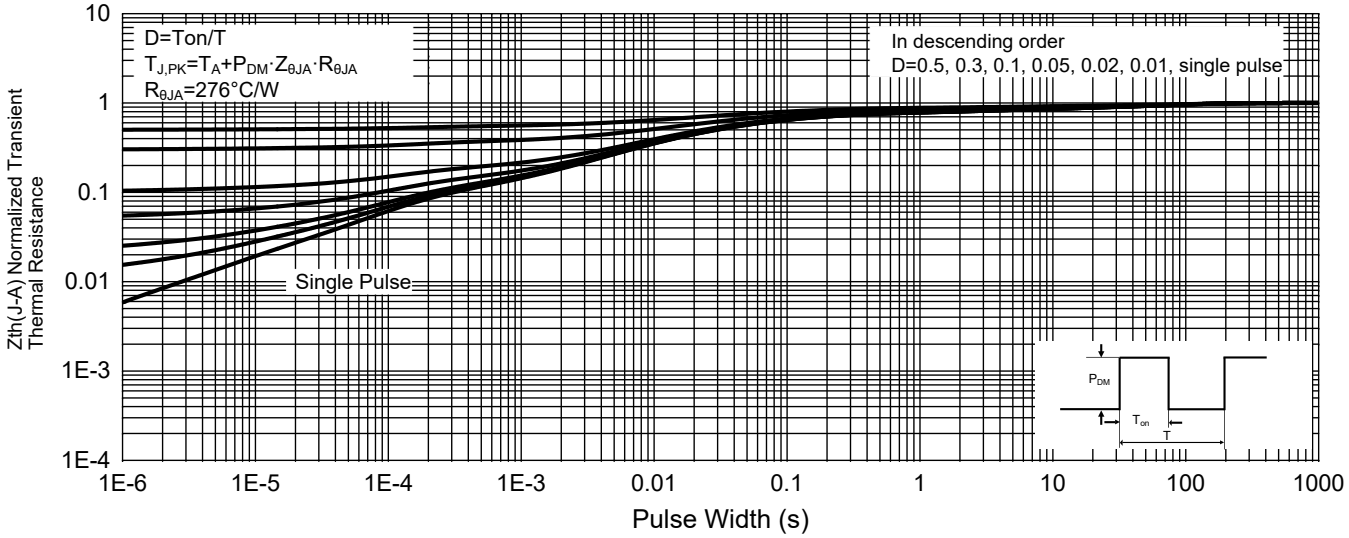


Fig. 13 -Normalized Transient Thermal Impedance



Ordering Information

Device	Packing
SI3139K-TP	Tape&Reel: 8Kpcs/Reel

Revision History

Datasheet status	Version No	Release date	Update content
New product datasheet	Rev4-1	20221220	

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