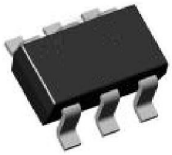
SSF2145CH6

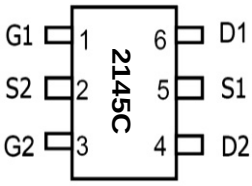
20V N-Channel + P-Channel Complementary MOSFET

Main Product Characteristics

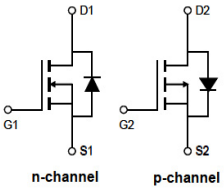
	N-Ch	P-Ch
V_{DSS}	20V	-20V
$R_{DS(ON)(typ.)}$	38mΩ	64mΩ
I_D	4.8A	-2.9A



TSOP-6



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced trench MOSFET process technology
- Designed for load switching and battery protection applications
- 150°C operating temperature

Description

The SSF2145CH6 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Max Ratings

Symbol	Parameter	Max.		Unit
		N-channel	P-channel	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 4.5V①	4.8	-2.9	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 4.5V①	3.9	-2.4	
I_{DM}	Pulsed Drain Current②	17	-11	
P_D @T_C = 25°C	Power Dissipation③	1.7	1.7	W
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-to-Source Voltage	± 8	± 8	V
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	-55 to + 150	°C

Thermal Resistance

Symbol	Characteristics	Typ.	Max.		Unit
			N-channel	P-channel	
$R_{\theta JA}$	Junction-to-Ambient (t ≤ 10S) ④	—	76	114	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	53	53	°C/W

Electrical Characteristics (T_A=25°C unless otherwise specified)

Symbol	Parameter		Min.	Typ.	Max.	Unit	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	N-Channel	20	—	—	V	V_{GS} = 0V, I_D = 250μA
			22	—	—		T_J = 125°C
		P-Channel	-20	—	—		V_{GS} = 0V, I_D = -250μA
			-22	—	—		T_J = 125°C
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	N-Channel	—	38	55	mΩ	V_{GS}=4.5V,I_D = 3.6A
		P-Channel	—	68	80		V_{GS}=-4.5V,I_D = -3A
		N-Channel	—	64	75		V_{GS}=2.5V,I_D = 3.1A
		P-Channel	—	89	100		V_{GS}=-3.5V,I_D = -2A
		N-Channel	—	55	63		V_{GS}=1.8V,I_D = 2A
		P-Channel	—	129	148		V_{GS}=-1.8V,I_D = -1A
$V_{GS(th)}$	Gate Threshold Voltage	N-Channel	0.4	0.72	1	V	V_{DS} = V_{GS}, I_D = 250μA
		P-Channel	-0.4	-0.56	-1		T_J = 125°C
		N-Channel	0.4	0.78	1		V_{DS} = V_{GS}, I_D = -250μA
		P-Channel	-0.4	-0.66	-1		T_J = 125°C
I_{DSS}	Drain-to-Source Leakage Current	N-Channel	—	—	1	μA	V_{DS} = 20V,V_{GS} = 0V
		P-Channel	—	—	-1		V_{DS} = -20V,V_{GS} = 0V
I_{GSS}	Gate-to-Source Forward Leakage	N-Channel	—	—	100	nA	V_{GS} =8V
		N-Channel	—	—	100		V_{GS} = -8V
		P-Channel	—	—	-100		V_{GS} =8V
		P-Channel	—	—	-100		V_{GS} = -8V
Ciss	Input Capacitance	N-Channel	—	348	420	pF	V_{GS} = 0V, V_{DS} = 10V, f = 1.0MHz
Coss	Output Capacitance	N-Channel	—	58	70		
Crss	Reverse Transfer Capacitance	N-Channel	—	32	39		
Ciss	Input Capacitance	P-Channel	—	519	622		V_{GS} = 0V, V_{DS} = -10V, f = 1.0MHz
Coss	Output Capacitance	P-Channel	—	75	90		
Crss	Reverse Transfer Capacitance	P-Channel	—	58	70		
$t_{d(on)}$	Turn-On Delay Time	N-Channel	—	5	12	nS	V_{DD}=10V, R_L = 2.8 Ω V_{GS}=4.5V,R_{GEN}=6Ω, I_D=3.6A
t_r	Rise Time	N-Channel	—	10	30		
$t_{d(off)}$	Turn-Off Delay Time	N-Channel	—	10	30		
t_f	Fall Time	N-Channel	—	7	28		
$t_{d(on)}$	Turn-On Delay Time	P-Channel	—	13.6	27.2	nS	V_{DD}=-10V,I_D=-3A V_{GS}=-4.5V,R_{GEN}=3Ω
t_r	Rise Time	P-Channel	—	8.6	17.2		
$t_{d(off)}$	Turn-Off Delay Time	P-Channel	—	73.6	147.2		
t_f	Fall Time	P-Channel	—	34.6	69.2		

Source-Drain Ratings and Characteristics

Symbol	Parameter		Min.	Typ.	Max.	Unit	Conditions
I_S	Continuous Source Current (Body Diode)	N-Channel	—	—	4.8	A	MOSFET symbol showing the integral reverse p-n junction diode.
		P-Channel	—	—	-2.9		
I_{SM}	Pulsed Source Current (Body Diode)	N-Channel	—	—	17	A	
		P-Channel	—	—	-11		
V_{SD}	Diode Forward Voltage	N-Channel	—	0.69	1.2	V	I_S=0.94A, V_{GS}=0V
		P-Channel	—	-0.72	-1.2		I_S=-0.75A, V_{GS}=0V

Notes:

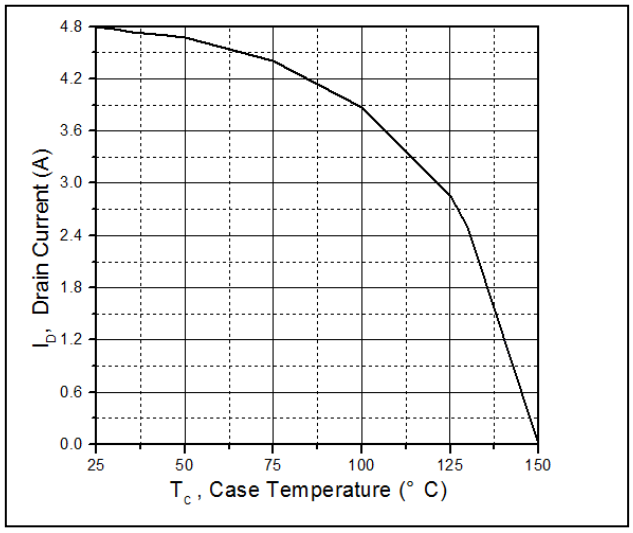
①The maximum current rating is limited by bond-wires.

②Repetitive rating; pulse width limited by max. junction temperature.

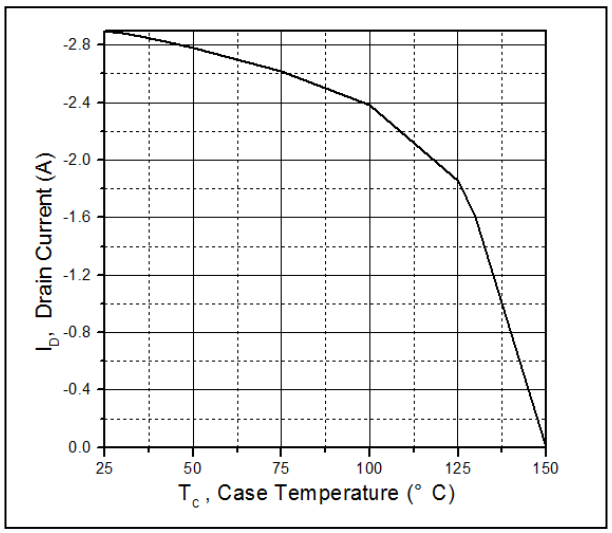
③The power dissipation P_D is based on max. junction temperature, using junction-to- ambient thermal resistance.

④The value of $R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C

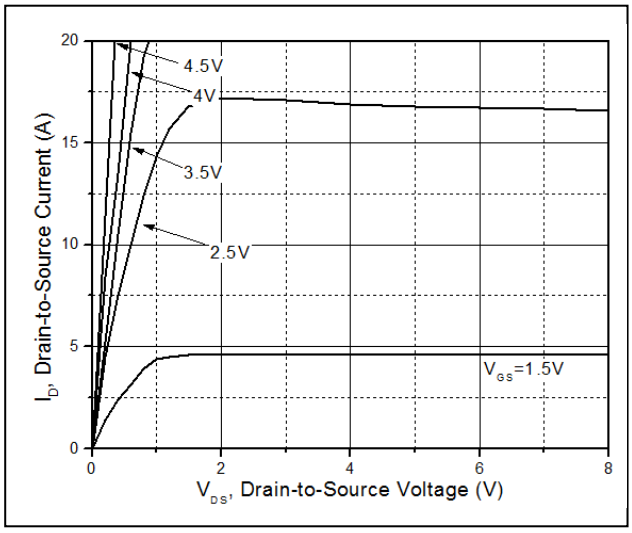
Typical Electrical and Thermal Characteristics



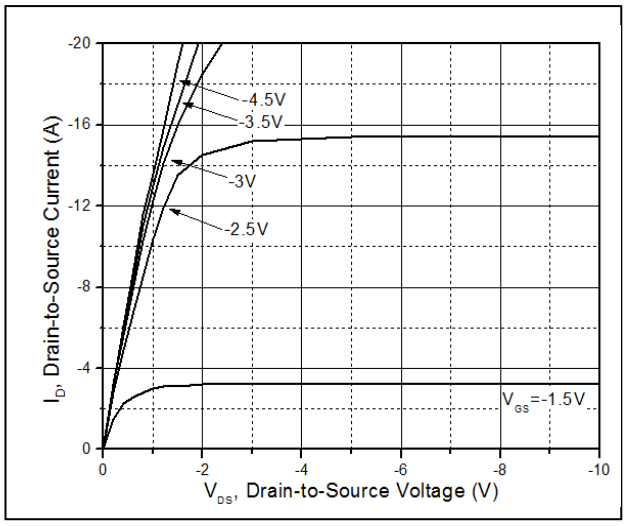
Maximum Drain Current Vs. Case Temperature(N-Channel)



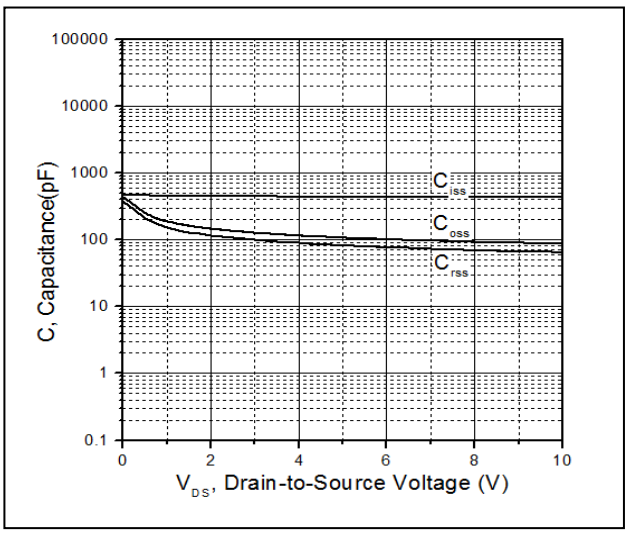
Maximum Drain Current Vs. Case Temperature(P-Channel)



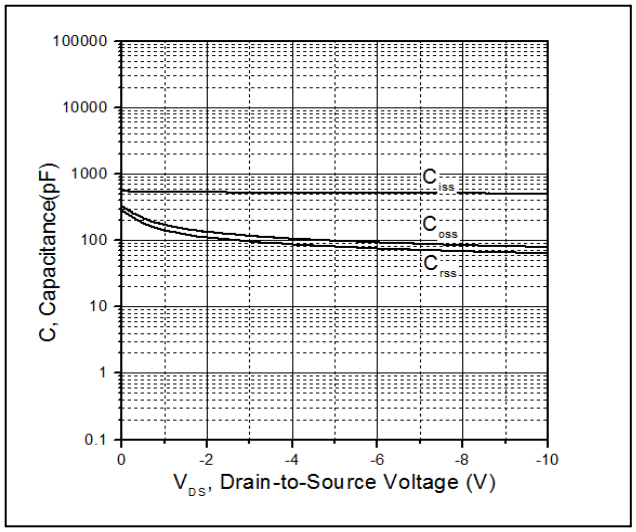
Typical Output Characteristics（N-Channel）



Typical Output Characteristics（P-Channel）

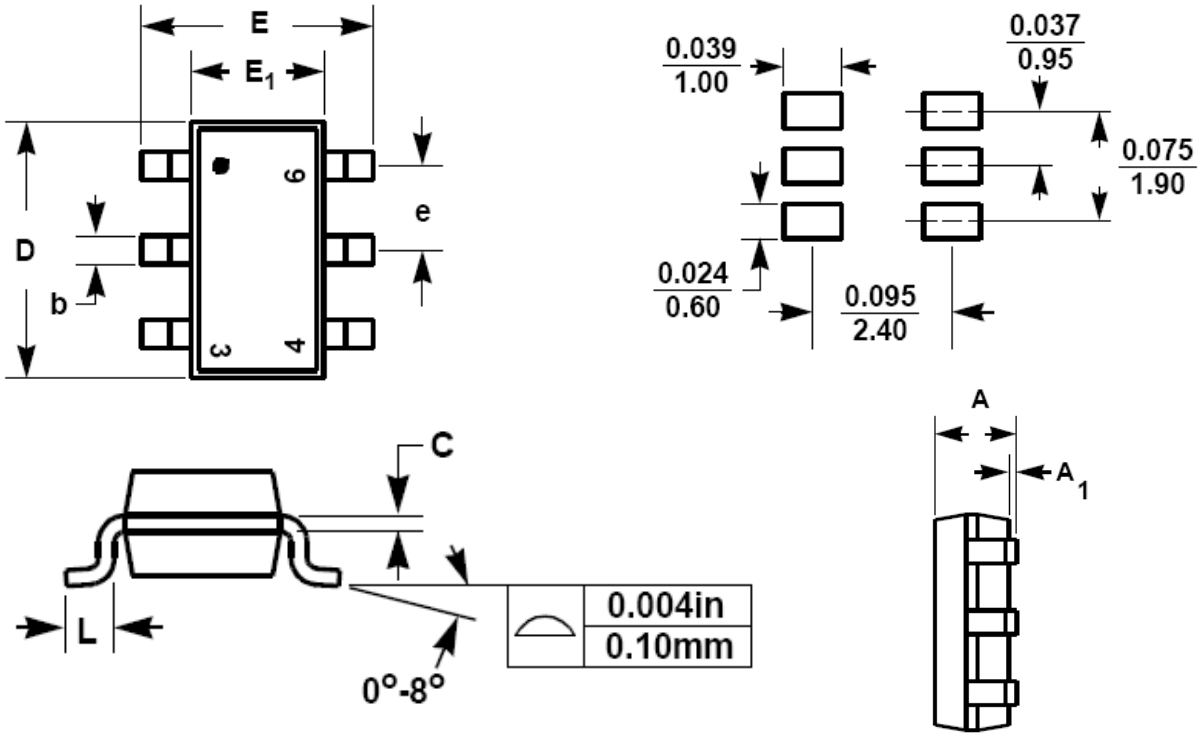


Typical Capacitance Vs. Drain-to-Source Voltage(N-Channel)



Typical Capacitance Vs. Drain-to-Source Voltage(P-Channel)

Mechanical Data: TSOP-6



SYMBOL	Millimeters	
	MIN	MAX
A	0.90	1.30
A1	0.10	
b	0.30	0.50
c	0.08	0.20
D	2.80	3.10
E	2.60	3.00
E1	1.50	1.70
e	0.95 BSC	
L	0.35	0.55

Notes：

① Dimensions are inclusive of plating

② Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils

③ Dimension L is measured in gauge plane.

④ Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

Ordering and Marking Information

Device Marking: 2145C

Package (Available)

TSOP-6

Operating Temperature Range

C : -55ºC to +150 ºC

Devices per Unit

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TSOP-6	3000pcs	10pcs	30000pcs	4pcs	120000pcs

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T_J=125°C or 150°C @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T_J=125°C or 150°C @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices