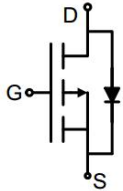
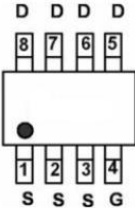



## P-Channel Enhancement Mode Power MOSFET

<p><b>Description</b></p> <p>The 4435 uses advanced trench technology to provide excellent <math>R_{DS(ON)}</math>, low gate charge. It can be used in a wide variety of applications.</p> <p><b>General Features</b></p> <ul style="list-style-type: none"> <li>● <math>V_{DS}</math> -30V</li> <li>● <math>I_D</math> (at <math>V_{GS} = -10V</math>) -11A</li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = -10V</math>) &lt; 20m<math>\Omega</math></li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = -4.5V</math>) &lt; 33m<math>\Omega</math></li> <li>● 100% Avalanche Tested</li> <li>● RoHS Compliant</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● Power switch</li> <li>● DC/DC converters</li> </ul>		 <p>Schematic diagram</p>  <p>pin assignment</p>  <p>SOP-8</p>	
<b>Device</b>	<b>Package</b>	<b>Marking</b>	<b>Packaging</b>
4435	SOP-8	4435	4000pcs/Reel

### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Continuous Drain Current	$I_D$	-11	A
Pulsed Drain Current (note1)	$I_{DM}$	-44	A
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Power Dissipation	$P_D$	2.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 To 150	$^\circ\text{C}$

### Thermal Resistance

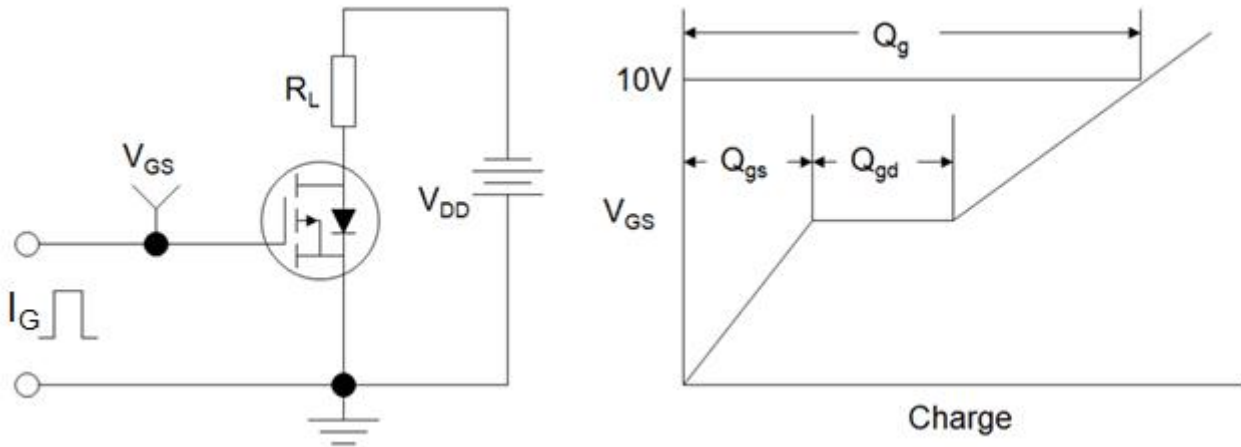
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	50	$^\circ\text{C/W}$

Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static Parameters</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30V, V_{GS} = 0V$	--	--	-1	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.4	-2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -10A$	--	12	20	m $\Omega$
		$V_{GS} = -4.5V, I_D = -5A$	--	18	33	
Forward Transconductance	$g_{FS}$	$V_{DS} = -5V, I_D = -10A$	--	20	--	S
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = -15V,$ $f = 1.0MHz$	--	1818	--	pF
Output Capacitance	$C_{oss}$		--	233	--	
Reverse Transfer Capacitance	$C_{rss}$		--	203	--	
Total Gate Charge	$Q_g$	$V_{DD} = -15V,$ $I_D = -5A,$ $V_{GS} = -10V$	--	40	--	nC
Gate-Source Charge	$Q_{gs}$		--	5	--	
Gate-Drain Charge	$Q_{gd}$		--	7.5	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -15V,$ $I_D = -5A,$ $R_G = 2.7\Omega$	--	20	--	ns
Turn-on Rise Time	$t_r$		--	12	--	
Turn-off Delay Time	$t_{d(off)}$		--	55	--	
Turn-off Fall Time	$t_f$		--	15	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	-11	A
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = -10A, V_{GS} = 0V$	--	--	-1.2	V
Reverse Recovery Charge	$Q_{rr}$	$I_F = -11A, V_{GS} = 0V$ $di/dt = -100A/\mu s$	--	15	--	nC
Reverse Recovery Time	$T_{rr}$		--	10	--	ns

**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical  $R_G$

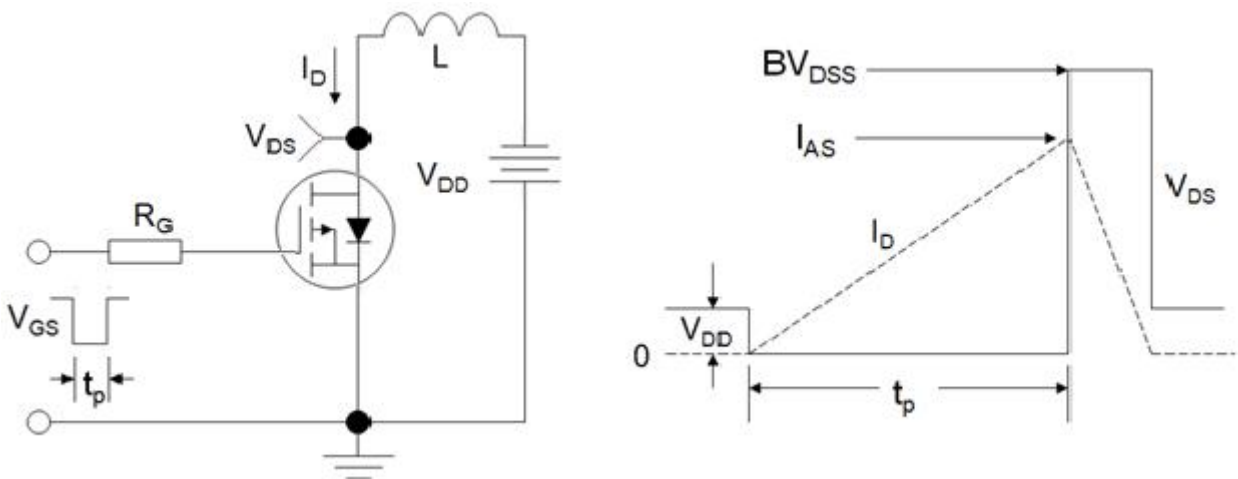
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics

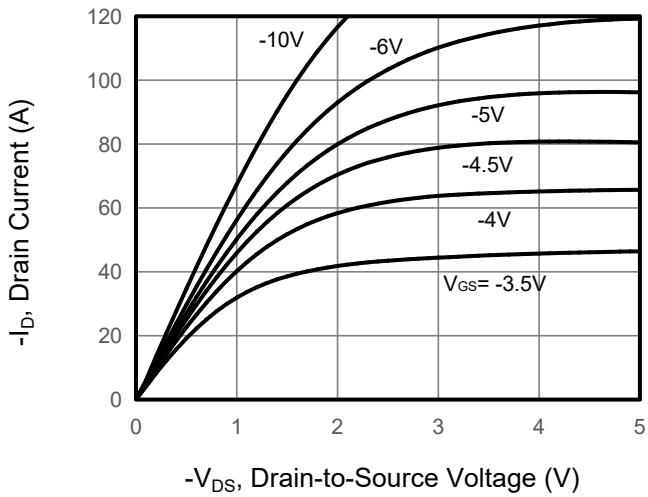


Figure 2. Transfer Characteristics

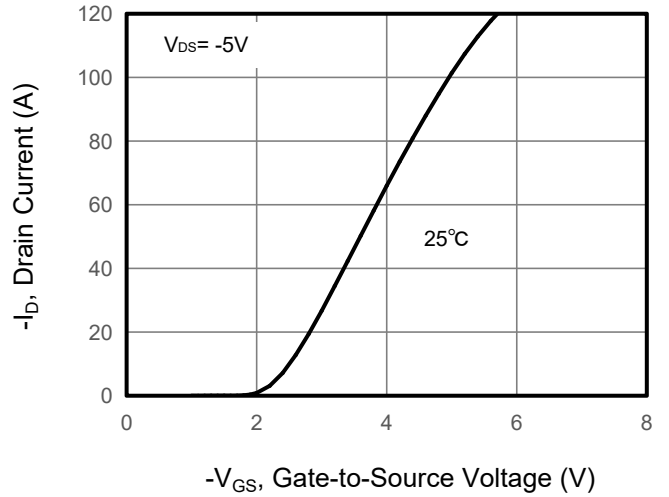


Figure 3. Drain Source On Resistance

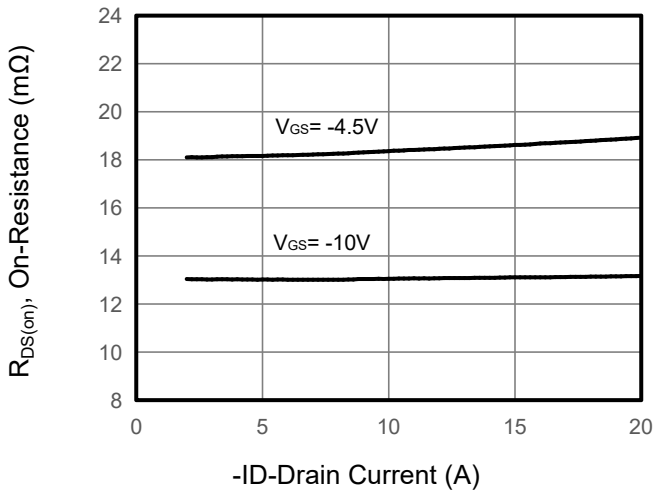


Figure 4. Gate Charge

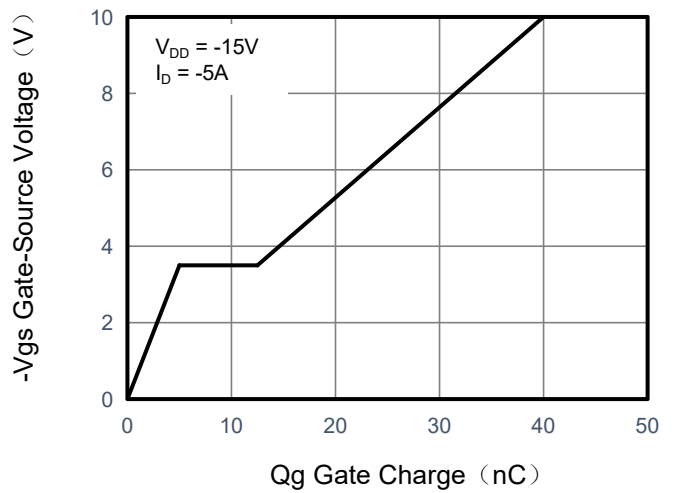


Figure 5. Capacitance

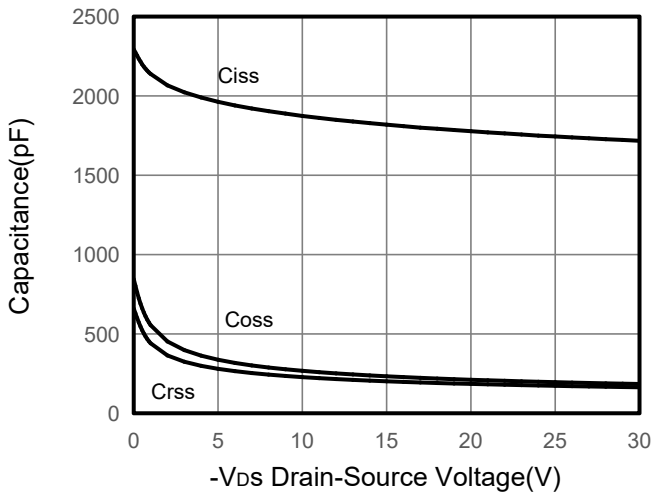
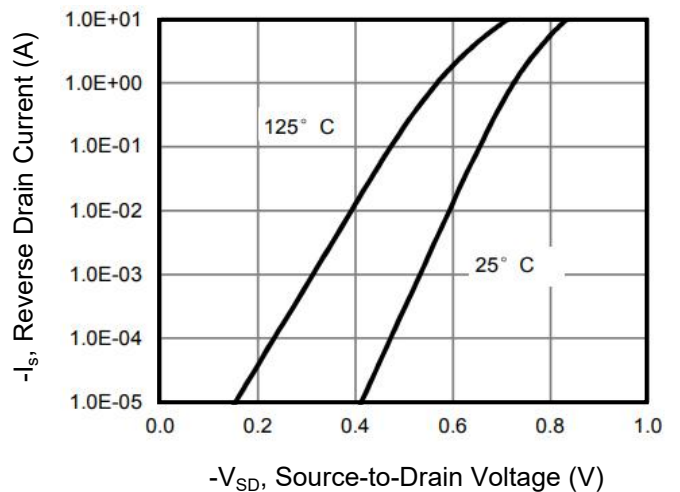


Figure 6. Source-Drain Diode Forward



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 7. Drain-Source On-Resistance

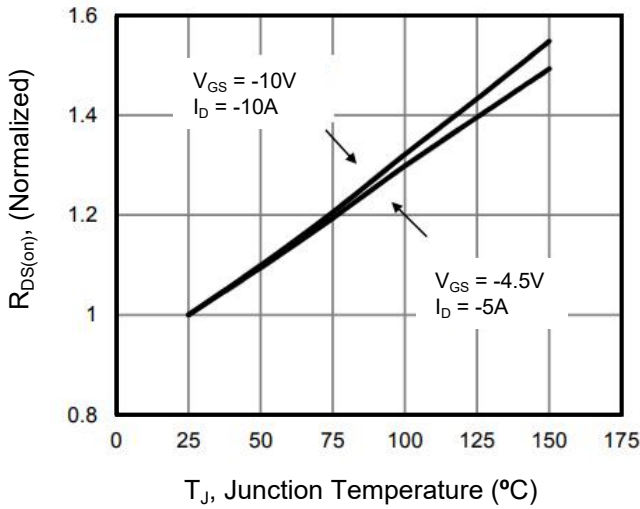


Figure 10. Safe Operation Area

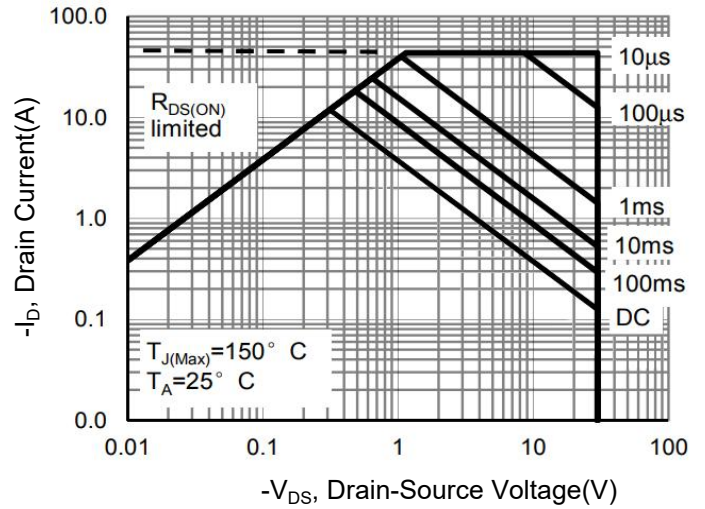
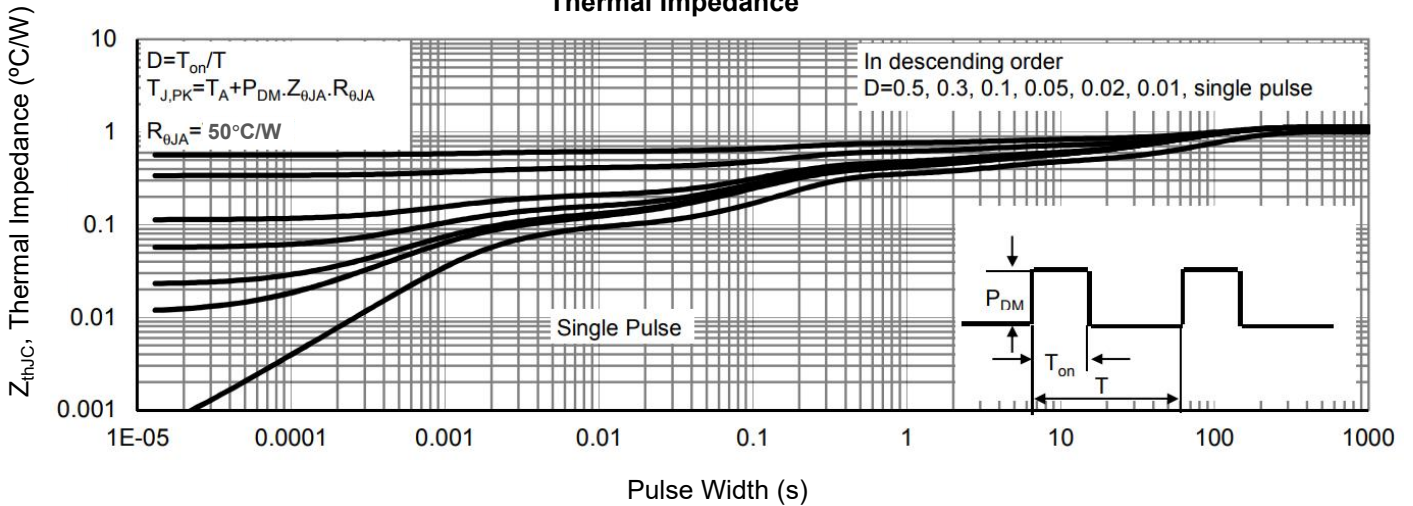
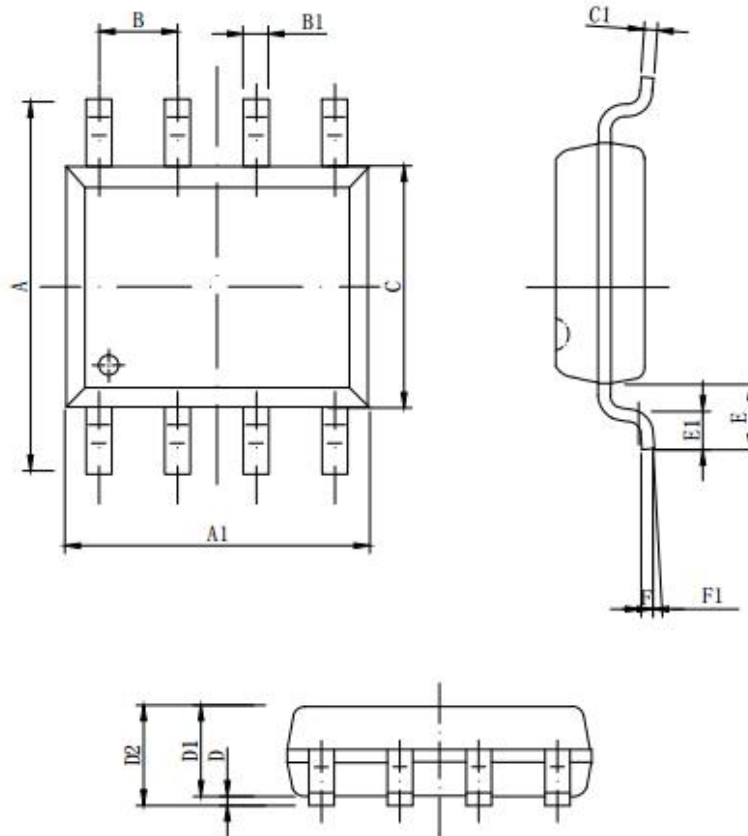


Figure 9. Normalized Maximum Transient Thermal Impedance



**SOP-8 Package Information**



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	5.800	6.000	6.200
A1	4.800	4.900	5.000
B	1.270BSC		
B1	0.35 <sup>8x</sup>	0.40 <sup>8x</sup>	0.45 <sup>8x</sup>
C	3.780	3.880	3.980
C1	--	0.203	0.253
D	0.050	0.150	0.250
D1	1.350	1.450	1.550
D2	1.500	1.600	1.700
D2	1.500	1.600	1.700
E	1.060REF		
E1	0.400	0.700	0.100
F	0.250BSC		
F1	2°	4°	6°