

Single P-Channel MOSFET

DESCRIPTION

SMC5455H is the P-Channel MOSFET, uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. With the excellent thermal resistance, the TO-252 package, this device is well suited for high current applications.

PART NUMBER INFORMATION

SMC 5455 H - TR G
 a b c d e

a : Company name.
 b : Product Serial number.
 c : Package code H:TO-252
 d : Handling code TR:Tape&Reel
 e : Green produce code G:RoHS Compliant

FEATURES

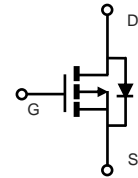
$V_{DS}=-40V$, $I_D=-42A$

$R_{DS(ON)}=12.5m\Omega(Typ.)@V_{GS}=-10V$
 $R_{DS(ON)}=16m\Omega(Typ.)@V_{GS}=-4.5V$

- ◆ 100% UIS and Rg tested
- ◆ High power and current handling capability

APPLICATIONS

- ◆ Load Switch
- ◆ Power Management
- ◆ Motor Drives



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	± 25	V
I_D	Continuous Drain Current	$T_C=25^\circ C$	-42
		$T_C=100^\circ C$	-26.5
I_{DM}	Pulsed Drain Current ^B	-168	A
I_D	Continuous Drain Current	$T_A=25^\circ C$	-15
		$T_A=70^\circ C$	-12
P_D	Power Dissipation ^A	$T_A=25^\circ C$	6.3
		$T_A=70^\circ C$	4
I_{AS}	Avalanche Current ^B	-35	A
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^B	61	mJ
P_D	Power Dissipation ^C	$T_C=25^\circ C$	48
		$T_C=100^\circ C$	19
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	$t \leq 10s$	25	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	50	
$R_{\theta JC}$	Thermal Resistance Junction to Case		2.6	

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

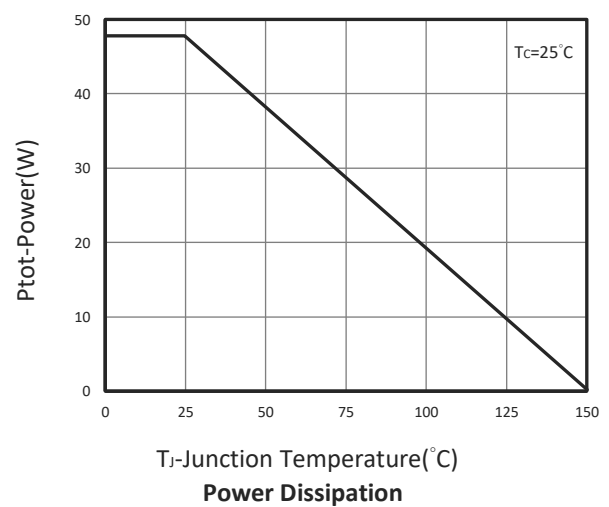
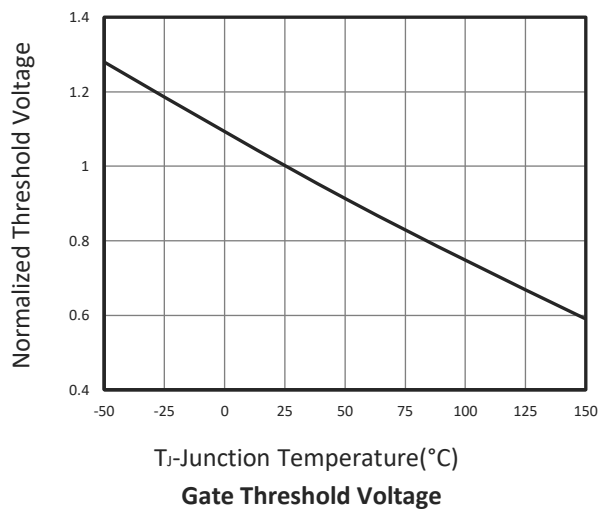
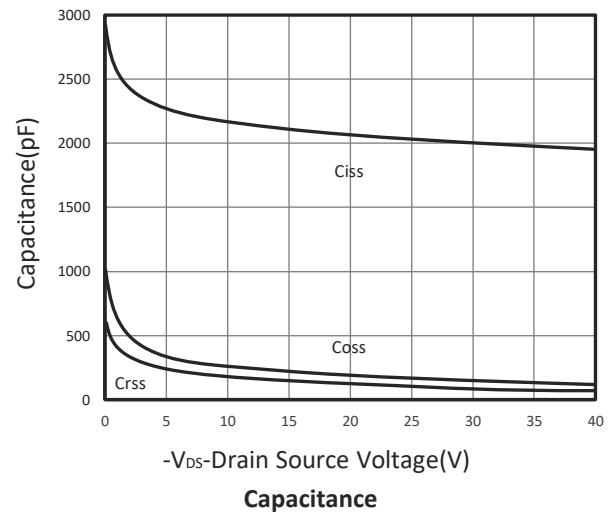
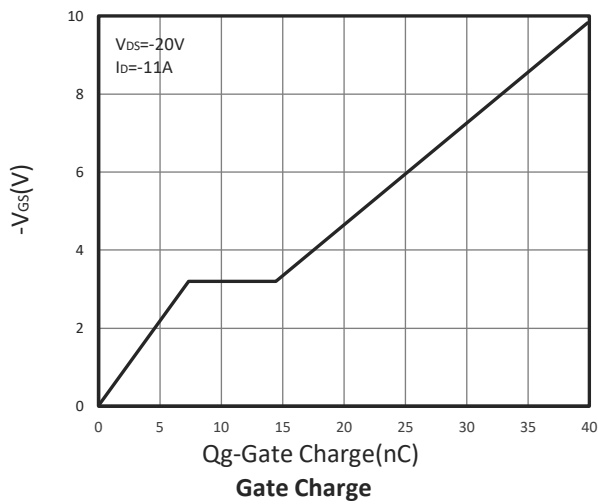
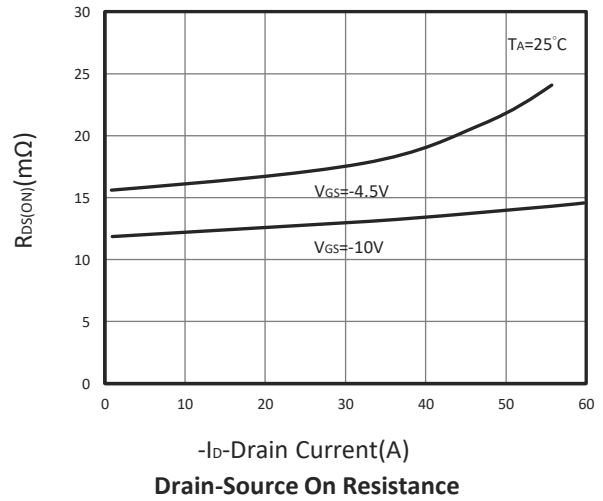
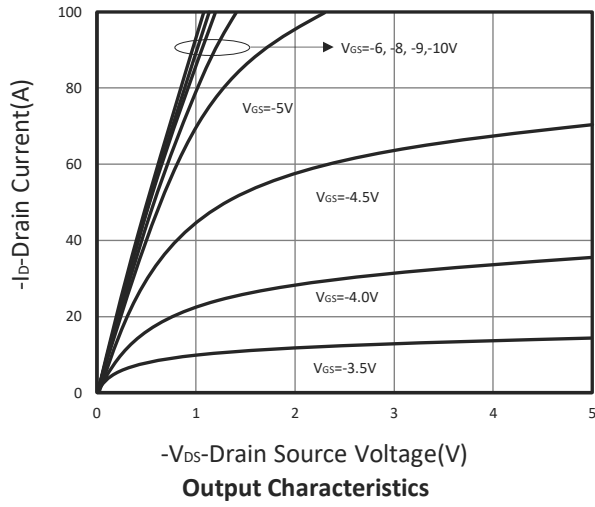
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250 μ A	-40			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250 μ A	-1	-1.6	-2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 25V			\pm 100	nA
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 ^D	V _{GS} =-10V, I _D =-15A V _{GS} =-4.5V, I _D =-10A		12.5 16	15 20	m Ω
G _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-11A		30		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =-1A, V _{GS} =0V			-1	V
I _S	Diode Continuous Forward Current				-21	A
Dynamic and Switching Parameters^E						
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V I _D =-11A		40.6	54.8	nC
Q _g	Total Gate Charge (4.5V)			19.8	26.7	
Q _{gs}	Gate-Source Charge			6.8	9.2	
Q _{gd}	Gate-Drain Charge			7.8	10.5	
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz		2050		pF
C _{oss}	Output Capacitance			175		
C _{rss}	Reverse Transfer Capacitance			126		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		8.5		Ω
t _{d(on)}	Turn-On Time	V _{DD} =-20V, V _{GEN} =-10V R _G =6 Ω I _D =-1A		17.3		nS
t _r				13		
t _{d(off)}	Turn-Off Time			70		
t _f				32		

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

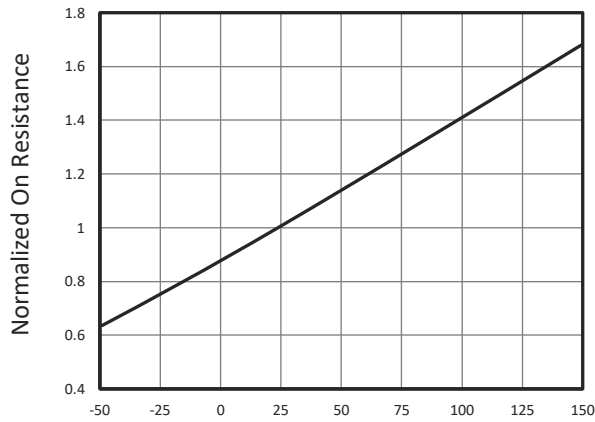
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- C. Using \leq 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150 $^\circ$ C.
- D. Pulse test width \leq 300 μ s and duty cycle \leq 2%.
- E.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

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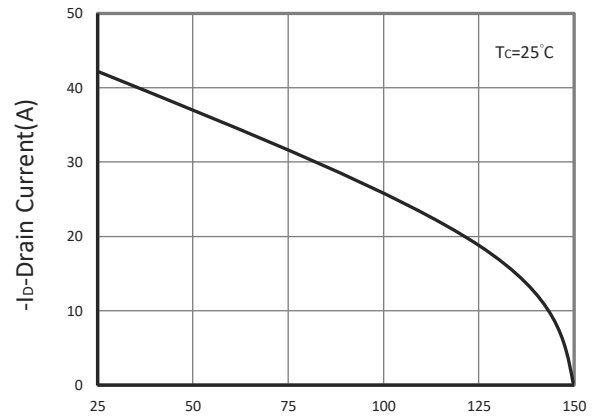
TYPICAL CHARACTERISTICS



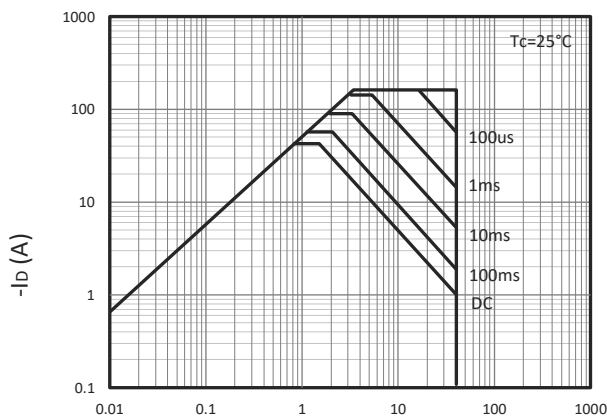
TYPICAL CHARACTERISTICS



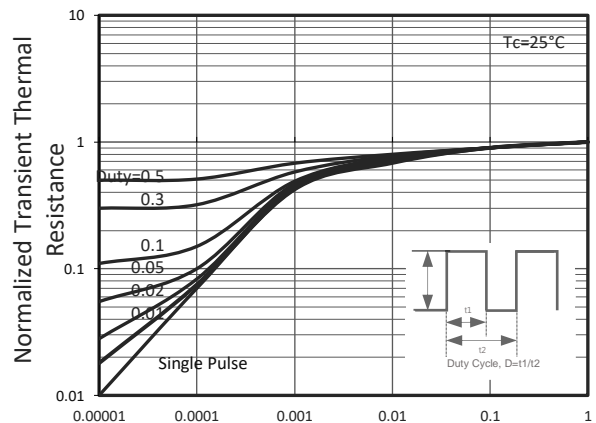
T_j -Junction Temperature($^{\circ}$ C)
 $R_{DS(ON)}$ vs Junction Temperature



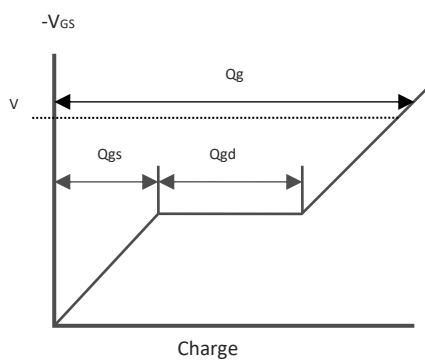
T_c -Case Temperature($^{\circ}$ C)
Drain Current vs T_c



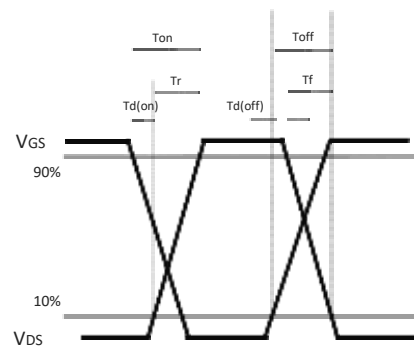
$-V_{ds}$ Voltage (V)
Maximum Safe Operation Area



**Square Wave Pulse Duration(Sec)
Thermal Transient Impedance**

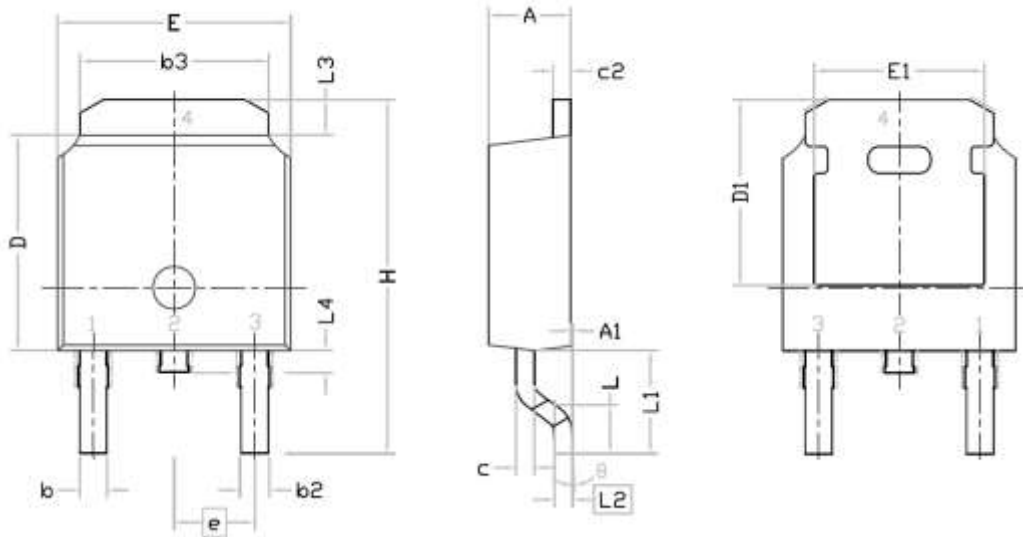


Gate Charge Waveform



Switching Time Waveform

TO-252 PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.380	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.640	0.880	0.025	0.035
b2	0.770	1.140	0.030	0.045
b3	5.210	5.460	0.205	0.215
c	0.460	0.600	0.018	0.024
c2	0.460	0.580	0.018	0.023
D	6.000	6.223	0.236	0.245
D1	5.210	-	0.205	-
E	6.400	6.731	0.252	0.265
E1	4.400	-	0.173	-
e	2.286 BSC.		0.090 BSC.	
H	9.400	10.40	0.370	0.409
L	1.400	1.770	0.055	0.070
L1	2.743 REF.		0.108 REF.	
L2	0.508 BSC.		0.020 BSC.	
L3	0.890	1.270	0.035	0.050
L4	0.640	1.010	0.025	0.040
θ	0°	10°	0°	10°

Recommended Land Pattern

