

P-Channel Enhancement Mode Power MOSFET

DESCRIPTION

The 9435 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a load switch or in PWM applications.

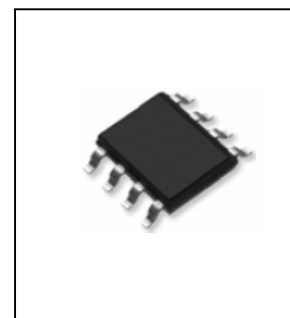
GENERAL FEATURES

- $V_{DS} = -30V, I_D = -5.1A$
 $R_{DS(ON)} < 105m\Omega @ V_{GS} = -4.5V$
 $R_{DS(ON)} < 55m\Omega @ V_{GS} = -10V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

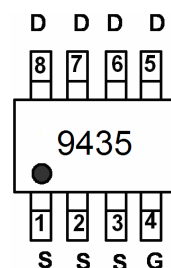
Application

- PWM applications
- Load switch
- Power management

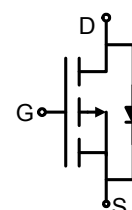
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SOP-8 top view



pin Assignment



Schematic diagram

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-5.1	A
Drain Current-Pulsed (Note 1)	I_{DM}	-20	A
Maximum Power Dissipation	P_D	2	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	50	°C/W
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Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = -250\mu A$	-30	-33		V

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Parameter	Symbol	Condition	Min	Typ	Max	Unit
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-24V, V_{GS}=0V$			-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1		-2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4.6A$			60	m Ω
		$V_{GS}=-6V, I_D=-4.7A$			70	m Ω
		$V_{GS}=-4.5V, I_D=-2A$			105	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-15V, I_D=-4.5A$	4	7		S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$		1040		PF
Output Capacitance	C_{oss}			420		PF
Reverse Transfer Capacitance	C_{rss}			150		PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-1A,$ $V_{GS}=-10V, R_{GEN}=6\Omega$		15		nS
Turn-on Rise Time	t_r			13		nS
Turn-Off Delay Time	$t_{d(off)}$			58		nS
Turn-Off Fall Time	t_f			21		nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-5.1A, V_{GS}=-10V$		12		nC
Gate-Source Charge	Q_{gs}			2.2		nC
Gate-Drain Charge	Q_{gd}			3		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=-1.7A$			-1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

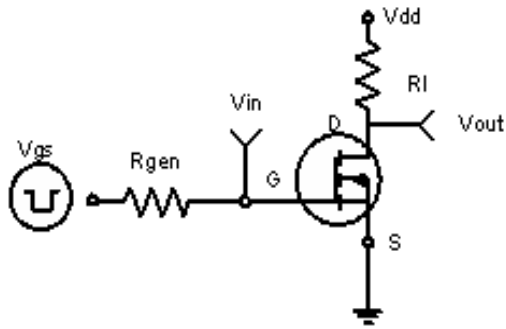


Figure 1: Switching Test Circuit

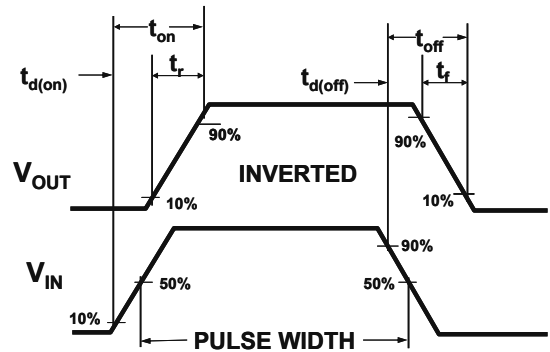
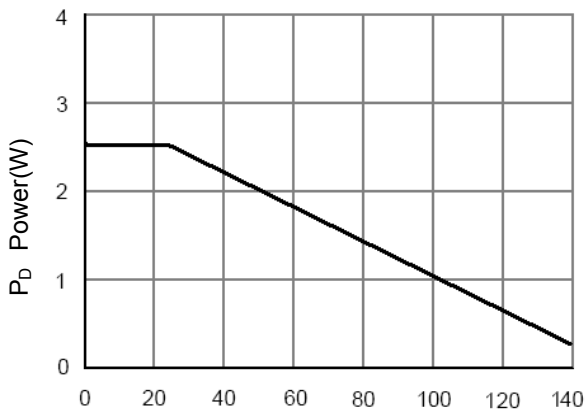
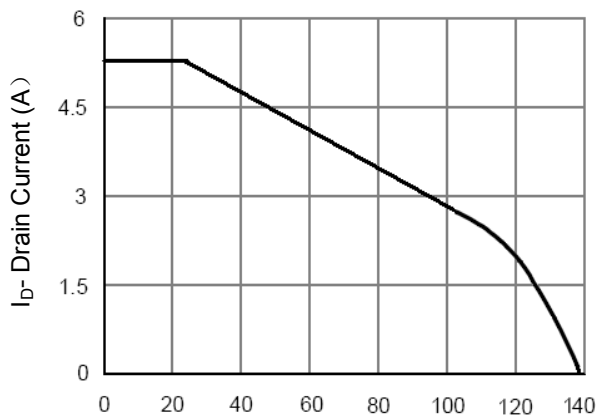


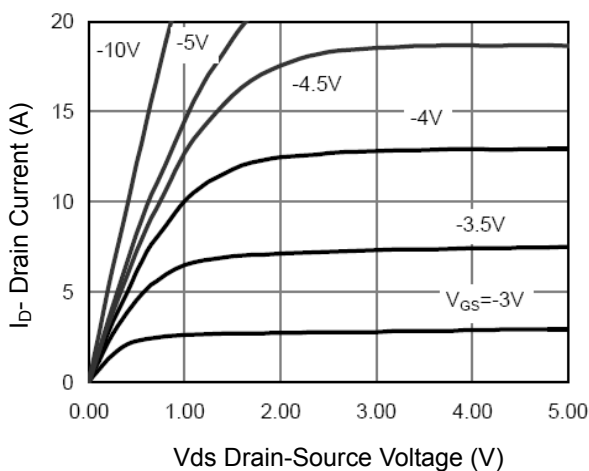
Figure 2: Switching Waveforms



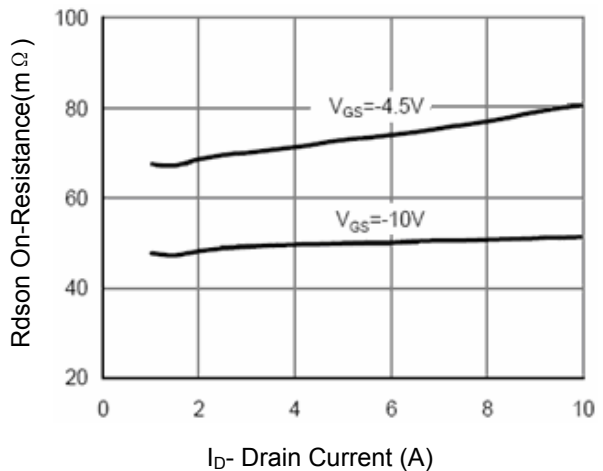
T_J-Junction Temperature(°C)
Figure 3 Power Dissipation



T_J-Junction Temperature(°C)
Figure 4 Drain Current

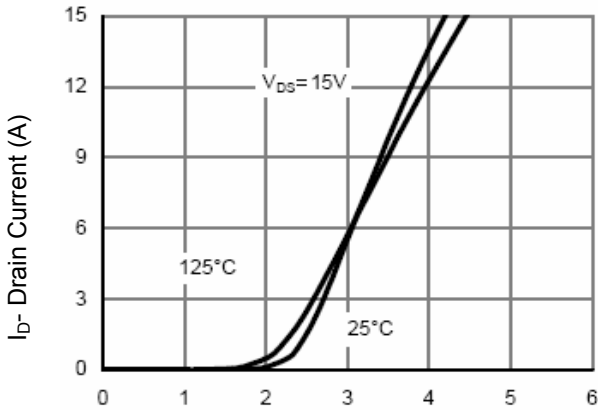


V_{DS} Drain-Source Voltage (V)
Figure 5 Output CHARACTERISTICS

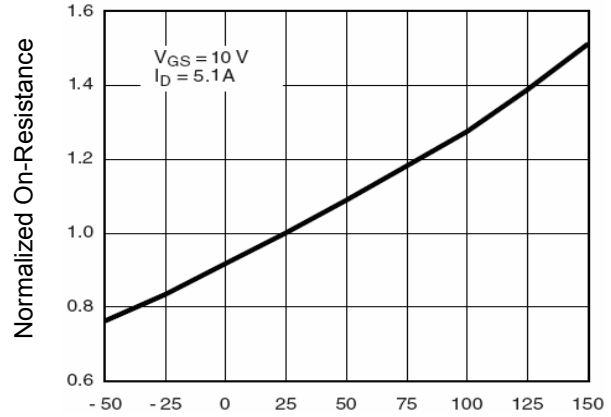


I_D-Drain Current (A)
Figure 6 Drain-Source On-Resistance

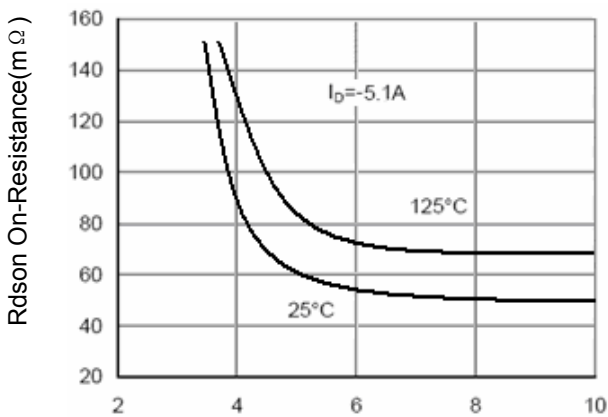
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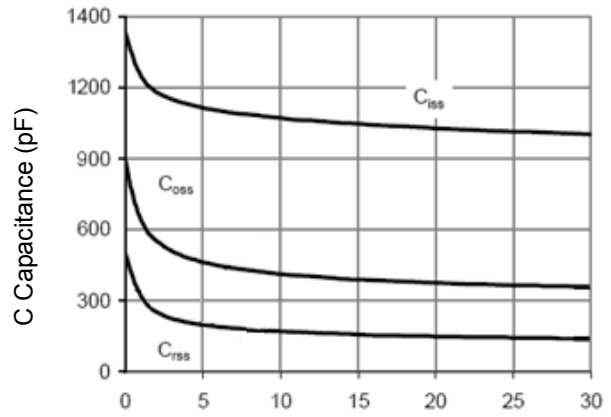
Vgs Gate-Source Voltage (V)
Figure 7 Transfer Characteristics



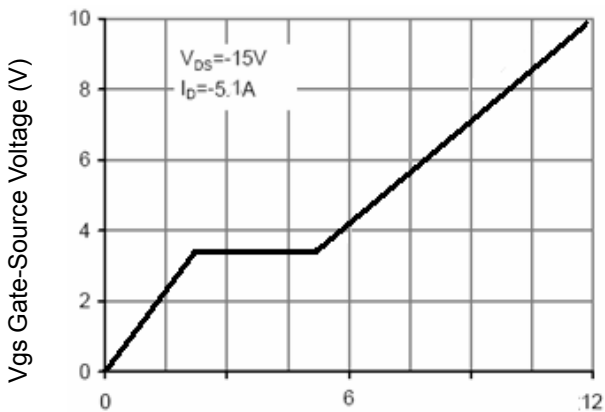
T_J -Junction Temperature(°C)
Figure 8 Drain-Source On-Resistance



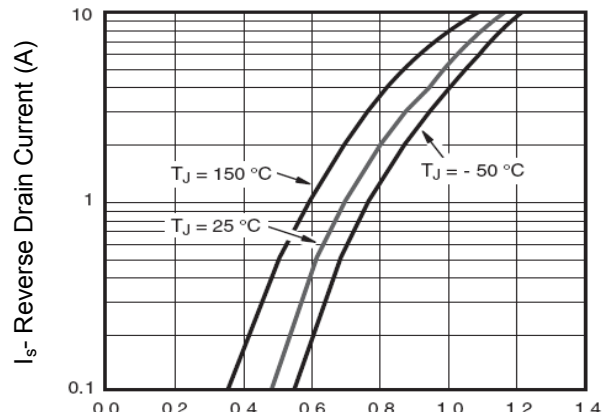
Vgs Gate-Source Voltage (V)
Figure 9 Rdson vs Vgs



Vds Drain-Source Voltage (V)
Figure 10 Capacitance vs Vds



Qg Gate Charge (nC)
Figure 11 Gate Charge



Vsd Source-Drain Voltage (V)
Figure 12 Source- Drain Diode Forward

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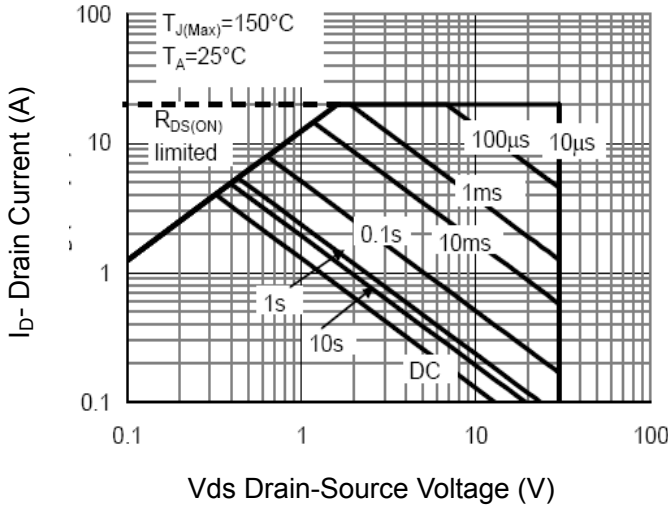


Figure 13 Safe Operation Area

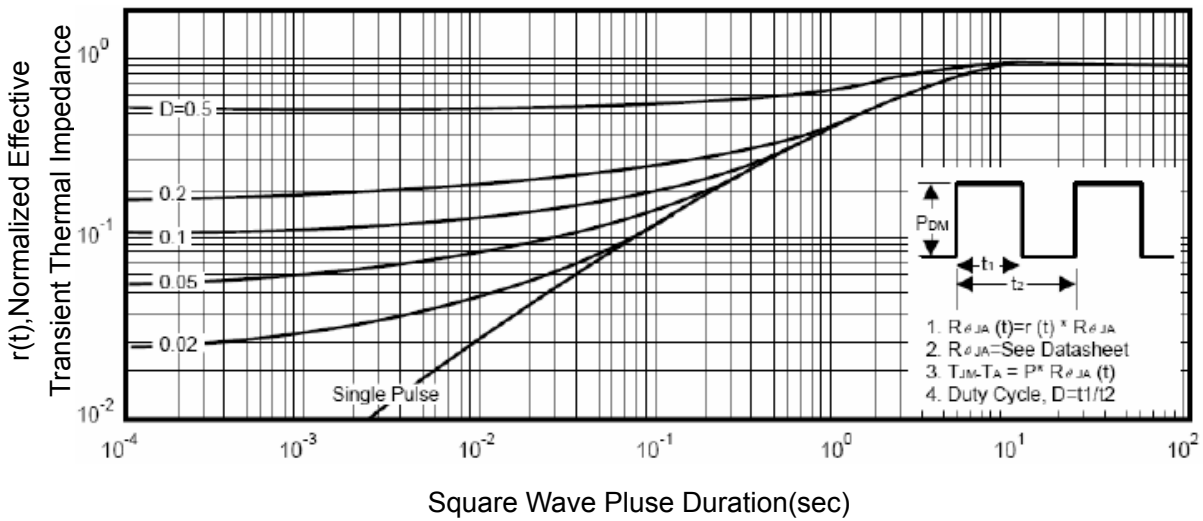


Figure 14 Normalized Maximum Transient Thermal Impedance