

Single N-Channel MOSFET

DESCRIPTION

SMC4458 is the N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior, fast switching performance. These devices are well suited for high efficiency fast switching applications.

PART NUMBER INFORMATION

SMC 4458 M - TR G
 a b c d e

- a : Company name.
- b : Product Serial number.
- c : Package code M:SOP-8
- d : Handling code TR:Tape&Reel
- e : Green produce code G:RoHS Compliant

FEATURES

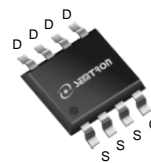
$V_{DS} = 40V, I_D = 11A$

$R_{DS(ON)} = 12m\Omega (Typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 15m\Omega (Typ.) @ V_{GS} = 4.5V$

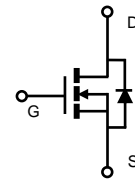
- ◆ Fast switch
- ◆ Improved dv/dt capability
- ◆ High power and current handling capability

APPLICATIONS

- ◆ LED Lighting
- ◆ Power Management
- ◆ Motor Drive



SOP-8



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

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	40	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ C$	11
		$T_A = 70^\circ C$	9
I_{DM}	Pulsed Drain Current ^A	44	A
I_{AS}	Avalanche Current ^A	25	A
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^{AF}	31	mJ
P_D	Power Dissipation ^B	$T_A = 25^\circ C$	3.1
		$T_A = 70^\circ C$	2
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 ^B	$t \leq 10s$	40	$^\circ C/W$
			70	
$R_{\theta JC}$	Thermal Resistance Junction to Case		25	

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

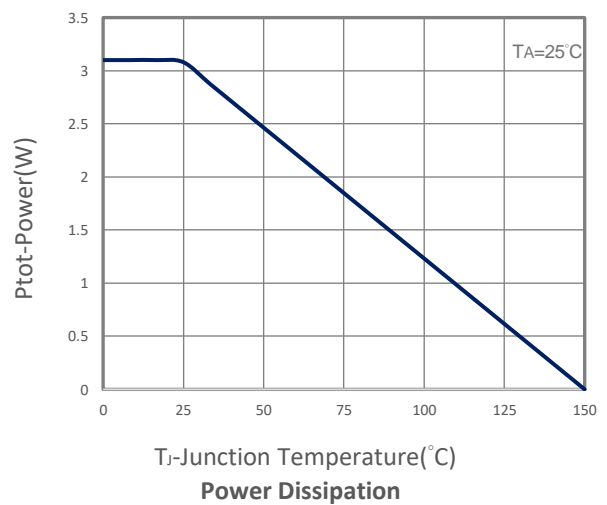
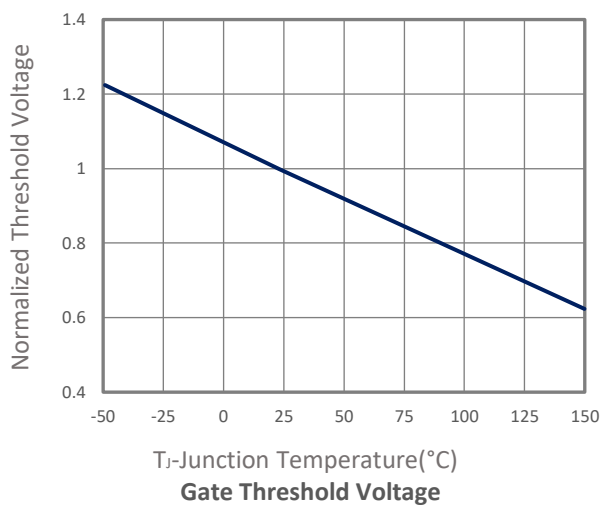
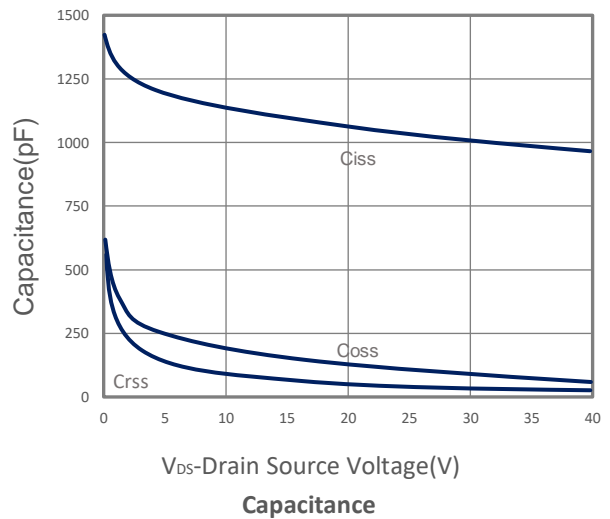
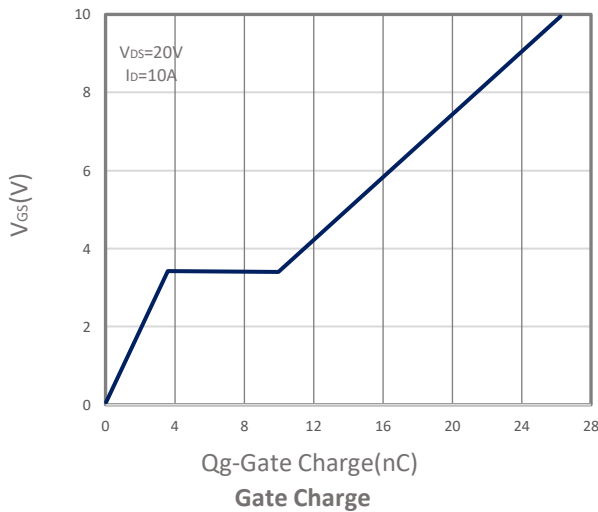
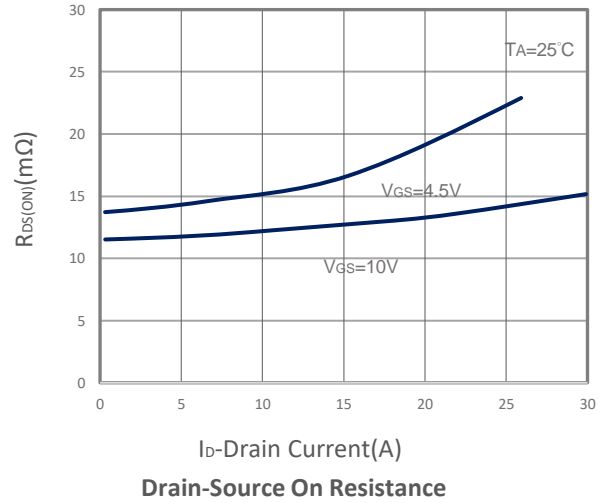
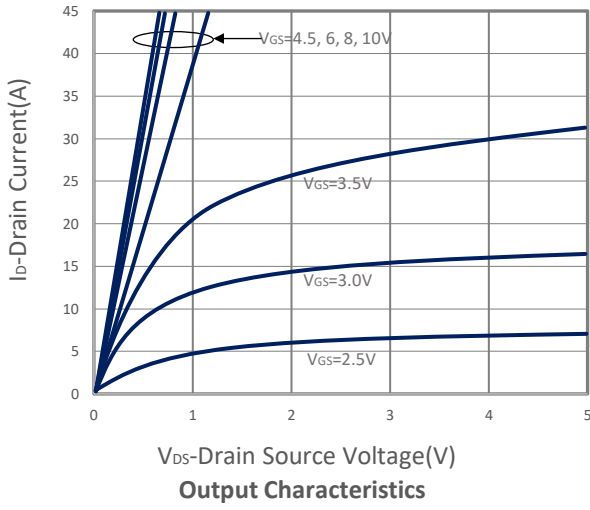
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	40			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μ A	1.0	1.6	2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 20V			\pm 100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V, T _J =25 $^\circ$ C			1	μ A
		V _{DS} =32V, V _{GS} =0V, T _J =75 $^\circ$ C			10	
R _{DS(ON)}	Drain-source On-Resistance ^E	V _{GS} =10V, I _D =11A		12	15	m Ω
		V _{GS} =4.5V, I _D =8A		15	18	
G _{fs}	Forward Transconductance	V _{DS} =10V, I _D =10A		35		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^E	I _S =1A, V _{GS} =0V		0.7	1.0	V
I _S	Continuous Source Current				6.5	A
t _{rr}	Reverse Recovery Time	I _S =10A, di/dt=100A/ μ s		25		ns
Q _{rr}	Reverse Recovery Charge			21		nC
Dynamic and Switching Parameters						
Q _g	Total Gate Charge (10V)	V _{DS} =20V, V _{GS} =10V, I _D =10A		26.2	36.5	nC
Q _g	Total Gate Charge (4.5V)			12.8	17.9	
Q _{gs}	Gate-Source Charge			3.9	5.3	
Q _{gd}	Gate-Drain Charge			6.2	8.7	
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz		1050		pF
C _{oss}	Output Capacitance			125		
C _{rss}	Reverse Transfer Capacitance			83		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		3	4.5	Ω
t _{d(on)}	Turn-On Time	V _{DD} =20V, V _{GEN} =10V, R _G =3.3 Ω , I _D =1A		8.2	16	nS
t _r				3	6	
t _{d(off)}	Turn-Off Time			28	53	
t _f				4.7	9	

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

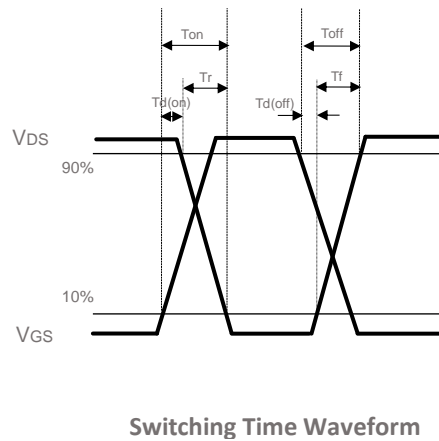
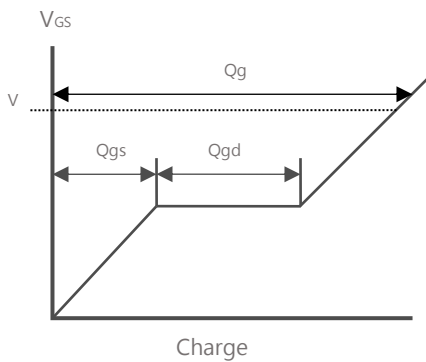
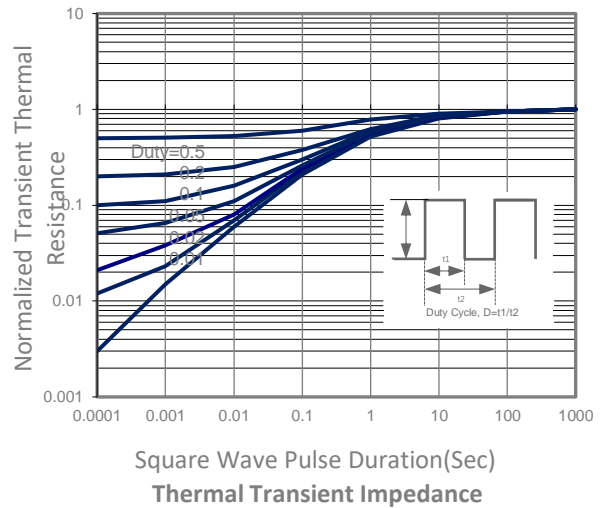
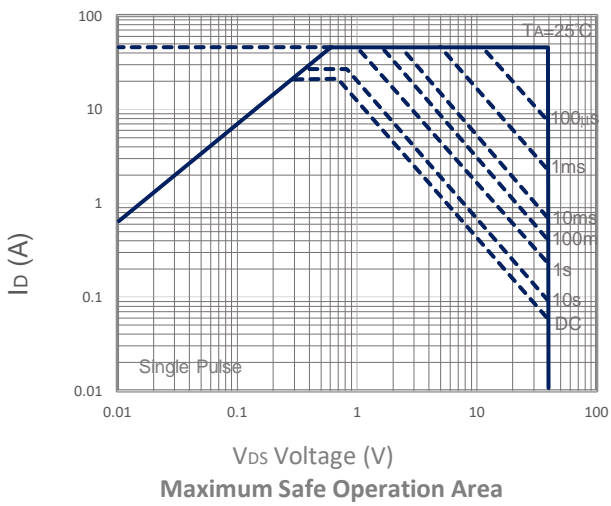
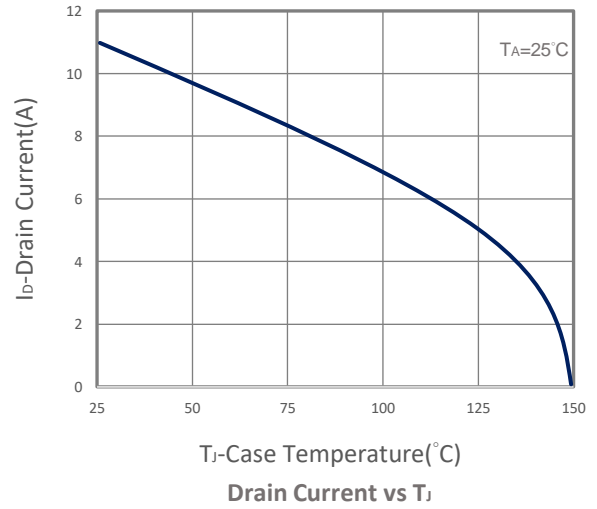
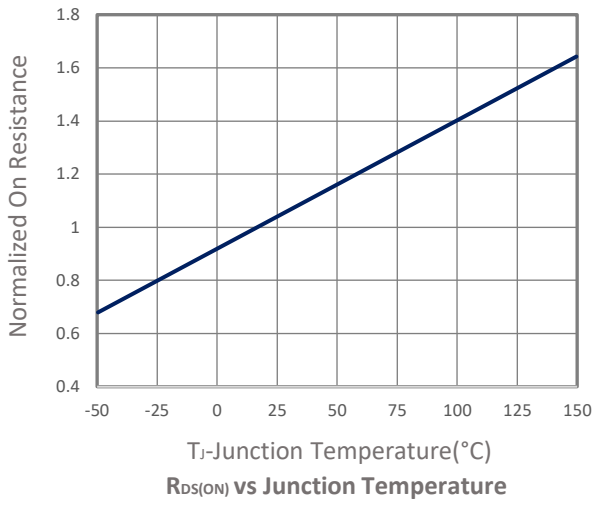
- A. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- B. The value of R_{θJA} is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature T_{J(MAX)}=150 $^\circ$ C (initial temperature T_A=25 $^\circ$ C).
- C. T_{J(MAX)}=150 $^\circ$ C, using junction-to-ambient thermal resistance, t ≤ 10sec.
- D. T_{J(MAX)}=150 $^\circ$ C, using junction-to-case thermal resistance (R_{θJC}) is more useful in additional heat sinking is used.
- E. The data tested by pulsed, pulse width ≤ 300 μ s, duty cycle ≤ 2%.
- F. The EAS data shows Max, tested and pulse width limited by T_{J(MAX)}=150 $^\circ$ C (initial temperature T_J=25 $^\circ$ C).

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.

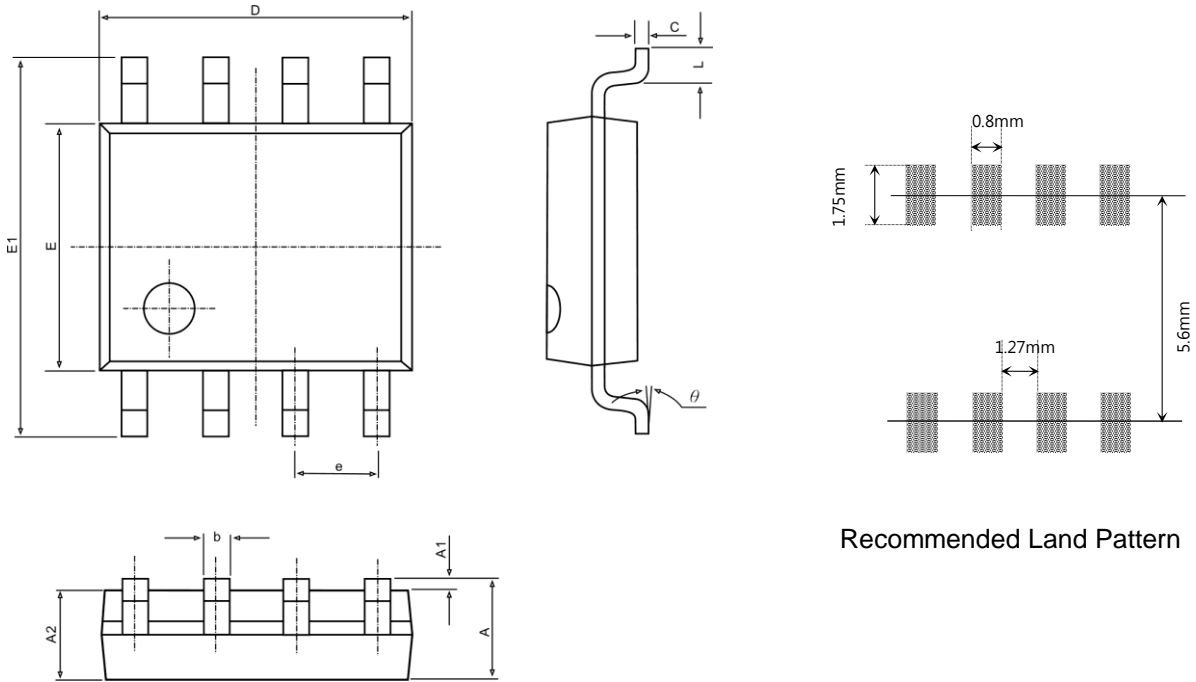
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



■ SOP-8 PACKAGE DIMENSIONS



Recommended Land Pattern

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.040	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.130	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270BSC.		0.050BSC.	
L	0.400	1.270	0.016	0.005
θ	0°	8°	0°	8°