

Single N-Channel MOSFET

DESCRIPTION

SMC3056AK is the N-Channel MOSFET, this advanced trench technology to provide excellent $R_{DS(ON)}$. This devices are well suited for high efficiency fast switching applications, low in-line power loss are needed in small outline surface mount package.

PART NUMBER INFORMATION

SMC 3056A K - TR G
 a b c d e

- a : Company name.
- b : Product Serial number.
- c : Package code K: SOT-89
- d : Handling code TR: Tape&Reel
- e : Green produce code G: *RoHS Compliant*

FEATURES

$V_{DS}=20V, I_D=6.8A$

- $R_{DS(ON)}=22m\Omega(Typ.)@V_{GS}=4.5V$
- $R_{DS(ON)}=24m\Omega(Typ.)@V_{GS}=2.5V$
- $R_{DS(ON)}=30m\Omega(Typ.)@V_{GS}=1.8V$

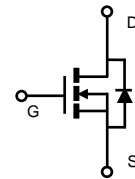
- ◆ Fast switch
- ◆ 1.8V Low gate drive applications
- ◆ High power and current handling capability

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Load Switch
- ◆ Battery Powered System



SOT-89



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ Unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	20	V
V_{GSS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current	$T_A=25^\circ C$	6.8
		$T_A=70^\circ C$	5.4
I_{DM}	Pulsed Drain Current ^B	27	A
P_D	Power Dissipation ^A	$T_A=25^\circ C$	1.8
		$T_A=70^\circ C$	1.1
T_J	Operation Junction Temperature	-55/150	$^\circ C$
T_{STG}	Storage Temperature Range	-55/150	$^\circ C$

THERMAL RESISTANCE

Symbol	Parameter	Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient ^A	$t \leq 10s$	45	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	95	

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

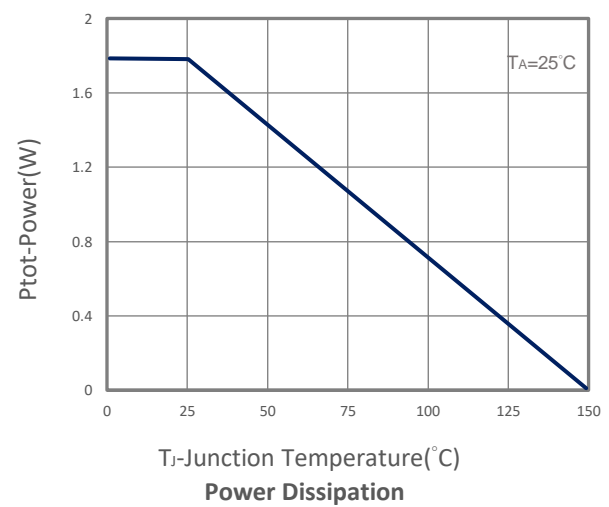
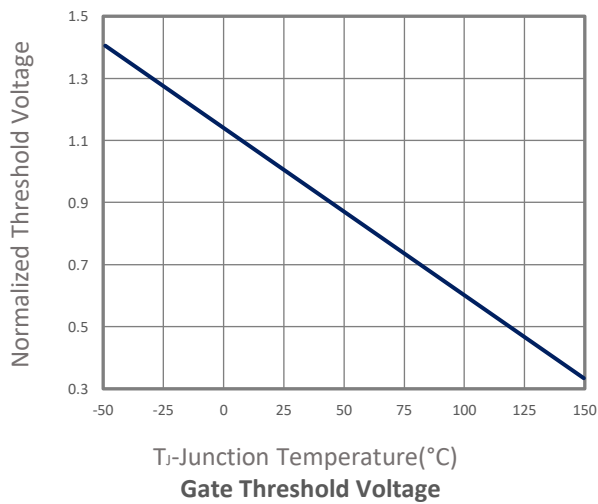
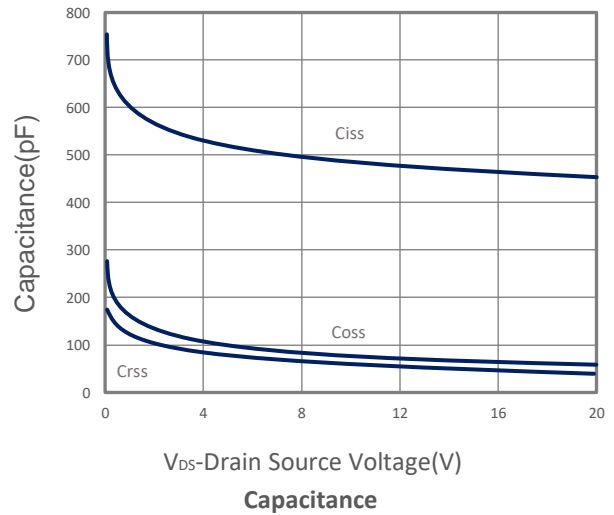
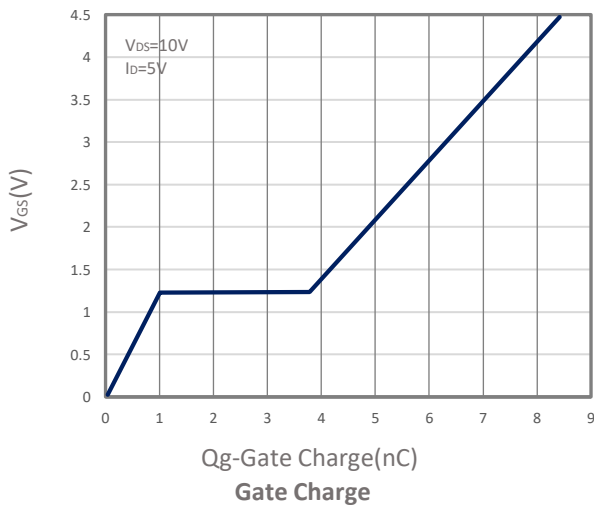
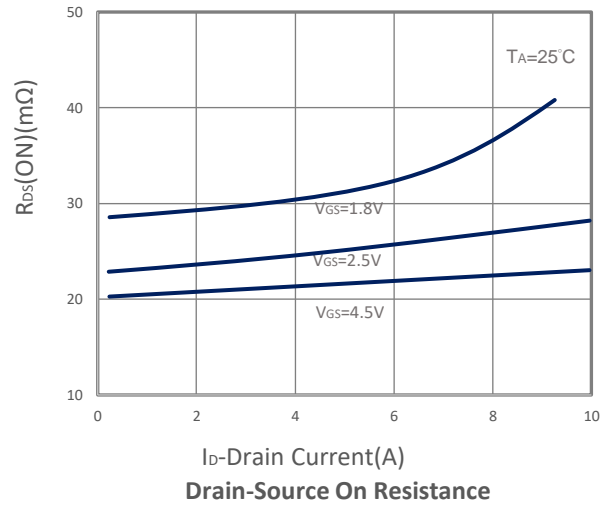
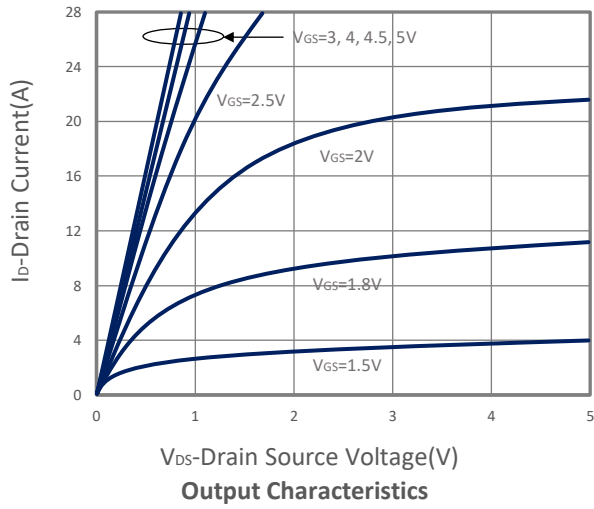
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μ A	0.4	0.7	1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 12V			\pm 100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V, T _J =25 $^\circ$ C			1	μ A
		V _{DS} =16V, V _{GS} =0V, T _J =75 $^\circ$ C			10	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} =4.5V, I _D =6.8A		22	25	m Ω
		V _{GS} =2.5V, I _D =4A		24	28	
		V _{GS} =1.8V, I _D =3A		30	38	
G _{fs}	Forward Transconductance	V _{DS} =5V, I _D =5A		7		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =1A, V _{GS} =0V			1.0	V
I _S	Diode Continuous Forward Current				6.8	A
t _{rr}	Reverse Recovery Time	I _S =5A, dI/dt=100A/ μ s		8.5		ns
Q _{rr}	Reverse Recovery Charge			2.7		nC
Dynamic and Switching Parameters^E						
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V, I _D =5A		8.4	11.8	nC
Q _{gs}	Gate-Source Charge			1	1.4	
Q _{gd}	Gate-Drain Charge			2.8	3.9	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz		492		pF
C _{oss}	Output Capacitance			82		
C _{rss}	Reverse Transfer Capacitance			70		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1.6		Ω
t _{d(on)}	Turn-On Time	V _{DD} =10V, V _{GEN} =4.5V R _G =3.3 Ω , I _D =1A		4.7	9	nS
t _r				14	27	
t _{d(off)}	Turn-Off Time			23.6	45	
t _f				8.5	16	

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

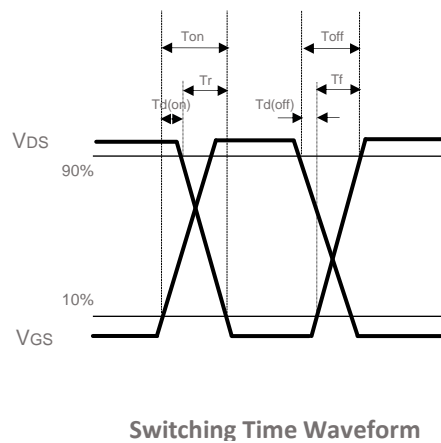
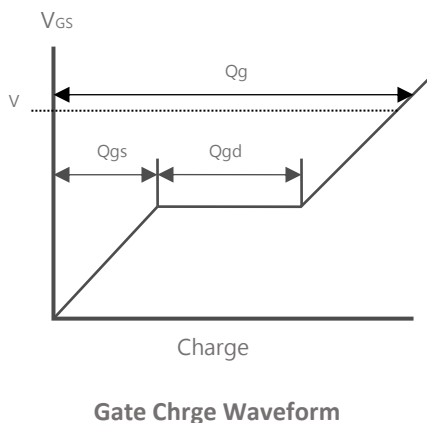
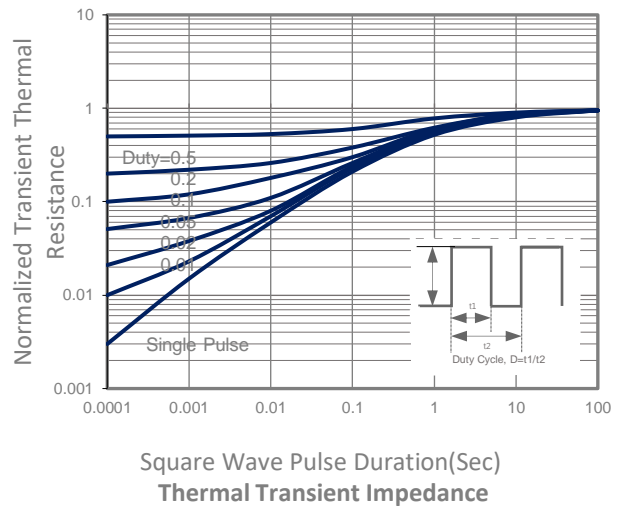
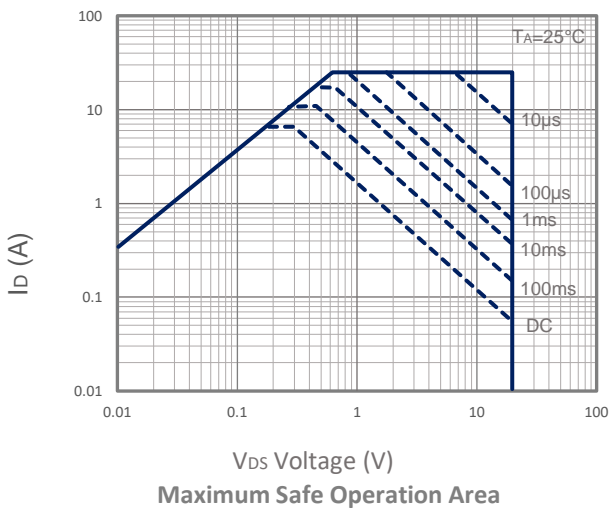
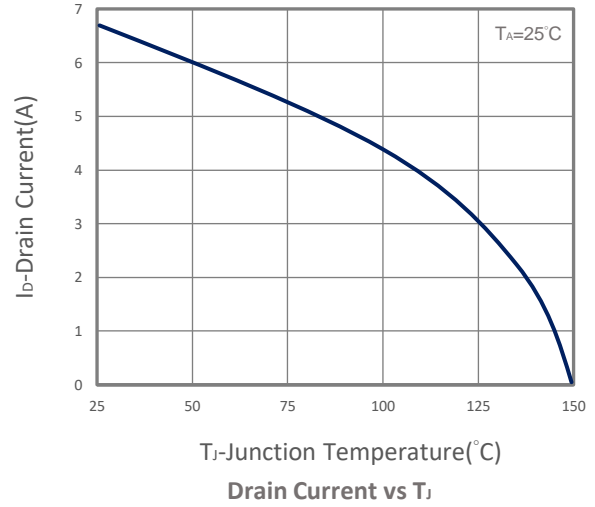
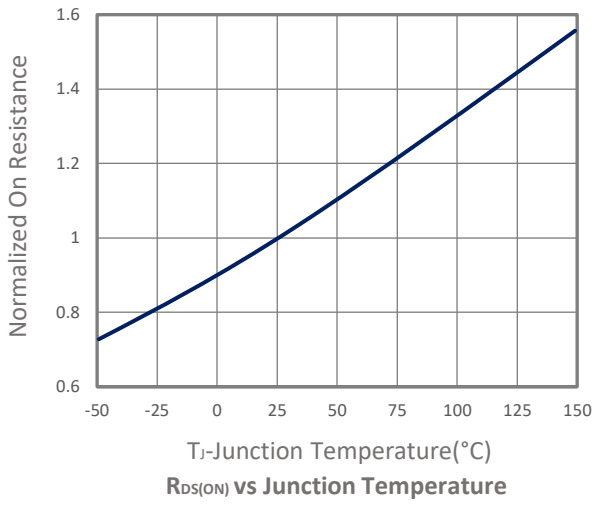
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- C. Using \leq 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150 $^\circ$ C.
- D. Pulse test width \leq 300 μ s and duty cycle \leq 2%.
- E. Guaranteed by design, not subject to production testing.

The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date. We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.

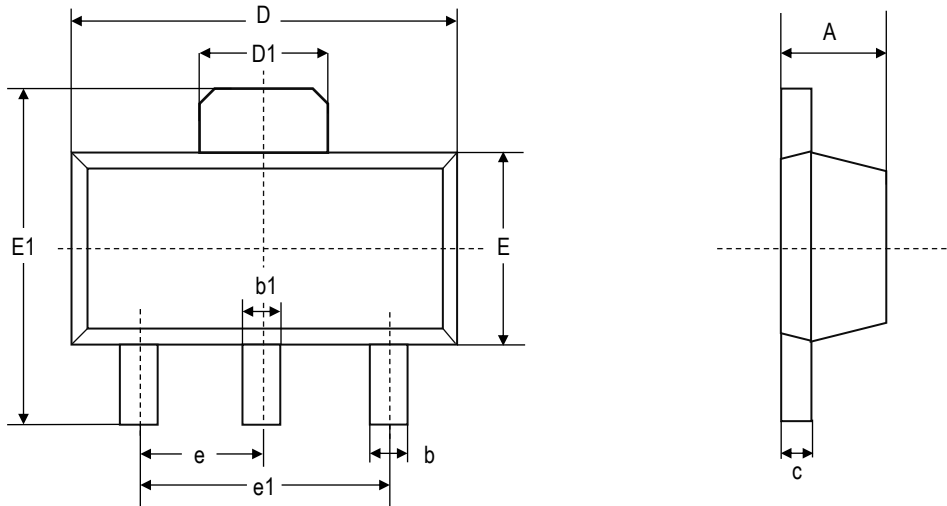
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



■ SOT-89 PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.440	1.540	0.567	0.606
b	0.350	0.450	0.138	0.177
b1	0.450	0.550	0.177	0.217
c	0.350	0.450	0.138	0.177
D	4.450	4.550	1.752	0.791
D1	1.650	1.750	0.650	0.689
E	2.450	2.550	0.965	1.004
E1	3.950	4.250	1.555	1.673
e	1.450	1.550	0.571	0.610
e1	2.900	3.100	1.142	1.220
L	0.900	1.200	0.354	0.472
θ	2°	10°	2°	10°