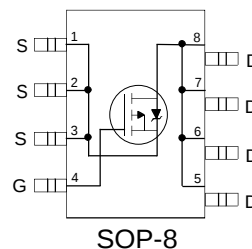


Description

The SOP-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infrared, or wave soldering technique



Features

- $V_{DS} (V) = -30V$
- $I_D = -8A$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 20m\Omega$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 35 m\Omega$ ($V_{GS} = -4.5V$)

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-30	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-8.0	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-6.4	
I_{DM}	Pulsed Drain Current ①	-50	
$P_D @ T_A = 25^\circ C$	Power Dissipation	2.5	W
$P_D @ T_A = 70^\circ C$	Power Dissipation	1.6	
	Linear Derating Factor	0.02	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

	Parameter	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ③	50	°C/W

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-30	—		V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		-0.019		V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		15 26	20 35	$m\Omega$	$V_{GS} = -10V, I_D = -8.0A$ ② $V_{GS} = -4.5V, I_D = -5.0A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	-1.5	-2	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
g_{fs}	Forward Transconductance		11		S	$V_{DS} = -15V, I_D = -8.0A$
I_{DSS}	Drain-to-Source Leakage Current		—	-10	μA	$V_{DS} = -24V, V_{GS} = 0V$ $V_{DS} = -15V, V_{GS} = 0V, T_J = 70^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage			-100	nA	$V_{GS} = -20V$
	Gate-to-Source Reverse Leakage			100	nA	$V_{GS} = 20V$
Q_g	Total Gate Charge		40	60	nC	$I_D = -4.6A$ $V_{DS} = -15V$ $V_{GS} = -10V$ ②
Q_{gs}	Gate-to-Source Charge		7.1		nC	
Q_{gd}	Gate-to-Drain ("Miller") Charge		8.0		nC	
$t_{d(on)}$	Turn-On Delay Time		16	24	ns	$V_{DD} = -15V, V_{GS} = -10V$ ② $I_D = -1.0A$ $R_G = 6.0\Omega$ $R_D = 15\Omega$
t_r	Rise Time		76	110	ns	
$t_{d(off)}$	Turn-Off Delay Time		130	200	ns	
t_f	Fall Time		90	140	ns	
C_{iss}	Input Capacitance		2320		pF	$V_{GS} = 0V$ $V_{DS} = -15V$ $f = 1.0kHz$
C_{oss}	Output Capacitance		390		pF	
C_{rss}	Reverse Transfer Capacitance		270		pF	

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode. ②
I_{SM}	Pulsed Source Current (Body Diode) ①			-50	A	
V_{SD}	Diode Forward Voltage			-1.2	V	$T_J = 25^\circ\text{C}, I_S = -2.5A, V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time		34	51	ns	$T_J = 25^\circ\text{C}, I_F = -2.5A$
Q_{rr}	Reverse Recovery Charge		33	50	nC	$di/dt = -100A/\mu s$ ②

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ③ Surface mounted on FR-4 board, $t \leq 5sec$.

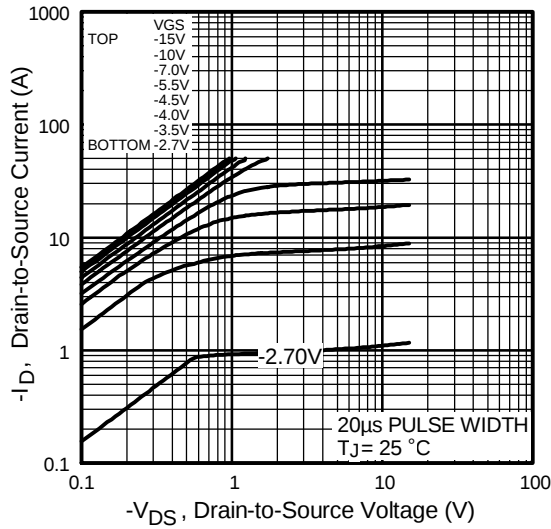


Fig 1. Typical Output Characteristics

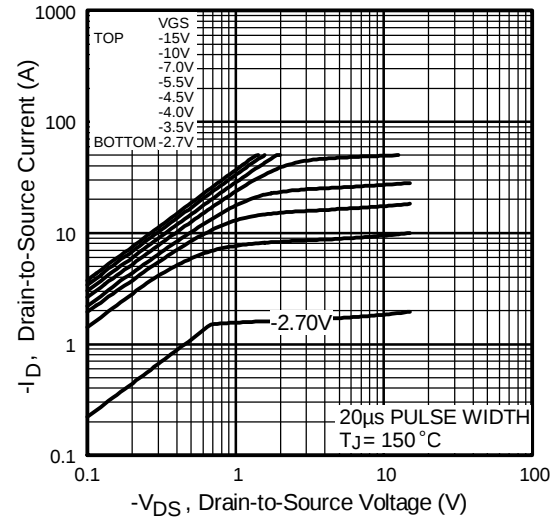


Fig 2. Typical Output Characteristics

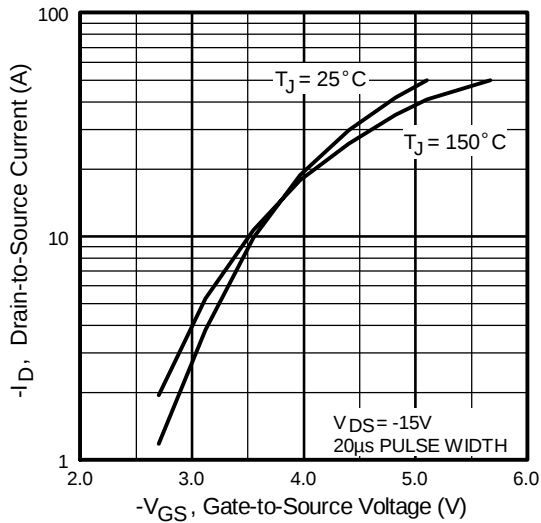


Fig 3. Typical Transfer Characteristics

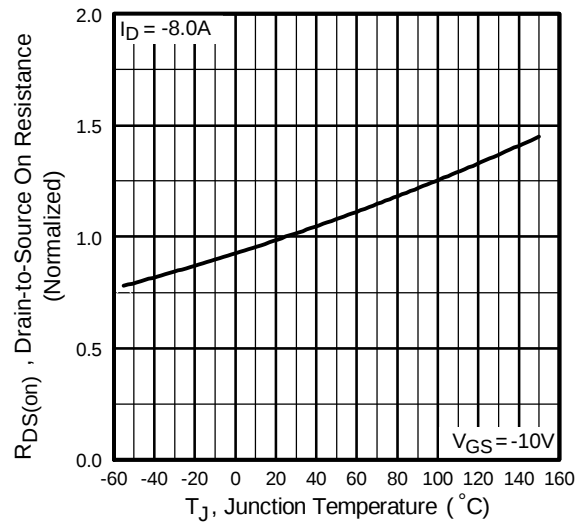


Fig 4. Normalized On-Resistance
Vs. Temperature

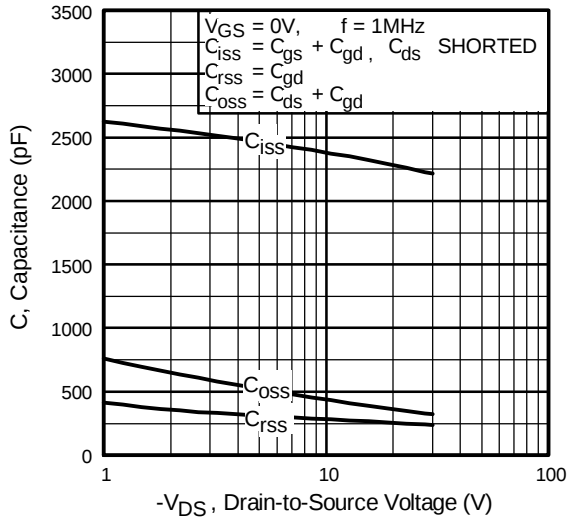


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

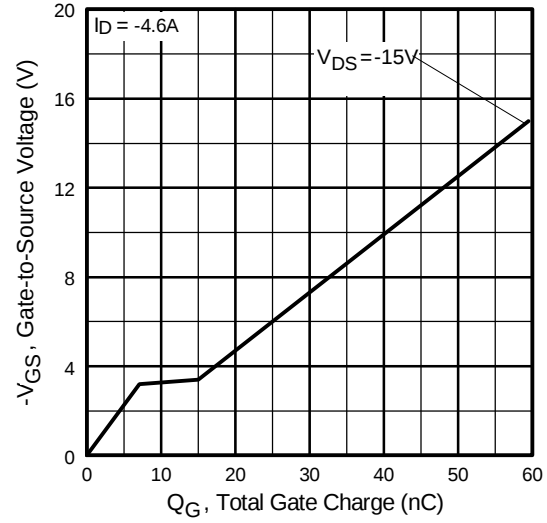


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

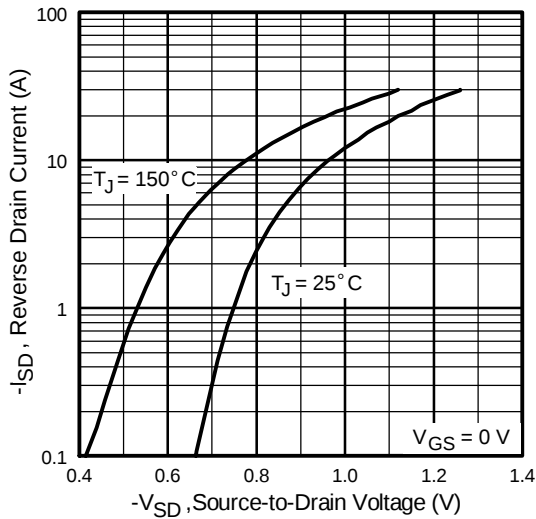


Fig 7. Typical Source-Drain Diode Forward Voltage

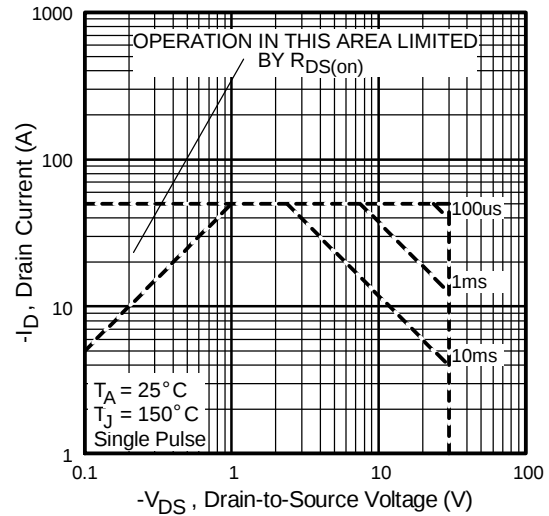


Fig 8. Maximum Safe Operating Area

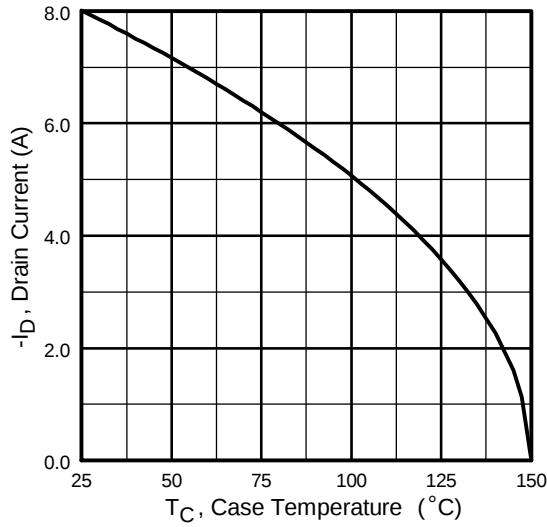


Fig 9. Maximum Drain Current Vs. Case Temperature

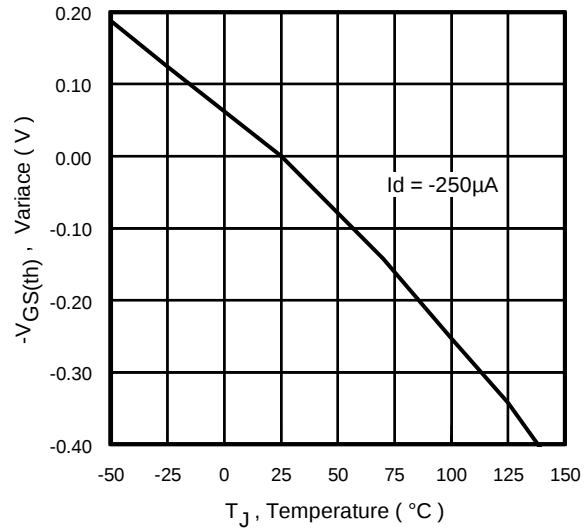


Fig 10. Typical VGS(th) Variance Vs. Junction Temperature

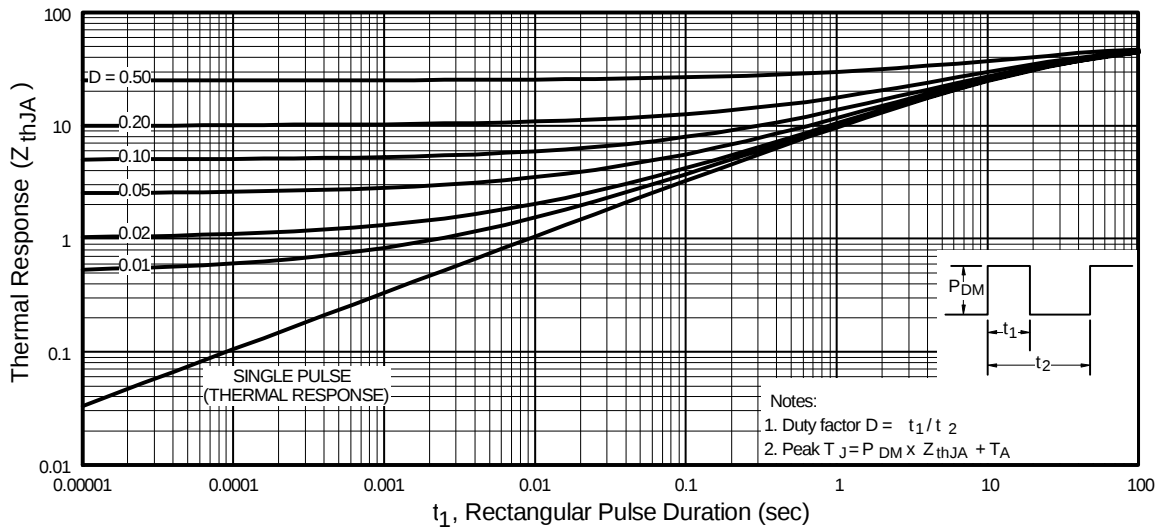


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

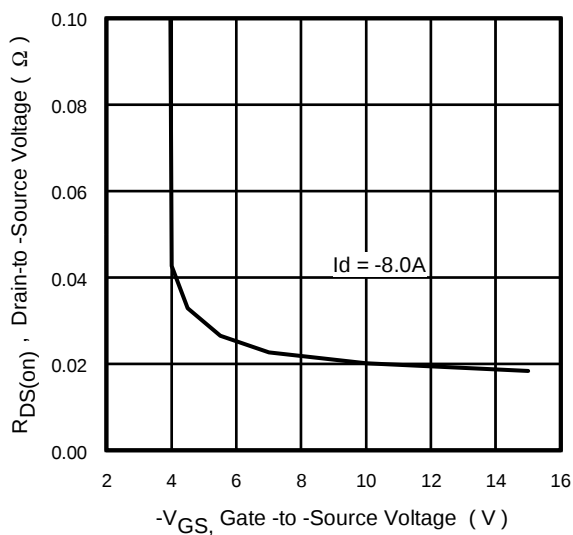


Fig 12. Typical On-Resistance Vs. Gate Voltage

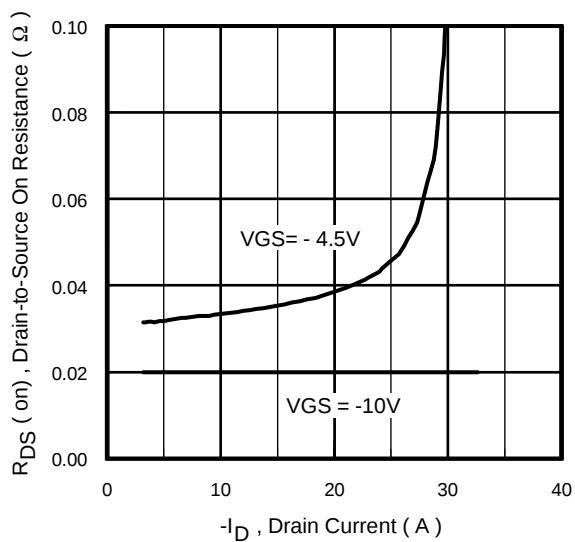
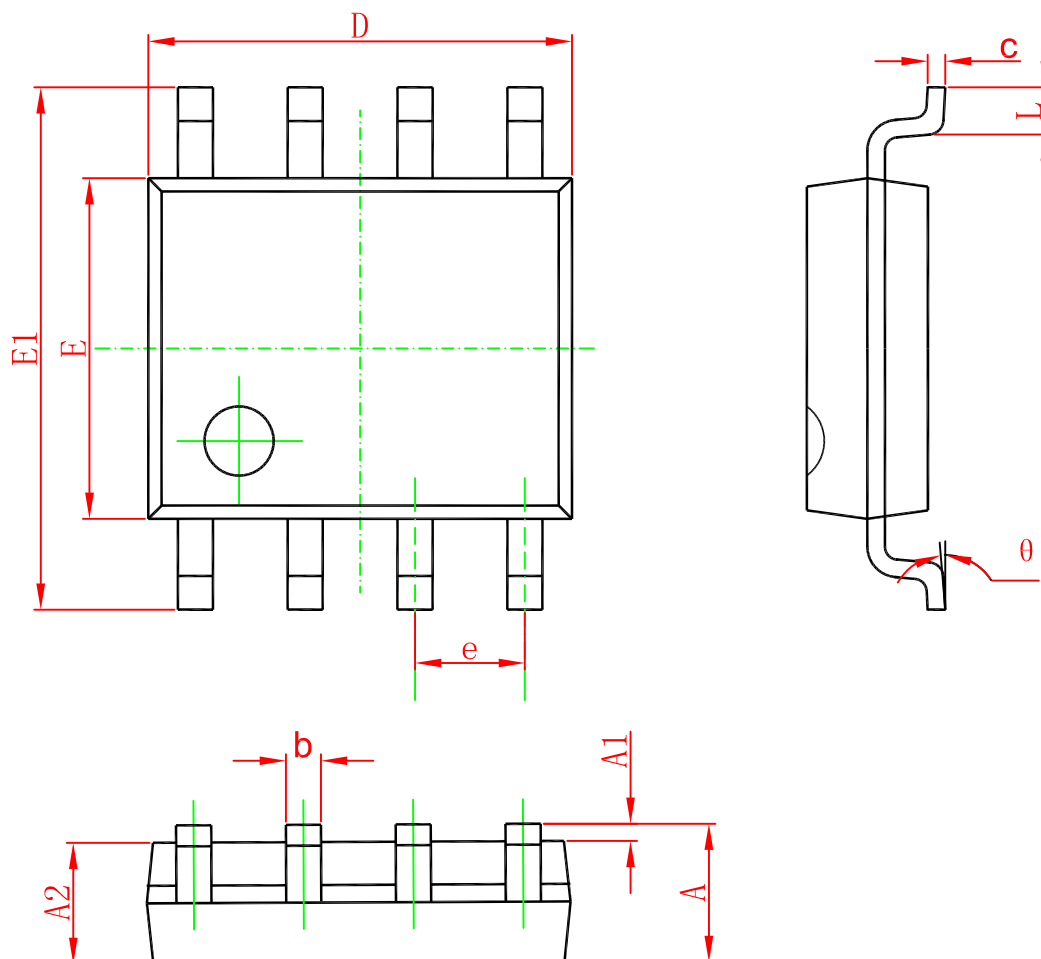


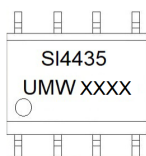
Fig 13. Typical On-Resistance Vs. Drain Current

Package Mechanical Data SOP-8



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	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	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	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW SI4435DY	SOP-8	3000	Tape and reel