P-Channel 30V (D-S)MOSFET

General Description

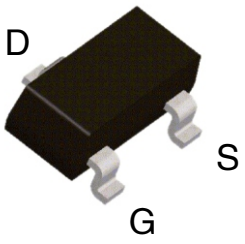
This miniature surface monut MOSFET uses advanced trench process , low $R_{DS(on)}$ assures minimal power loss and energy conversion , which makes this device ideal for use in power managementcircuit.

Features

- V_{DS} (V) = –30V
- I_D(A) = –4A (V_{GS} = –10V)
- $R_{DS(on)}$ = 0.060 ohm @ V_{GS} = –10V
- $R_{DS(on)}$ = 0.090 ohm@ V_{GS} = –4.5V
- Low gate charge
- Fast switching speed

Applications

- Load switch
- DC–DC converters
- Power management



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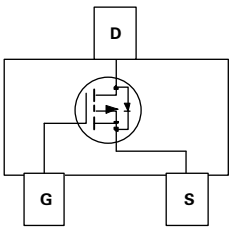

Absolute Maximum Ratings (T_A = 25℃ Unless Otherwise Noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	–30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current [a]	T_A=25℃	I_D	–4	A
	T_A=70℃		–3.2	
Pulsed Drain Current [b]		I_{DM}	–20	
Continuous Source Current (Diode Conduction) [a]		I_S	–2.2	A
Power Dissipation [a]	T_A=25℃	P_D	1.4	W
	T_A=70℃		1.0	
Operating Junction and Storage Temperature Range		T_J,T_{stg}	-55 to 150	℃

Thermal Resistance Ratings

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient [a]	t<= 5 sec	$R_{\theta JA}$	90	℃/W
	Steady-State		130	

Package Outlines and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
MPTS	MI3407	7''	8mm	3000 units

Specifications (T_A = 25℃ Unless Otherwise Noted)

Parameter	Symbol	Test Conditions	Limits			Units
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=−250uA	−30			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D = −250 uA	−1.00	−1.70	−3.00	V
Gate-Body Leakage	I_{GSS}	V_{DS}=0V, V_{GS}= ± 20V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=−30V, V_{GS}=0V			−1	uA
		V_{DS}=−30V, V_{GS}=0V, T_J=55℃			−5	uA
On-State Drain Current [c]	$I_{D(on)}$	V_{DS}=−5V, V_{GS}=−10V	−20			A
Drain−Source On−Resistance [c]	$R_{DS(on)}$	V_{GS}=−10V, I_D=−4A		50	60	mΩ
		V_{GS}=−4.5 V, I_D=−3.5A		70	90	mΩ
Forward Tranconductance [c]	gfs	V_{DS}=−5V, I_D=−4A		11		S
Diode Forward Voltage	V_{SD}	I_S=−1.0A, V_{GS}=0V		−0.60	−1.00	V
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V f=1MHz		745	830	nF
Output Capacitance	C_{oss}			440		nF
Reverse Transfer Capacitance	C_{rss}			120		nF
Total Gate Charge	Q_g	V_{DS}=−15V, V_{GS}=−10V I_D =−4.0 A		25	33	nC
Gate-Source Charge	Q_{gs}			3	7.9	nC
Gate-Drain Charge	Q_{gd}			7	9.1	nC
Switching						
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=−15V, I_D=−4.0A, R_G=3 ohm, V_{GEN}=−10V		9	18	ns
Rise Time	t_r			15	30	ns
Turn-Off Delay Time	$t_{d(off)}$			75	150	ns
Fall-Time	t_f			48	80	ns

Notes: a. Surface Mounted on 1" x 1" FR4 Board.
b. Pulse width limited by maximum junction temperature
c. Pulse test: PW <= 300us duty cycle <= 2%.

Typical Electrical and Thermal Characteristics

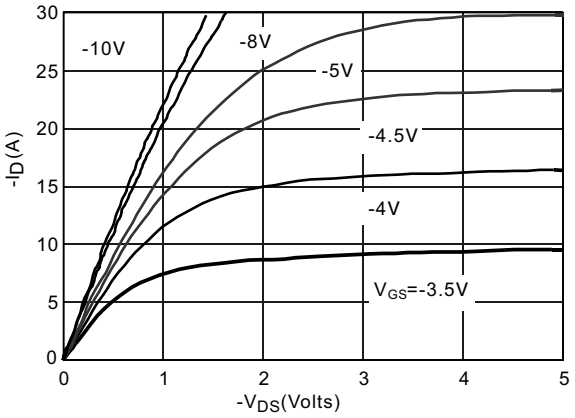

Fig 1: On-Region Characteristics

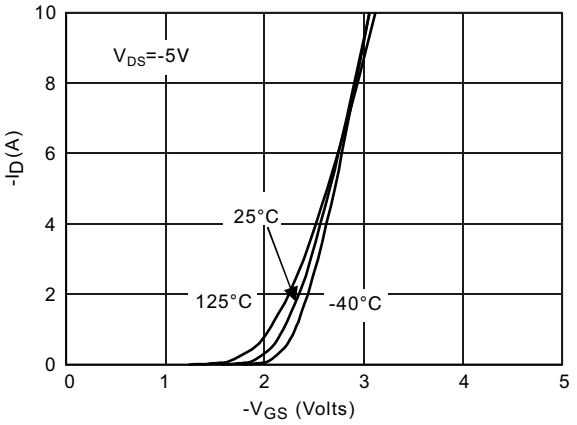

Figure 2: Transfer Characteristics

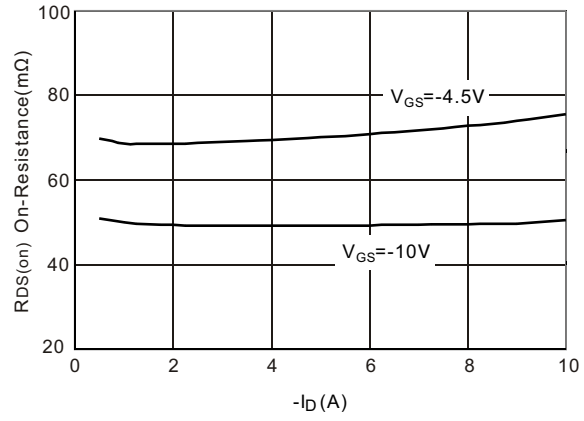

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

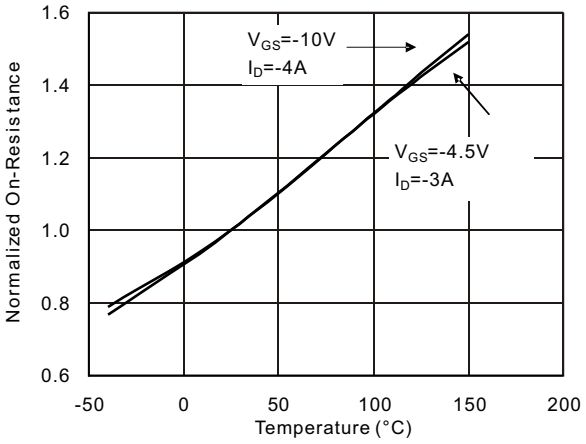

Figure 4: On-Resistance vs. Junction Temperature

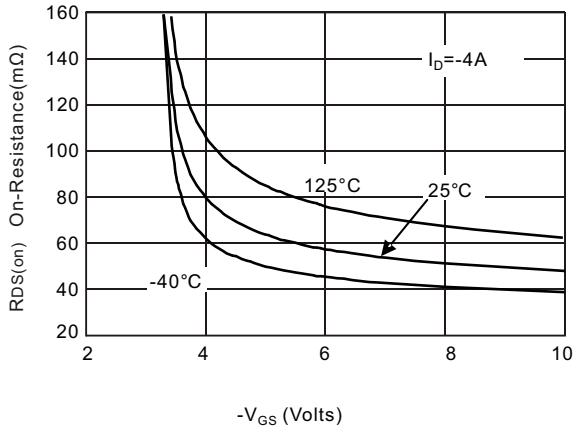

Figure 5: On-Resistance vs. Gate-Source Voltage

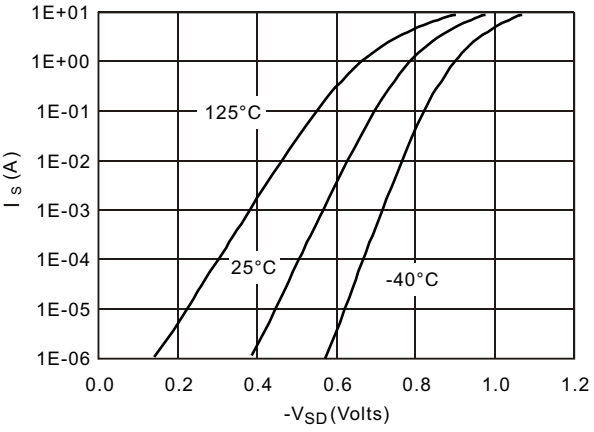

Figure 6: Body-Diode Characteristics

Typical Electrical and Thermal Characteristics

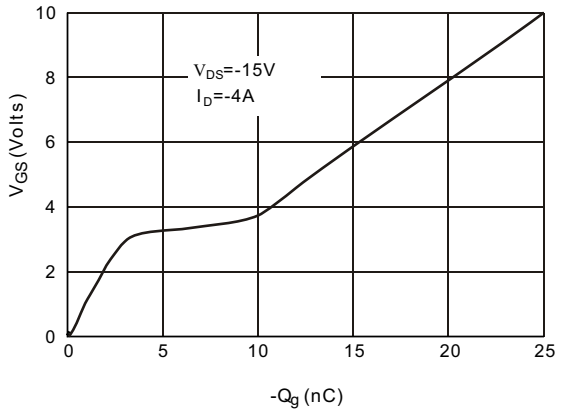

Figure 7: Gate-Charge Characteristics

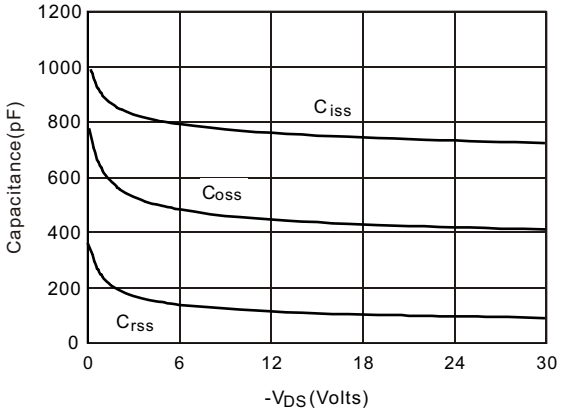

Figure 8: Capacitance Characteristics

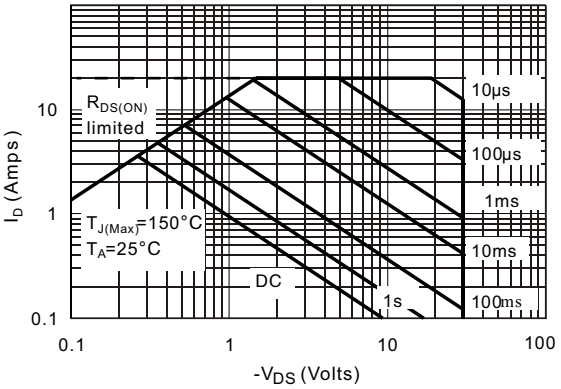

Figure 9: Maximum Forward Biased Safe Operating Area (Note d)

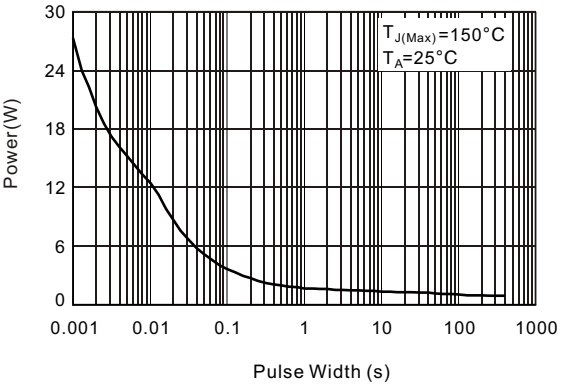

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note d)

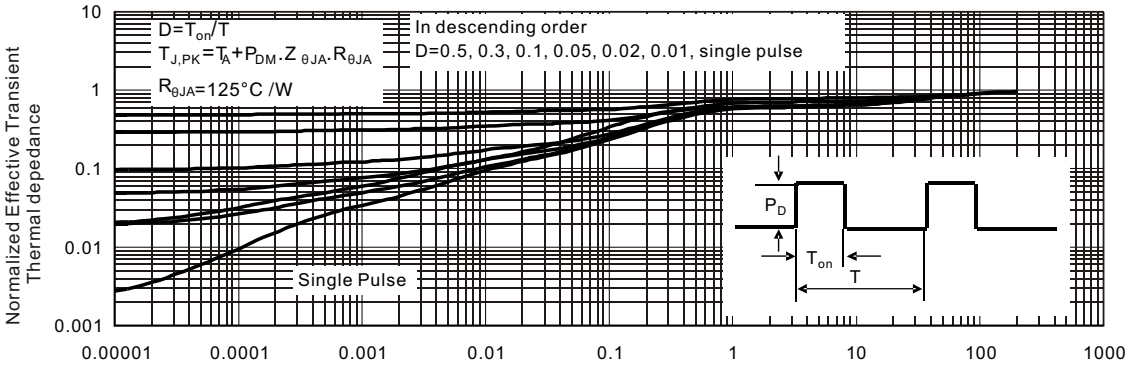

Figure 11: Normalized Maximum Transient Thermal Impedance(Note d)

Note d: These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

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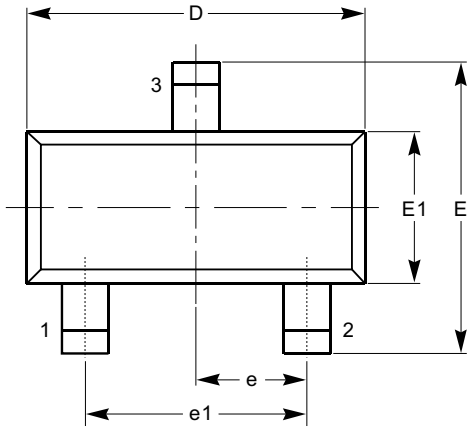
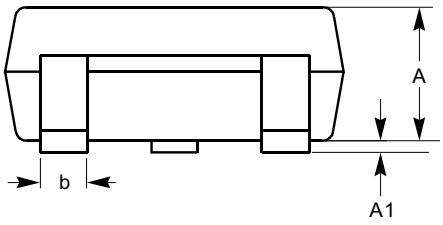
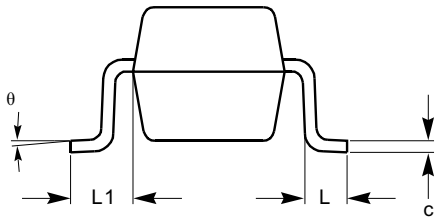


TOP VIEW

SYMBOL	MIN	NOM	MAX
A	0.70	1.00	1.15
A1	0.00		0.13
b	0.30	0.40	0.50
c	0.08	0.13	0.20
D	2.80	2.90	3.10
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95 BSC		
e1	1.90 BSC		
L	0.400 REF		
L1	0.540 REF		
θ	0°	5°	8°



SIDE VIEW



END VIEW

Notes:

(1) All dimensions are in millimeters. Angles in degrees.
(2) Complies with JEDEC TO-236.

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