

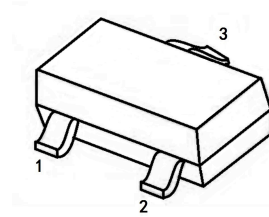
2N7002K

60V N-Channel Mosfet

FEATURES

- $R_{DS(ON)} \leq 2.3 \Omega @V_{GS}=10V$
- $R_{DS(ON)} \leq 2.7 \Omega @V_{GS}=4.5V$

SOT-23

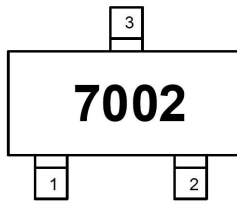


1. GATE
2. SOURCE
3. DRAIN

APPLICATIONS

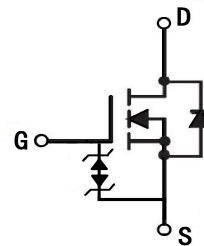
- Portable appliances

MARKING



7002: Device Code

N-CHANNEL MOSFET



MAXIMUM RATINGS (Ta=25°C unless otherwise noted)

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	0.34	A
I_{DM}	Pulsed Drain Current	1.7	A
P_D	Power Dissipation	0.83	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	150	$^{\circ}C/W$
T_J	Junction Temperature	150	$^{\circ}C$
T_{STG}	Storage Temperature Range	-55 to +150	$^{\circ}C$

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MOSFET ELECTRICAL CHARACTERISTICS Ta=25 °C unless otherwise specified

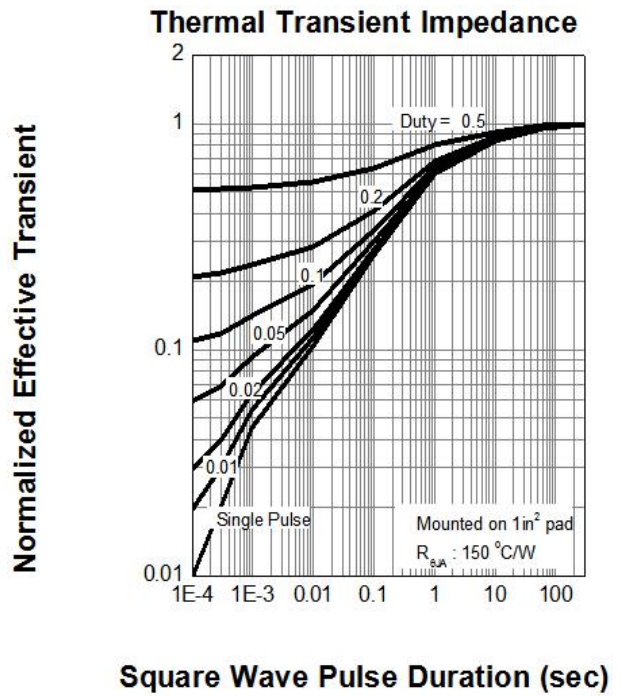
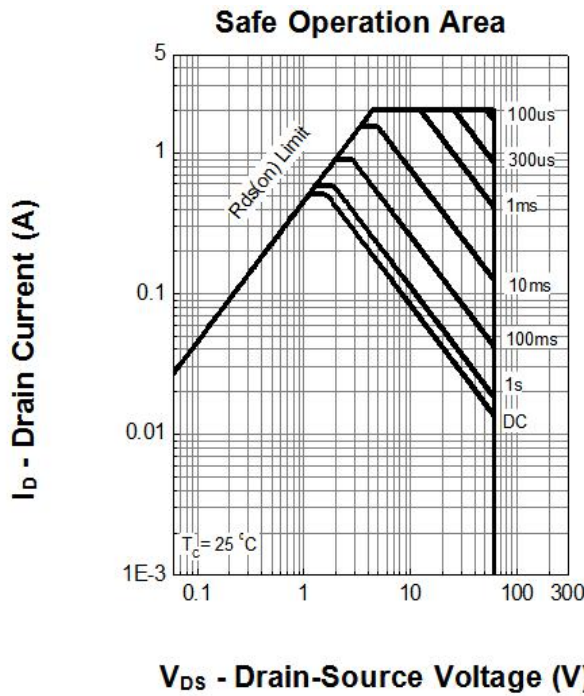
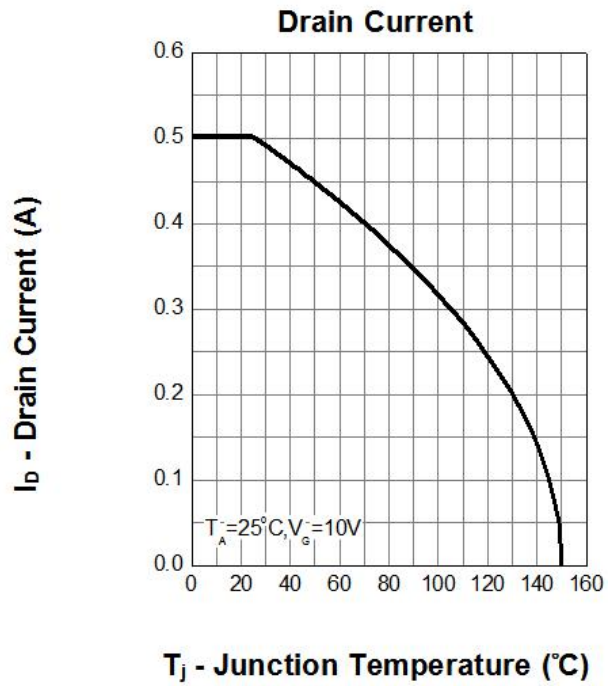
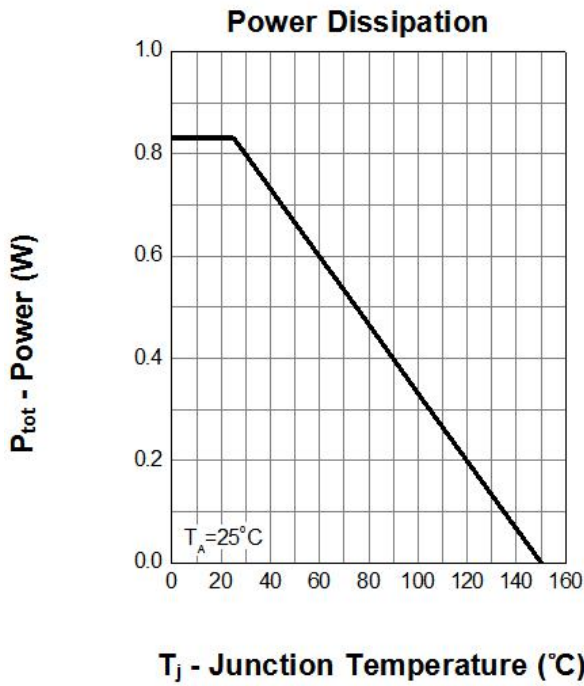
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 48V,$ $V_{GS} = 0V, T_J = 25^\circ C$	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 10	μA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^{note1}	$V_{GS} = 10V, I_D = 0.5A$	-	-	2.3	Ω
		$V_{GS} = 4.5V, I_D = 0.1A$	-	-	2.7	
Dynamic Characteristics ^{note2}						
R_G	Gate Resistance	$V_{GS} = V_{DS} = 0V$ $f = 1MHz$	-	100	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	-	22.8	-	pF
C_{oss}	Output Capacitance		-	3.5	-	pF
C_{rss}	Reverse Transfer Capacitance		-	2.9	-	pF
Q_g	Total Gate Charge	$V_{DS} = 10V, I_D = 0.5A,$ $V_{GS} = 4.5V$	-	280	-	pC
Q_{gs}	Gate-Source Charge		-	82	-	pC
Q_{gd}	Gate-Drain("Miller") Charge		-	201	-	pC
Switching Characteristics ^{note2}						
$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10V, V_{DS} = 30V,$ $R_G = 25\Omega, I_D = 0.5A$ $R_L = 60\Omega$	-	3.8	-	ns
t_r	Turn-On Rise Time		-	3.4	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	19	-	ns
t_f	Turn-Off Fall Time		-	12	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.34	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_{SD} = 0.5A,$ $T_J = 25^\circ C$	-	-	1.3	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0V, I_S = 0.5A,$ $di/dt = 100A/\mu s$	-	42	-	ns
Q_{rr}	Reverse Recovery Charge		-	41	-	nC

Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

2. Guaranteed by design, not subject to production

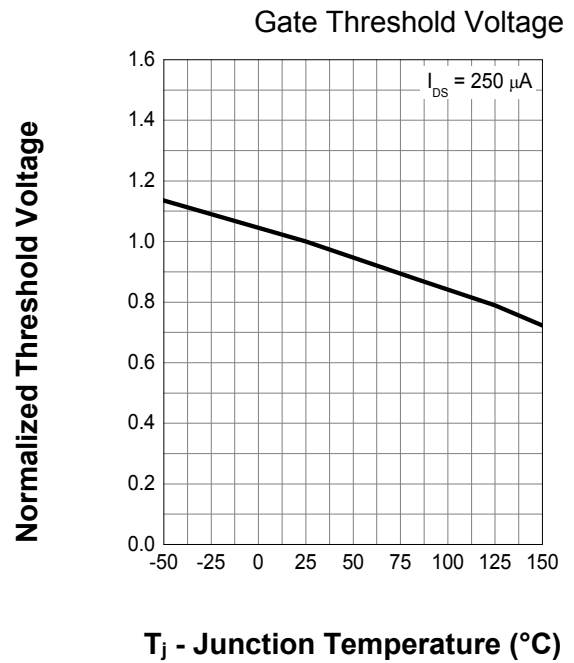
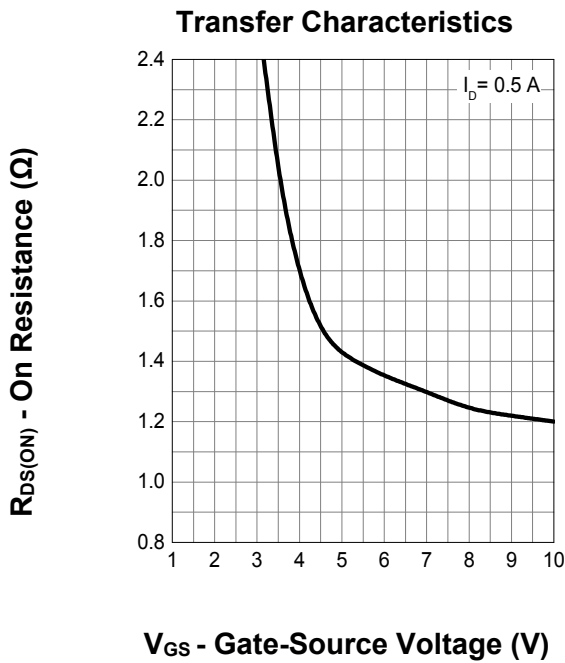
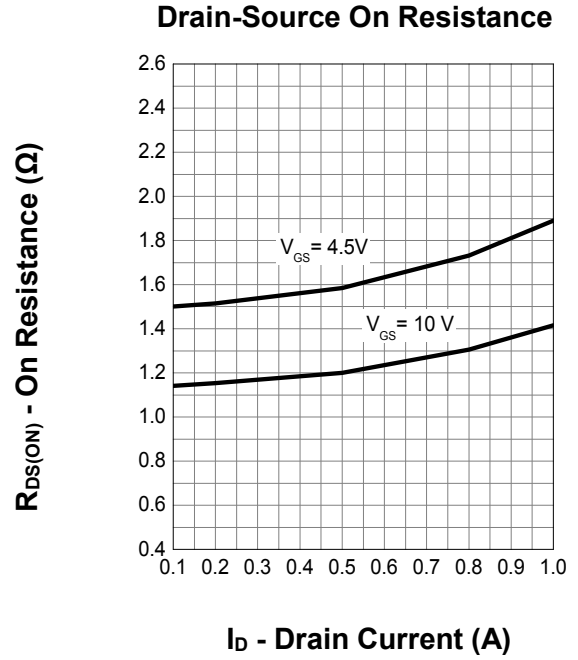
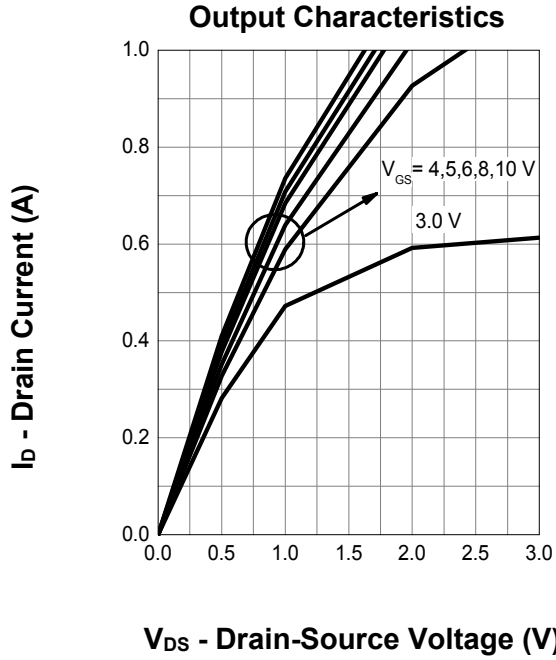
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TYPICAL PERFORMANCE CHARACTERISTICS



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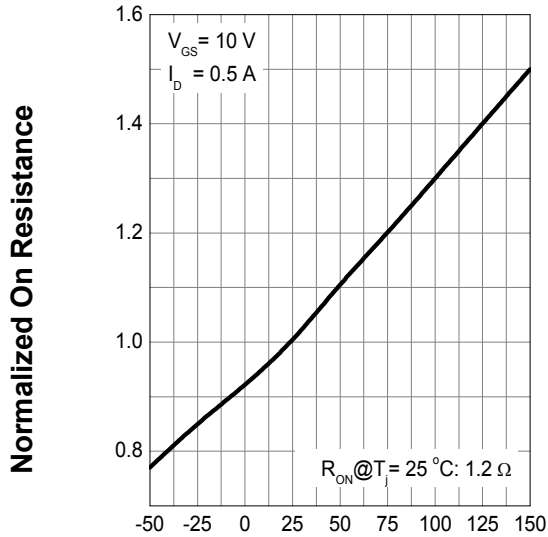
TYPICAL PERFORMANCE CHARACTERISTICS (cont.)



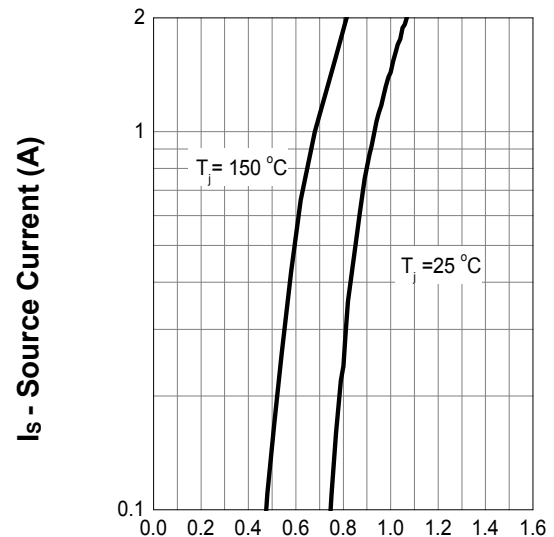
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TYPICAL PERFORMANCE CHARACTERISTICS (cont.)

Drain-Source On Resistance



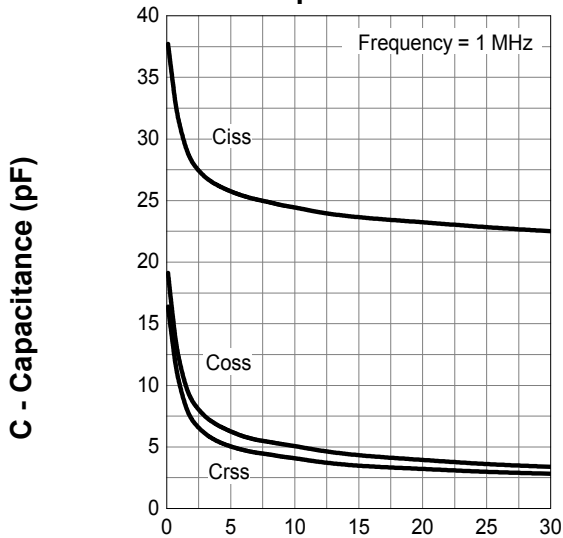
Source-Drain Diode Forward



T_j - Junction Temperature ($^{\circ}\text{C}$)

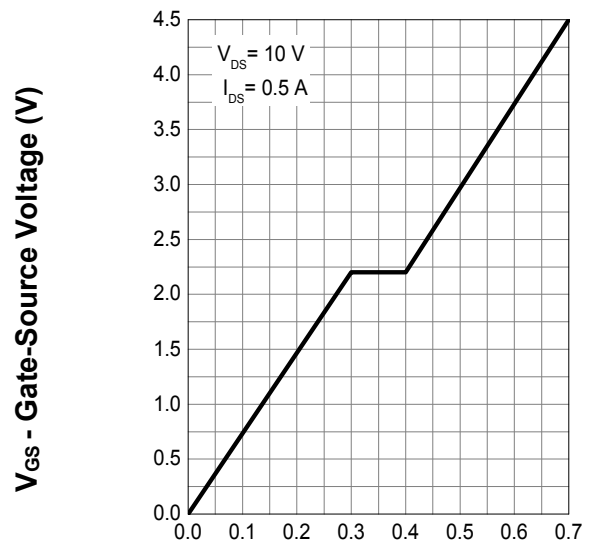
V_{SD} - Source-Drain Voltage (V)

Capacitance



V_{DS} - Drain-Source Voltage (V)

Gate Charge

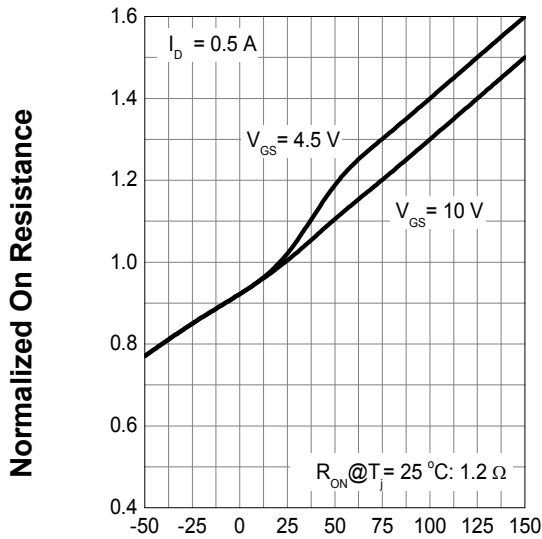


Q_G - Gate Charge (pC)

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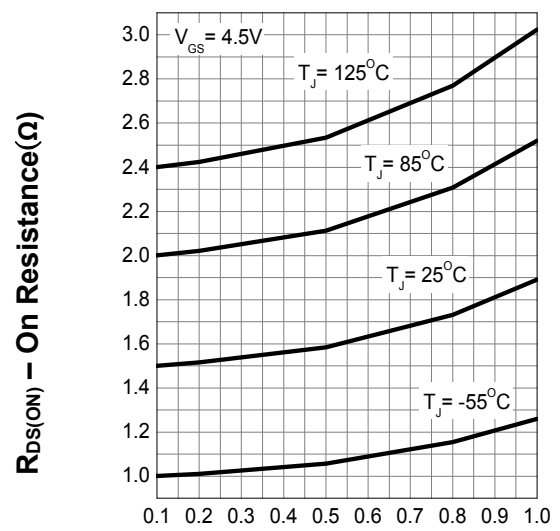
TYPICAL PERFORMANCE CHARACTERISTICS (cont.)

Drain-Source On Resistance



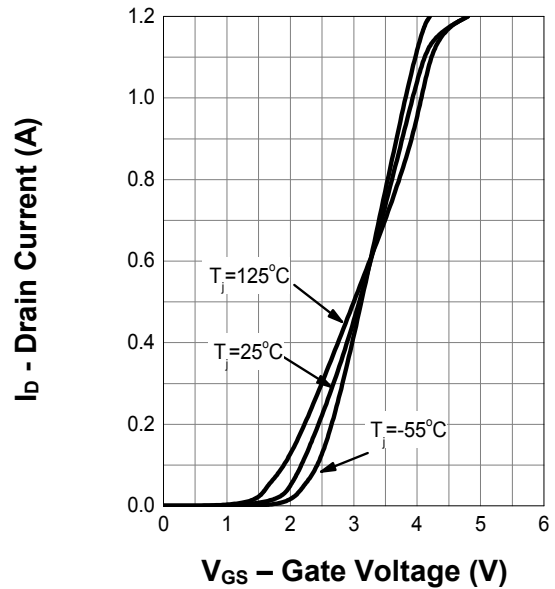
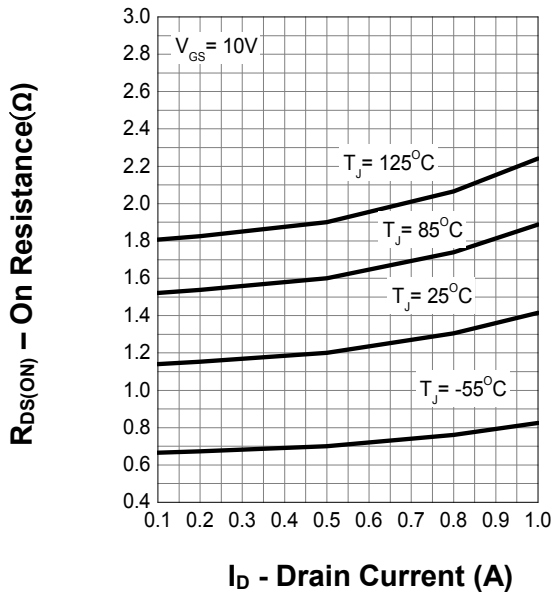
$T_J - \text{Junction Temperature } (^\circ\text{C})$

Drain-Source On Resistance



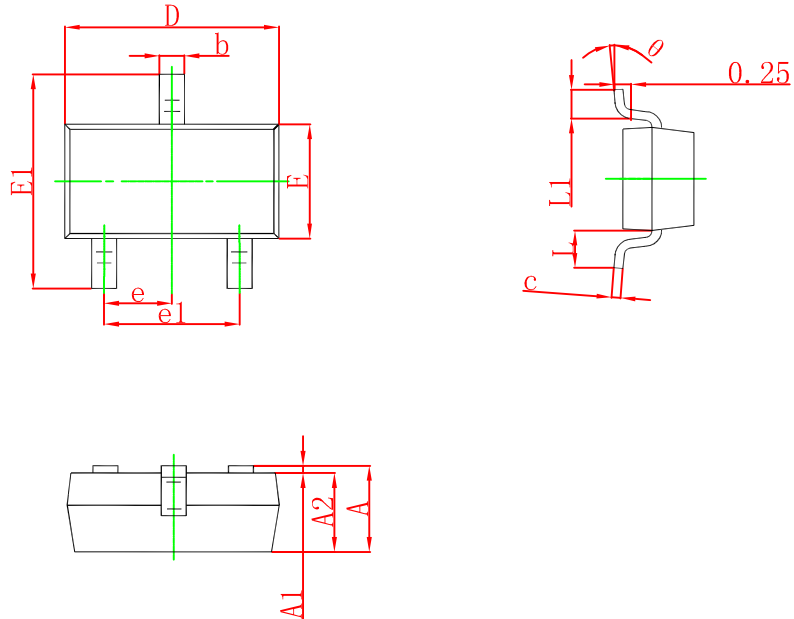
$I_D - \text{Drain Current (A)}$

Drain-Source On Resistance



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SOT-23 PACKAGE OUTLINE DRAWING



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°