

Description

This -6A,-40V P-Channel Enhancement Mode Field Effect Transistor in a SOP-8 Plastic Package.

Applications

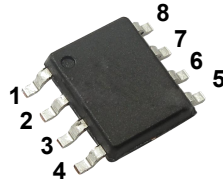
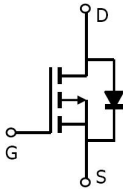
- Battery protection
- Load Switch.

Features

- $V_{DS(V)} = -40V$
- $I_D = -6 A (V_{GS} = -10V)$
- $R_{DS(ON)} < 42m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 63m\Omega (V_{GS} = -4.5V)$
- Halogen-free Product.

V_{DSS}	$R_{DS(on)}$ Typ	I_D
-40V	35m Ω	-6A

Equivalent Circuit & Pinning



PIN1、PIN 2、PIN 3: Source PIN 4 : Gate
PIN5、PIN 6、PIN 7、PIN 8: Drain

Absolute Maximum Ratings(Ta=25°C)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	-40	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I_D (Ta=25°C)	-6	A
Continuous Drain Current	I_D (Ta=70°C)	-5	A
Pulsed Drain Current ^C	I_{DM}	-40	A
Avalanche Current ^C	I_{AS}, I_{AR}	20	A
Avalanche energy L=0.1mH ^C	E_{AS}, E_{AR}	20	mJ
Power Dissipation ^B	P_D (Ta=25°C)	3.1	W
	P_D (Ta=70°C)	2	W
Junction and Storage Temperature Range	T_j, T_{stg}	-55 ~ 150	°C

Thermal Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	$t \leq 10s$		31	40	°C/W
Maximum Junction-to-Ambient ^{A D}				59	75	
Maximum Junction-to-Lead	$R_{\theta JL}$			16	24	°C/W

Note:

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)} = 150^\circ\text{C}$, using $\leq 10s$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J = 25^\circ\text{C}$.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300ms pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)} = 150^\circ\text{C}$. The SOA curve provides a single pulse rating.

Electrical Characteristics(Ta=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = -250\mu A$ $V_{GS} = 0V$	-40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -40$ $V_{GS} = 0V$			-1.0	μA
		$V_{DS} = -40$ $V_{GS} = 0V$ $T_J = 55^\circ C$			-5.0	
Gate-Body leakage current	I_{GSS}	$V_{DS} = 0V$ $V_{GS} = \pm 20$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ $I_D = -250\mu A$	-1.5	-2.0	-2.6	V
On state drain current	$I_{D(ON)}$	$V_{GS} = -10V$ $V_{DS} = -5V$	40			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = -10V$ $I_D = -6A$		35	42	m Ω
		$V_{GS} = -10V$ $I_D = -6A$ $T_J = 125^\circ C$		53	65	
		$V_{GS} = -4.5V$ $I_D = -5.0A$		46.5	63	
Forward Transconductance	g_{FS}	$V_{DS} = -5V$ $I_D = -6A$		17		S
Diode Forward Voltage	V_{SD}	$I_S = -1A$ $V_{GS} = 0V$		-0.76	-1.0	V
Maximum Body-Diode Continuous Current	I_S				-3.5	A
Total Gate Charge	$Q_{g(10V)}$	$V_{GS} = -10V$ $V_{DS} = -20V$ $I_D = -6A$		17.3	22	nC
Total Gate Charge	$Q_{g(4.5V)}$			8.4	11	
Gate-Source Charge	Q_{gs}			3.2		
Gate-Drain Charge	Q_{gd}			4.3		
Gate Resistance	R_g	$V_{GS} = 0V$ $V_{DS} = 0V$ $f = 1MHz$	7.0	14	21	Ω
Input Capacitance	C_{iss}	$V_{GS} = 0V$ $V_{DS} = -20V$ $f = 1MHz$	750	940	1175	pF
Output Capacitance	C_{oss}			97		
Reverse Transfer Capacitance	C_{rss}			72		
Turn-on Delay Time	$t_{d(ON)}$	$V_{GS} = -10V$ $V_{DS} = -20V$ $R_L = 3.35\Omega$ $R_{GEN} = 3\Omega$		10.3		ns
Turn-on Rise Time	t_r			4.3		
Turn-off Delay Time	$t_{d(OFF)}$			39		
Turn-off Fall Time	t_f			46.5		
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -6A$ $di/dt = 100A/\mu s$		17	24	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = -6A$ $di/dt = 100A/\mu s$		11.5		nC

Electrical Characteristic Curve

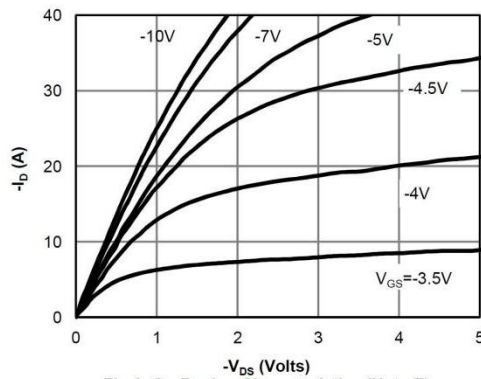


Fig 1: On-Region Characteristics (Note E)

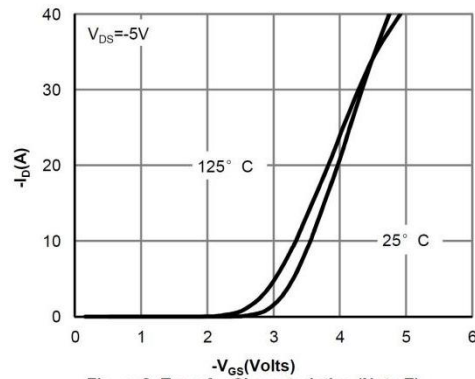


Figure 2: Transfer Characteristics (Note E)

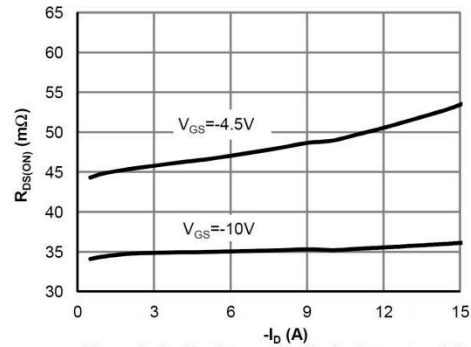


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

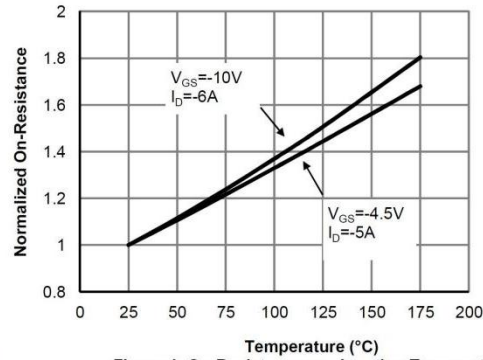


Figure 4: On-Resistance vs. Junction Temperature (Note E)

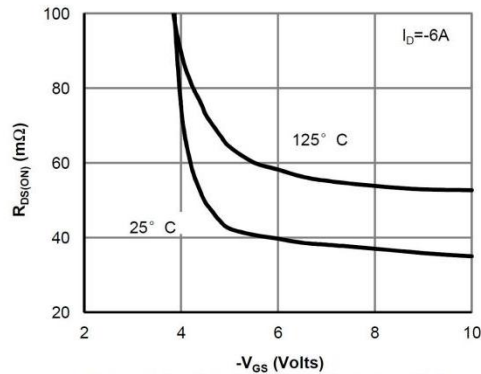


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

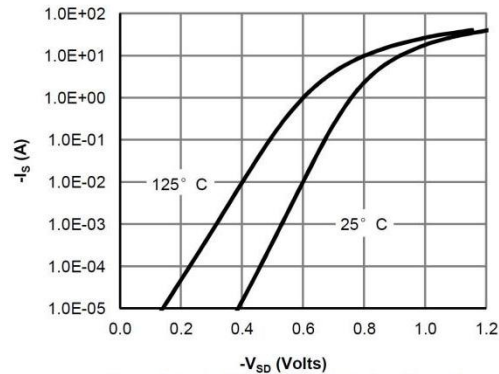


Figure 6: Body-Diode Characteristics (Note E)

Electrical Characteristic Curve

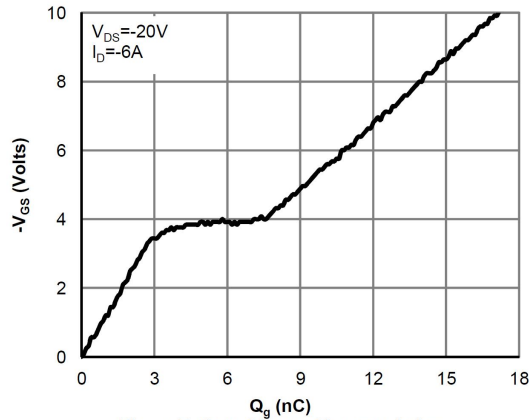


Figure 7: Gate-Charge Characteristics

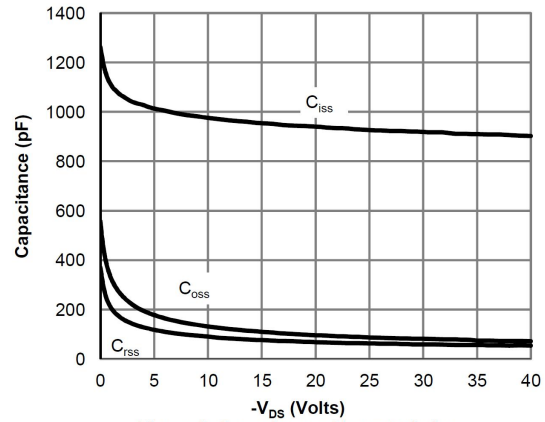


Figure 8: Capacitance Characteristics

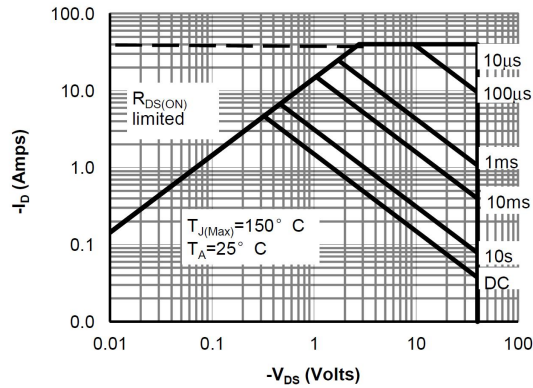


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

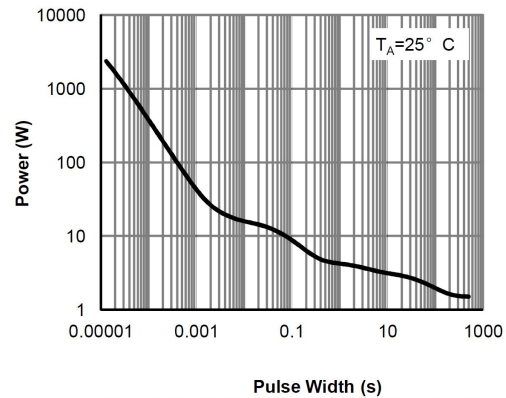


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

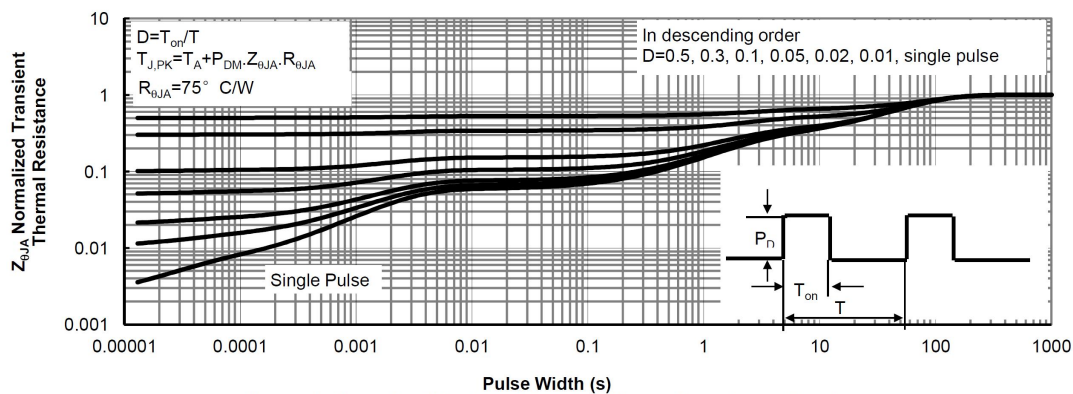
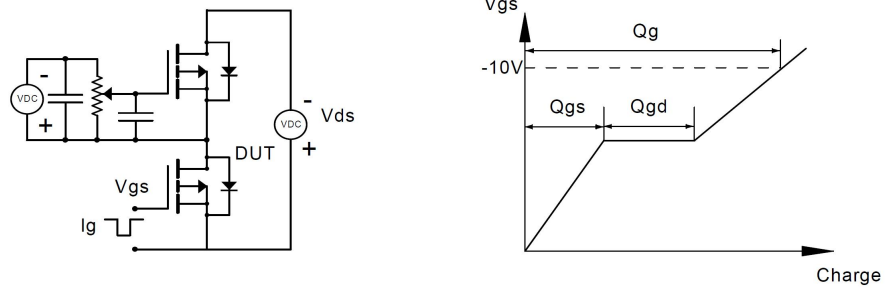


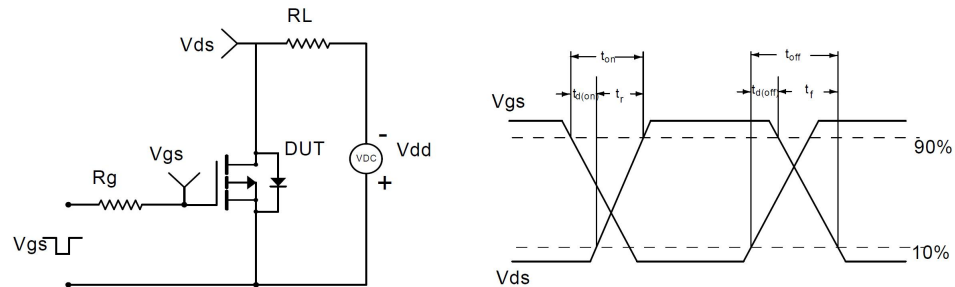
Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

Test Circuit & Waveform

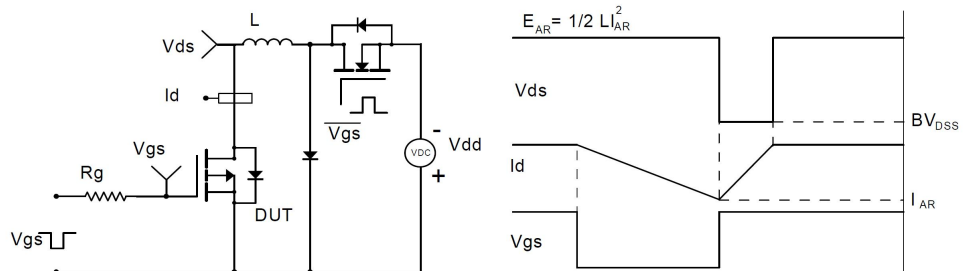
Gate Charge Test Circuit & Waveform



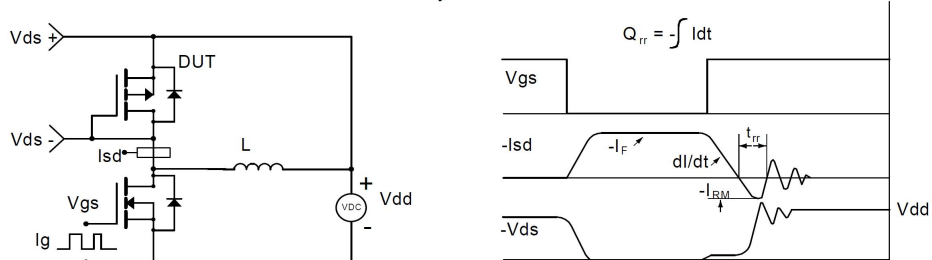
Resistive Switching Test Circuit & Waveforms



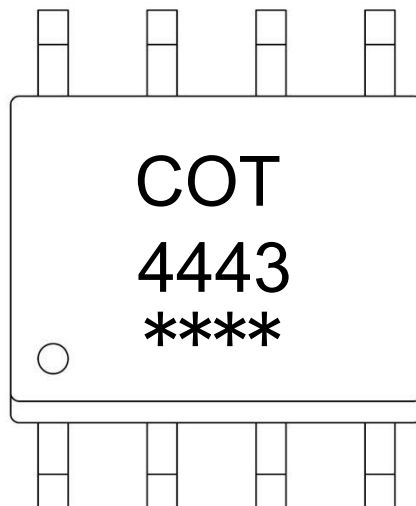
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Marking Instructions



Note:

COT: Company Logo

4443: Product Type.

*****: Lot No. Code, code change with Lot No.

Packaging SPEC.

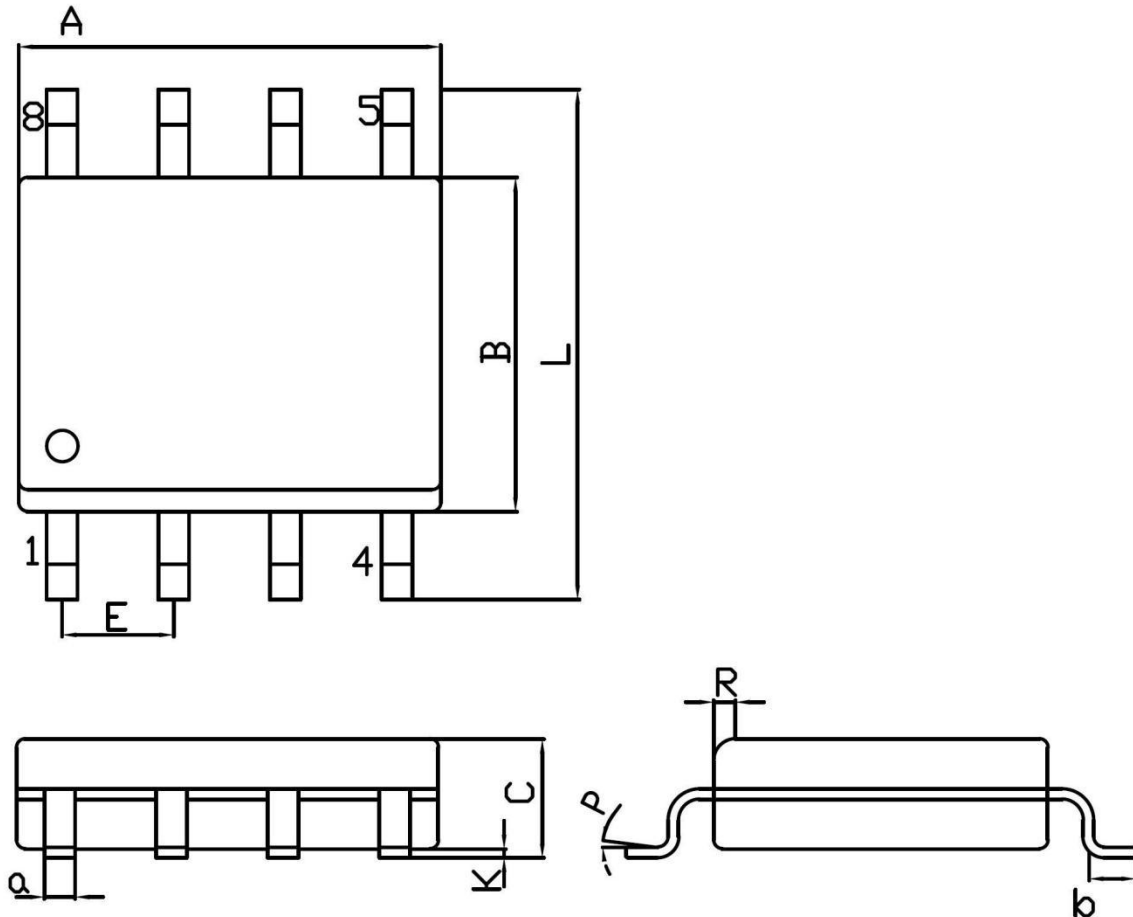
REEL INFORMATION

Package Type	Units					Dimension (unit: mm ³)		
	Units/Reel	Reels/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Reel	Inner Box	Outer Box
SOP-8	4,000	2	8,000	6	48,000	13" x12	360×360×50	380×335×366

Package Outline Dimensions

SOP-8

Unit:mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	4.70	5.10	C	1.35	1.75
B	3.70	4.10	a	0.35	0.49
L	5.80	6.20	R	0.30	0.60
E	1.27BSC		P	0°	7°
K	0.12	0.22	b	0.40	1.25