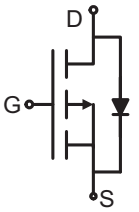
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM03P30S2E

P-Channel Enhancement Mode Power MOSFET

Description

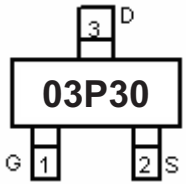
The RM03P30S2E uses advanced trench technology to provide excellent $R_{DS(ON)}$.



Schematic Diagram

General Features

- V_{DS} =- 30V,I_D =- 0.3A
  $R_{DS(ON)}$ <2.9 Ω @ V_{GS}=-2.5V
  $R_{DS(ON)}$ < 2.5Ω @ V_{GS}=-4.5V



Marking and Pin Assignment

Application

- Portable appliances
- Load switch appliances
- Halogen-free
- ESD≥2000V(HBM)

SOT23

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
03P30	RM03P30S2E	SOT23	Ø180mm	8mm	3000units

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous	I_D	-0.3	A
Drain Current-Pulsed (Note 1)	I_{DM}	-1	A
Total Power Dissipation	P_{tot} (FR4 PCB)	350	mW
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

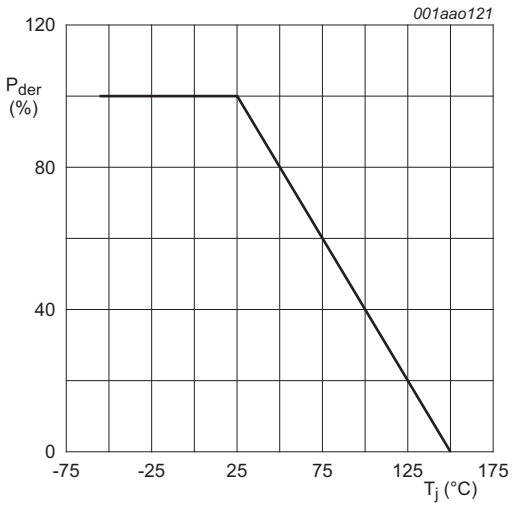
2019-08
REV:A

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±8V,V_{DS} =0V	-	-	±10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-0.4	-0.7	-1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}= -4.5V, I_D= -0.5A	-	1.7	2.5	Ω
		V_{GS}= -2.5V, I_D= - 0.2A	-	2	2.9	Ω
Forward Transconductance	g_{FS}	V_{DS}=-10V,I_D=-0.2A	-	0.16	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	31	46	PF
Output Capacitance	C_{oss}		-	6.5	-	PF
Reverse Transfer Capacitance	C_{rss}		-	2.3	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-20V, R_L=250Ω, V_{GS}=-4.5V,R_G=6Ω	-	19	38	nS
Turn-on Rise Time	t_r		-	30	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	65	130	nS
Turn-Off Fall Time	t_f		-	38	-	nS
Total Gate Charge	Q_g	V_{DS}=-30,I_D=-20A, V_{GS}=-10V	-	0.55	0.72	nC
Gate-Source Charge	Q_{gs}		-	0.23	-	nC
Gate-Drain Charge	Q_{gd}		-	0.09	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-0.5A	-	0.8	1.3	V

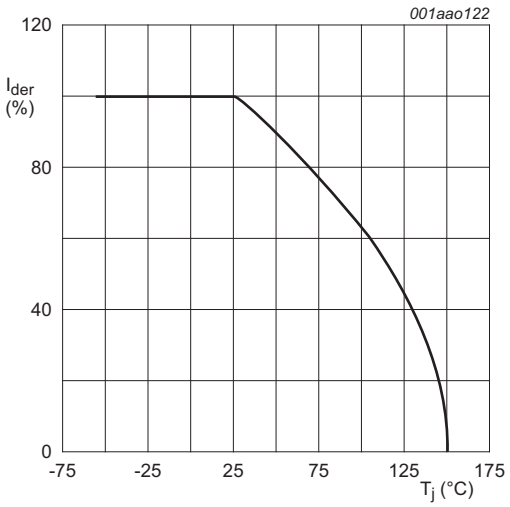
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: Tj=25℃,V_{DD}=-30V,V_G=-10V,L=1mH,Rg=25Ω,I_{AS}=38A



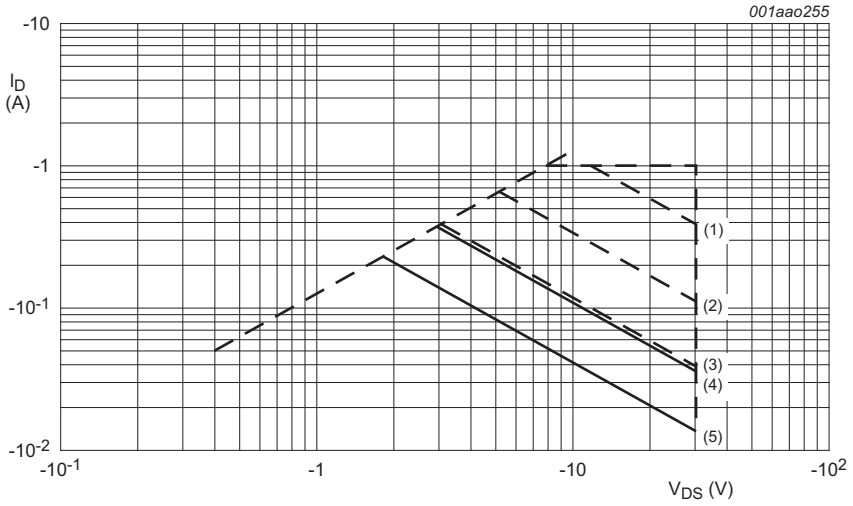
$$P_{der} = \frac{P_{tot}}{P_{tot(25°C)}} \times 100\,\%$$

Fig 1. Normalized total power dissipation as a function of junction temperature



$$I_{der} = \frac{I_D}{I_{D(25°C)}} \times 100\,\%$$

Fig 2. Normalized continuous drain current as a function of junction temperature



I_{DM} is a single pulse

(1) t_p = 1 ms

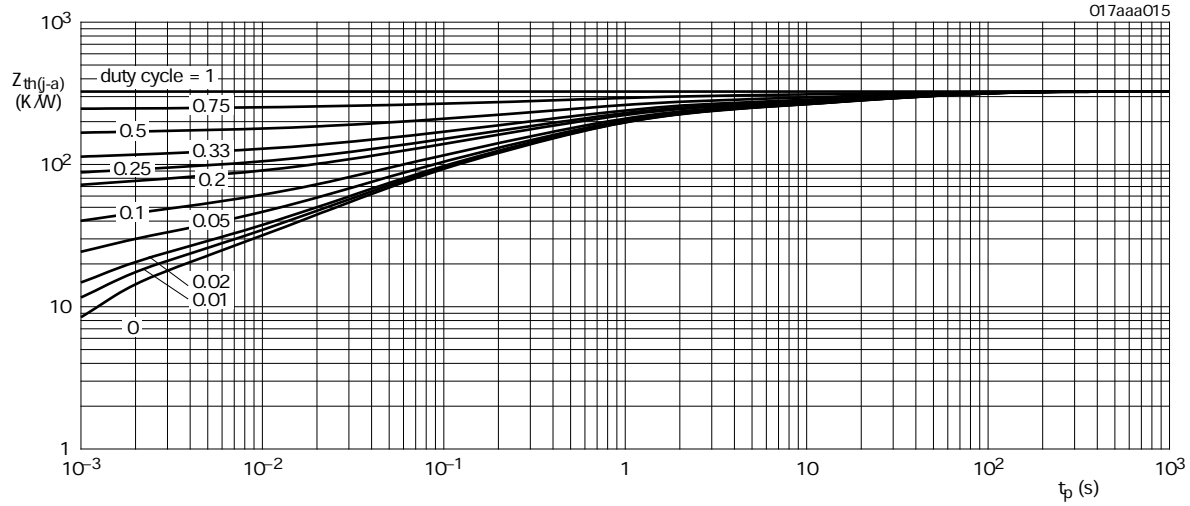
(2) t_p = 10 ms

(3) t_p = 100 ms

(4) DC; T_{sp} = 25 °C

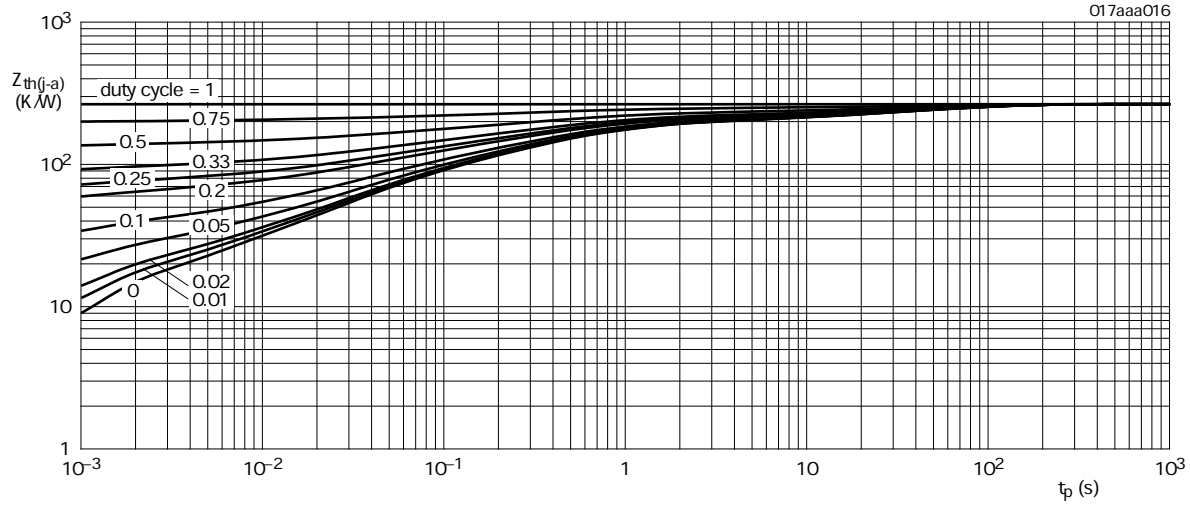
(5) DC; T_{amb} = 25 °C; 1 cm^2 drain mounting pad

Fig 3. Safe operating area; junction to ambient; continuous and peak drain currents as a function of drain-source voltage



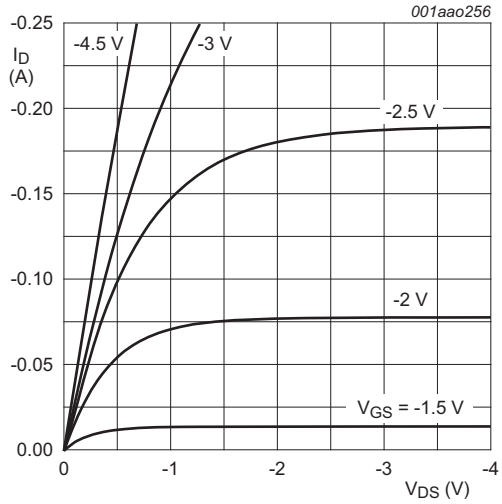
FR4 PCB, standard footprint

Fig 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



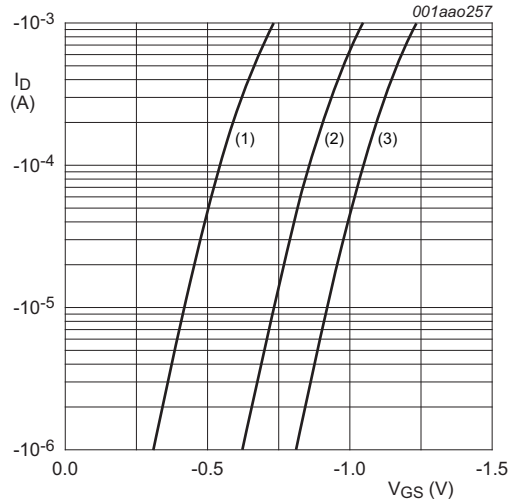
FR4 PCB, mounting pad for drain 1 cm^2

Fig 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



T_j = 25 °C

Fig 6. Output characteristics: drain current as a function of drain-source voltage; typical values



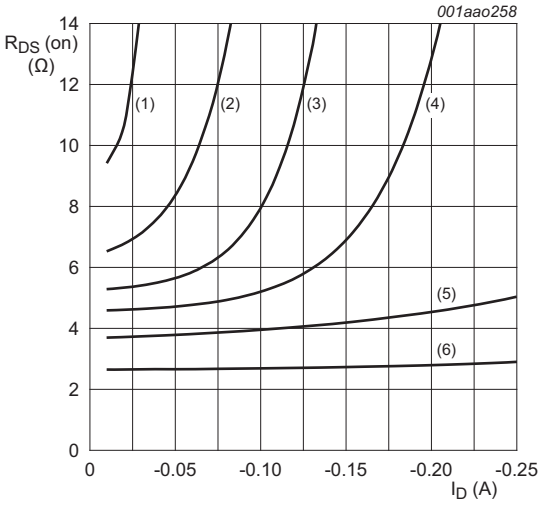
T_j = 25 °C; V_{DS} = -5 V

(1) minimum values

(2) typical values

(3) maximum values

Fig 7. Sub-threshold drain current as a function of gate-source voltage



T_j = 25 °C

(1) V_{GS} = -1.75 V

(2) V_{GS} = -2.0 V

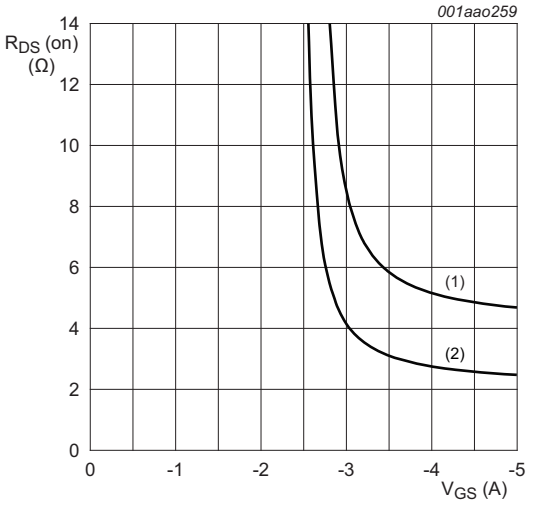
(3) V_{GS} = -2.25 V

(4) V_{GS} = -2.5 V

(5) V_{GS} = -3.0 V

(6) V_{GS} = -4.5 V

Fig 8. Drain-source on-state resistance as a function of drain current; typical values

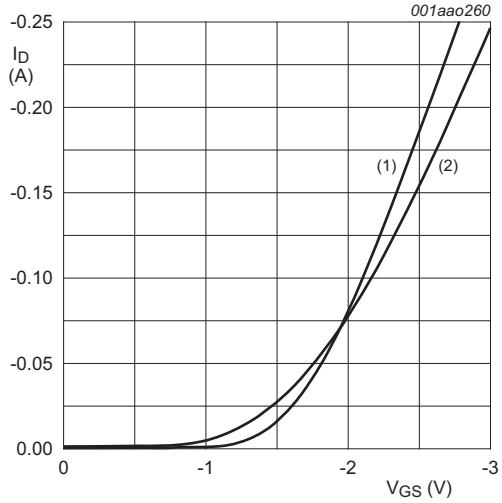


I_D = -200 mA

(1) T_j = 150 °C

(2) T_j = 25 °C

Fig 9. Drain-source on-state resistance as a function of gate-source voltage; typical values

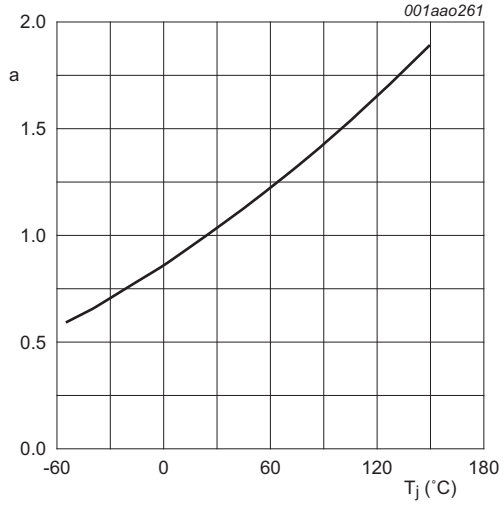


$V_{DS} > I_D \times R_{DSon}$

(1) T_j = 25 °C

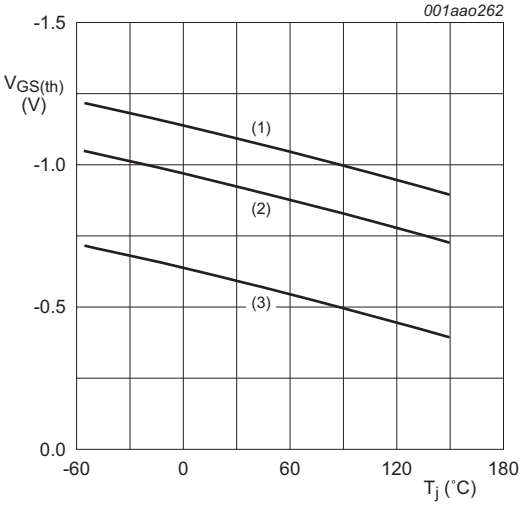
(2) T_j = 150 °C

Fig 10. Transfer characteristics: drain current as a function of gate-source voltage; typical values



$$a = \frac{R_{DSon}}{R_{DSon(25°C)}}$$

Fig 11. Normalized drain-source on-state resistance as a function of junction temperature; typical values



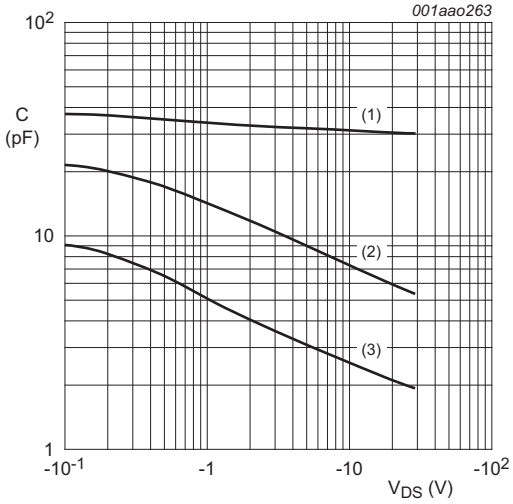
I_D = -0.25 mA; $V_{DS} = V_{GS}$

(1) maximum values

(2) typical values

(3) minimum values

Fig 12. Gate-source threshold voltage as a function of junction temperature



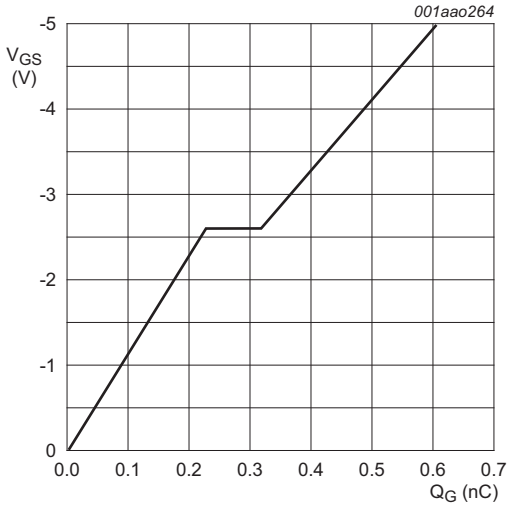
f = 1 MHz; V_{GS} = 0 V

(1)C_{iss}

(2)C_{oss}

(3)C_{rss}

Fig 13. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical



I_D = -200 mA; V_{DS} = -15 V; T_{amb} = 25 °C

Fig 14. Gate-source voltage as a function of gate charge; typical values

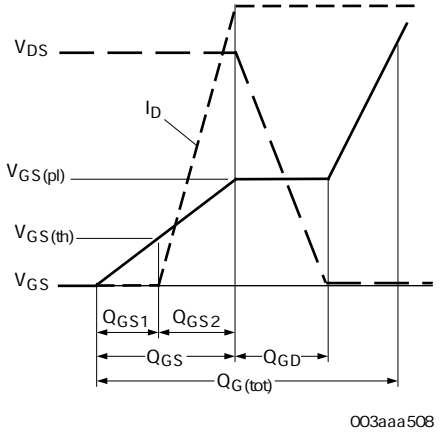
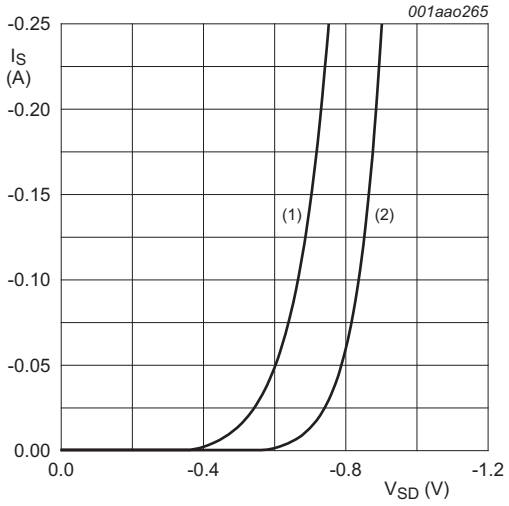


Fig 15. Gate charge waveform definitions



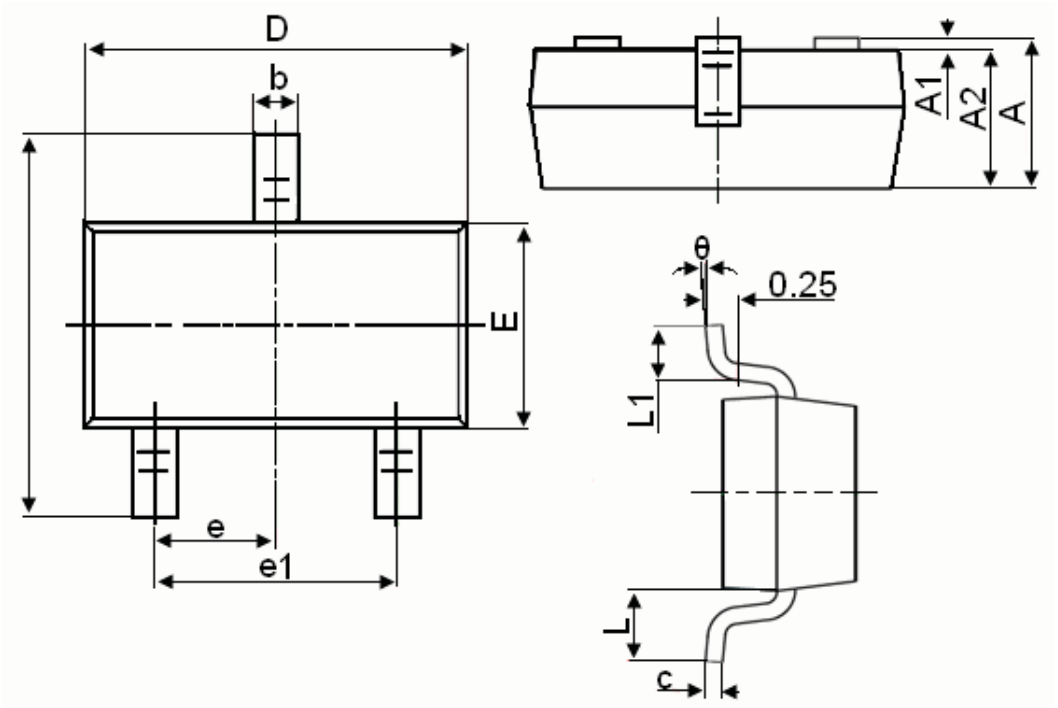
V_{GS} = 0 V

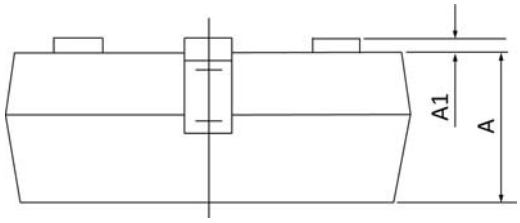
(1) T_j = 150 °C

(2) T_j = 25 °C

Fig 16. Source current as a function of source-drain voltage; typical values

SOT-23 Package Information





Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Notes

1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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