

## MS34P01

### P-Channel 30-V (D-S) MOSFET

#### Description

The MS34P01 utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device. The device is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

The device meets the RoHS and Green Product requirement with full function reliability approved.

#### Features

- Super High Dense Cell Design for Extremely Low  $R_{DS(ON)}$
- Low Gate Charge
- Green Device Available

#### Typical Applications

- Battery Protection
- Load Switch
- Hand-held Instrument

Package type : SOT-23

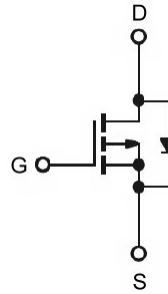
#### Packing & Order Information

3,000/Reel

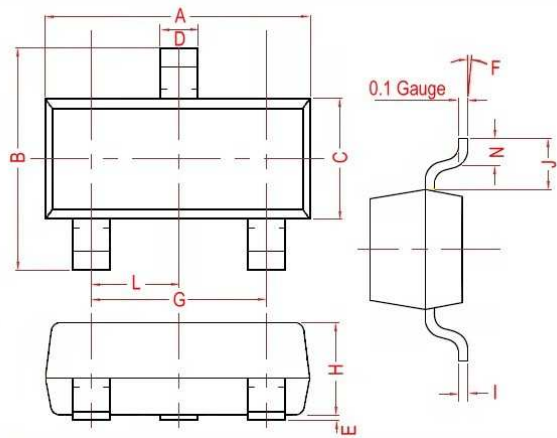


RoHS Compliant

#### Graphic Symbol

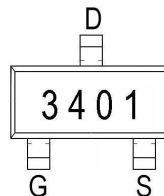


#### Package Dimension



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	1.90 Ref.	
B	2.30	3.00	H	0.90	1.30
C	1.20	1.75	I	0.05	0.21
D	0.30	0.50	J	0.58 Ref.	
E	0.01	0.15	L	0.95 Typ.	
F	0°	10°	N	0.20 Min.	

#### Marking



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#### MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

##### Absolute Maximum Ratings (unless otherwise specified)

Symbol	Parameter	Value	Units
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Continuous Drain Current <sup>3</sup> ( $T_A=25^\circ\text{C}$ )	-4.2	A
	Continuous Drain Current <sup>3</sup> ( $T_A=70^\circ\text{C}$ )	-3.5	A
$I_{DM}$	Pulsed Drain Current <sup>1,2</sup> ( $T_A=25^\circ\text{C}$ )	-20	A
$P_D$	Power Dissipation ( $T_A=25^\circ\text{C}$ )	1.38	W
$T_J/T_{STG}$	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$

##### Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient <sup>3</sup>	90	$^\circ\text{C/W}$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-0.5	-	-1.3	V
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$ , $I_D=-250\mu\text{A}$	-30	-	-	V
$g_{fs}$	Forward Transconductance	$V_{DS}=-5\text{V}$ , $I_D=-3\text{A}$	-	9	-	S
$I_{GSS}$	Gate-Source Leakage Current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 12\text{V}$	-	-	$\pm 100$	nA
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-24\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=25^\circ\text{C}$	-	-	-1	$\mu\text{A}$
		$V_{DS}=-24\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=55^\circ\text{C}$	-	-	-5	$\mu\text{A}$
$R_{DS(on)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-10\text{V}$ , $I_D=-4.2\text{A}$	-	-	53	m $\Omega$
		$V_{GS}=-4.5\text{V}$ , $I_D=-4.0\text{A}$	-	-	65	
		$V_{GS}=-2.5\text{V}$ , $I_D=-1.0\text{A}$	-	-	120	
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$I_S=-1.2\text{A}$ , $V_{GS}=0\text{V}$ , $T_J=25^\circ\text{C}$	-	-	-1.0	V
$I_S$	Continuous Source Current (Diode)	$V_G=V_D=0\text{V}$ , Force Current	-	-	-4.2	A
$I_{SM}$	Pulsed Source Current (Diode)		-	-	-8.4	

#### Notes

1. Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 270 $^\circ\text{C/W}$  when mounted on min. copper pad.

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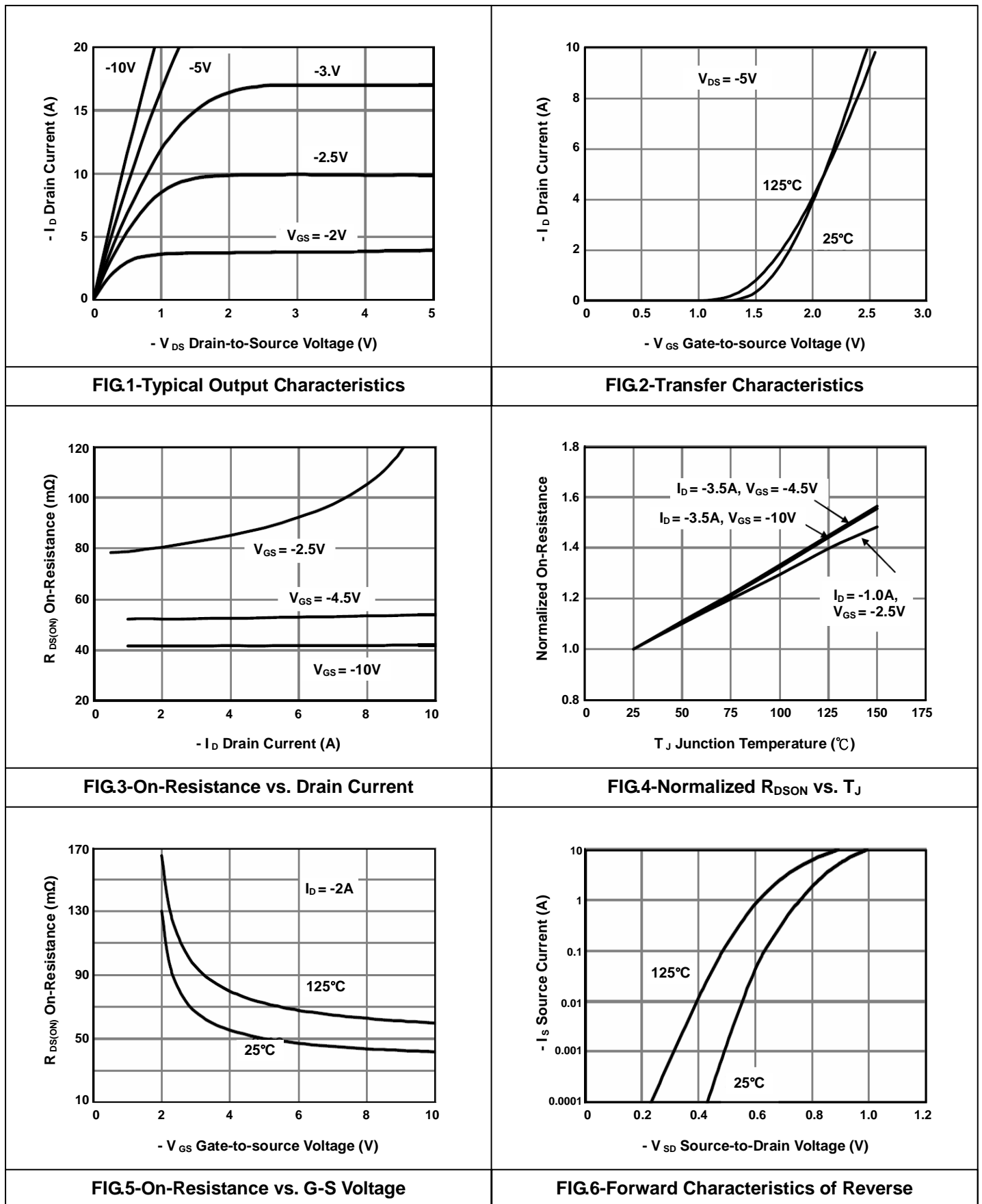
#### Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$Q_g$	Total Gate Charge <sup>2</sup>	$V_{DS} = -15V$	--	9.4	--	nC
$Q_{gs}$	Gate-Source Charge	$I_D = -4A$	--	2	--	
$Q_{gd}$	Gate-Drain Charge	$V_{GS} = -4.5V$	--	3	--	
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = -15V$	--	6.3	--	ns
$t_r$	Rise Time	$V_{GS} = -10V$	--	3.2	--	
$t_{d(off)}$	Turn-Off Delay Time	$R_G = 6.0\Omega$	--	38.2	--	
$t_f$	Fall Time	$R_L = 3.6\Omega$	--	12	--	
$C_{ISS}$	Input Capacitance	$V_{DS} = -15V$	--	954	--	pF
$C_{OSS}$	Output Capacitance	$V_{GS} = 0V$	--	115	--	
$C_{RSS}$	Reverse Transfer Capacitance	$f = 1.0MHz$	--	77	--	

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### P-Channel 30-V (D-S) MOSFET

- Typical Electrical Characteristics



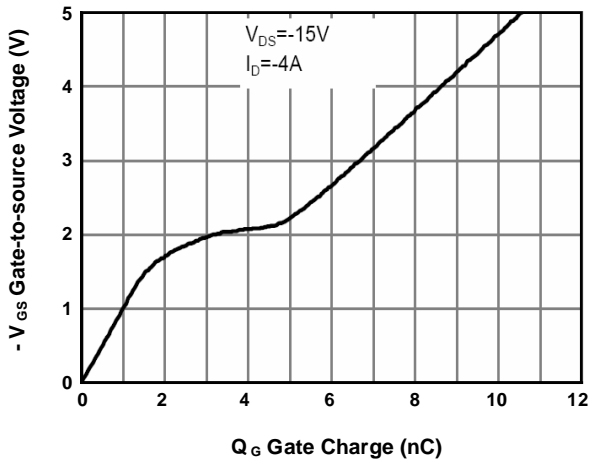


FIG.7-Gate Charge Characteristics

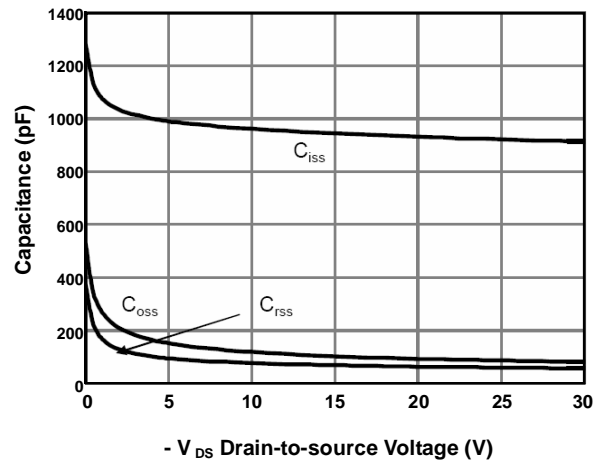


FIG.8-Capacitance Characteristics

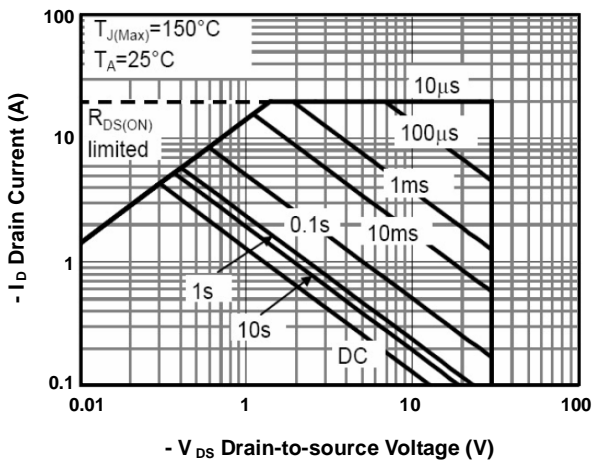


FIG.9-Safe Operating Area

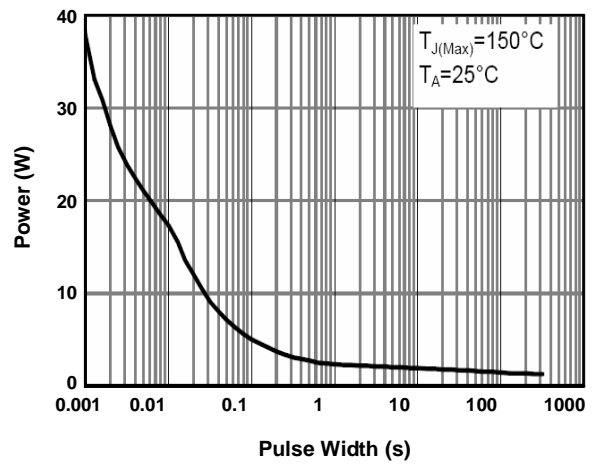


FIG.10-Single Pulse Power Rating vs.  $T_A$

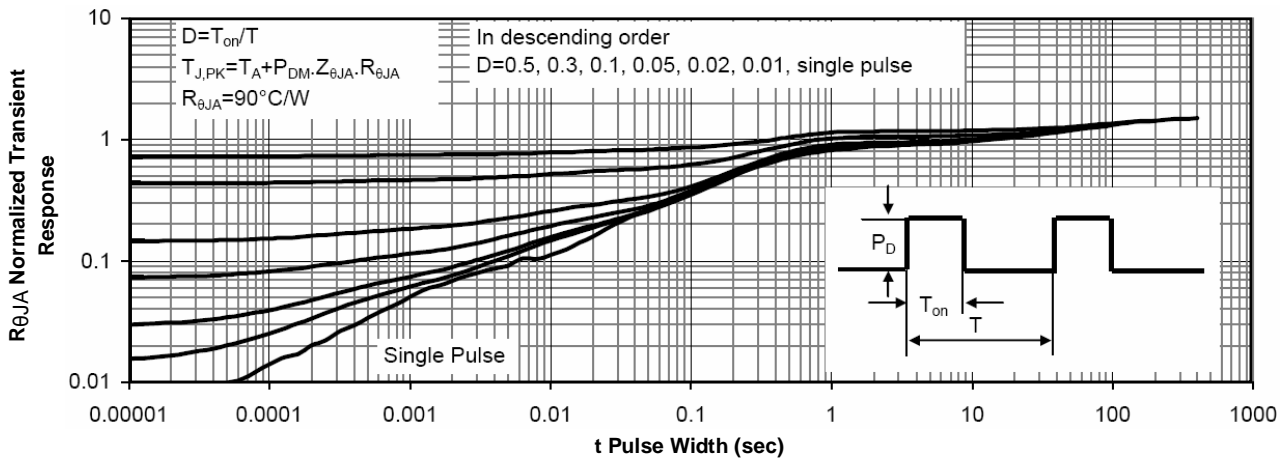


FIG.11-Normalized Maximum Transient Thermal Impedance

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