

## 2SJ540

Silicon P Channel MOS FET

REJ03G0887-0400

Rev.4.00

Jun 05, 2006

### Description

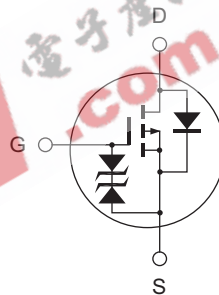
High speed power switching

### Features

- Low on-resistance  
 $R_{DS(on)} = 0.11 \Omega$  typ.
- Low drive current
- 4 V gate drive devices
- High speed switching

### Outline

RENESAS Package code: PRSS0004AC-A  
(Package name: TO-220AB)



1. Gate
2. Drain (Flange)
3. Source

## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V <sub>DSS</sub>	-60	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	I <sub>D</sub>	-12	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	-48	A
Body to drain diode reverse drain current	I <sub>DR</sub>	-12	A
Avalanche current	I <sub>AP</sub> <sup>Note 3</sup>	-12	A
Avalanche energy	E <sub>AR</sub> <sup>Note 3</sup>	12	mJ
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	50	W
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

- Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%  
 2. Value at T<sub>c</sub> = 25°C  
 3. Value at T<sub>ch</sub> = 25°C, R<sub>g</sub> ≥ 50 Ω

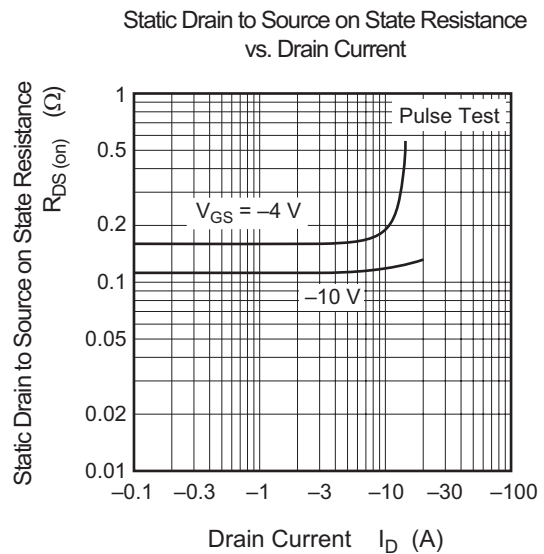
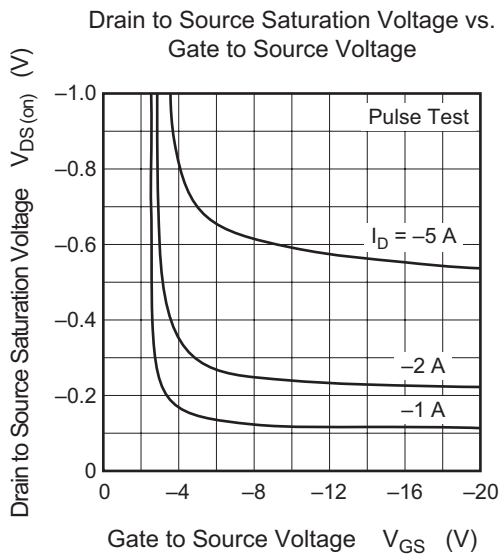
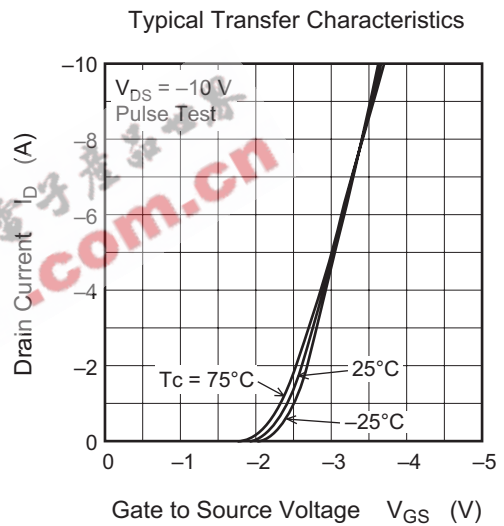
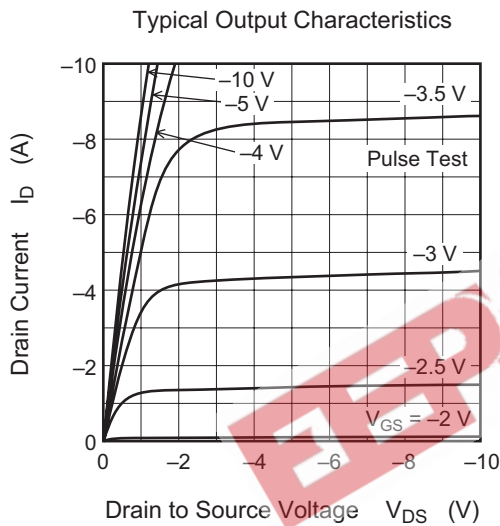
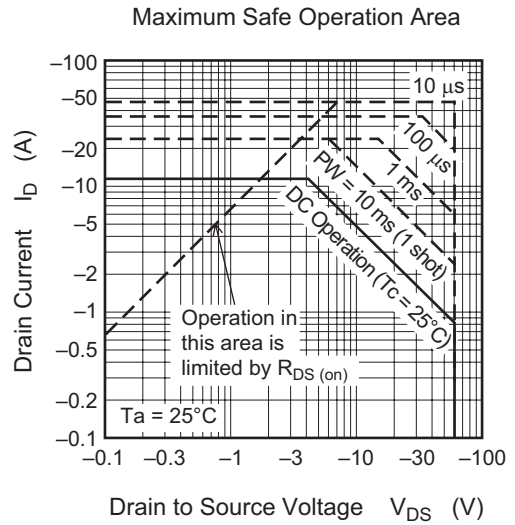
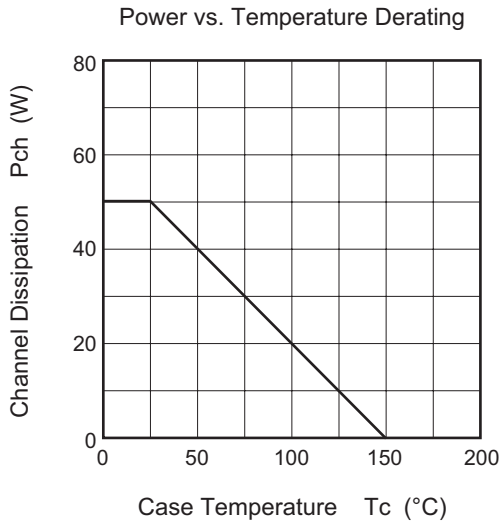
## Electrical Characteristics

(Ta = 25°C)

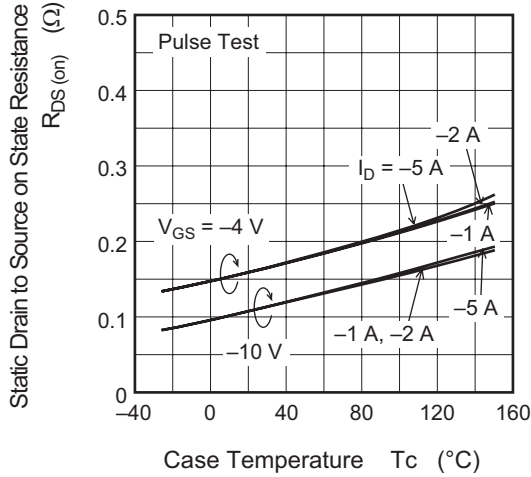
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V <sub>(BR) DSS</sub>	-60	—	—	V	I <sub>D</sub> = -10 mA, V <sub>GS</sub> = 0
Gate to source breakdown voltage	V <sub>(BR) GSS</sub>	±20	—	—	V	I <sub>G</sub> = ±100 μA, V <sub>DS</sub> = 0
Zero gate voltage drain current	I <sub>DSS</sub>	—	—	-10	μA	V <sub>DS</sub> = -60 V, V <sub>GS</sub> = 0
Gate to source leak current	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0
Gate to source cutoff voltage	V <sub>GS (off)</sub>	-1.0	—	-2.0	V	I <sub>D</sub> = -1 mA, V <sub>DS</sub> = -10 V
Static drain to source on state resistance	R <sub>DS (on)</sub>	—	0.11	0.15	Ω	I <sub>D</sub> = -6 A, V <sub>GS</sub> = -10 V <sup>Note 4</sup>
	R <sub>DS (on)</sub>	—	0.16	0.23	Ω	I <sub>D</sub> = -6 A, V <sub>GS</sub> = -4 V <sup>Note 4</sup>
Forward transfer admittance	y <sub>fs</sub>	5	8	—	S	I <sub>D</sub> = -6 A, V <sub>DS</sub> = -10 V <sup>Note 4</sup>
Input capacitance	C <sub>iSS</sub>	—	580	—	pF	V <sub>DS</sub> = -10 V
Output capacitance	C <sub>oSS</sub>	—	300	—	pF	V <sub>GS</sub> = 0
Reverse transfer capacitance	C <sub>rss</sub>	—	85	—	pF	f = 1 MHz
Turn-on delay time	t <sub>d (on)</sub>	—	10	—	ns	V <sub>GS</sub> = -10 V
Rise time	t <sub>r</sub>	—	55	—	ns	I <sub>D</sub> = -6 A
Turn-off delay time	t <sub>d (off)</sub>	—	85	—	ns	R <sub>L</sub> = 6 Ω
Fall time	t <sub>f</sub>	—	60	—	ns	
Body to drain diode forward voltage	V <sub>DF</sub>	—	-1.2	—	V	I <sub>F</sub> = -12 A, V <sub>GS</sub> = 0
Body to drain diode reverse recovery time	t <sub>rr</sub>	—	60	—	ns	I <sub>F</sub> = -12 A, V <sub>GS</sub> = 0 di <sub>F</sub> /dt = 50 A/μs

- Note: 4. Pulse test

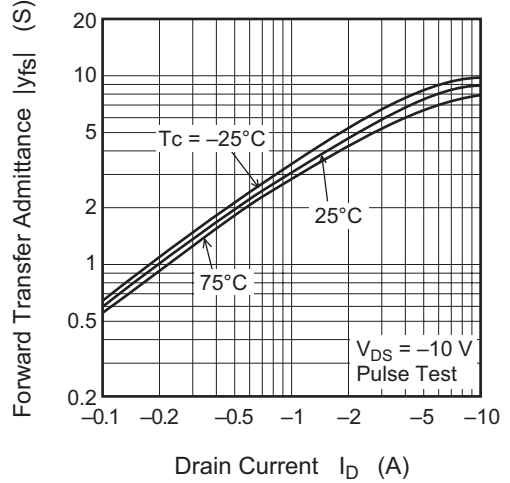
Main Characteristics



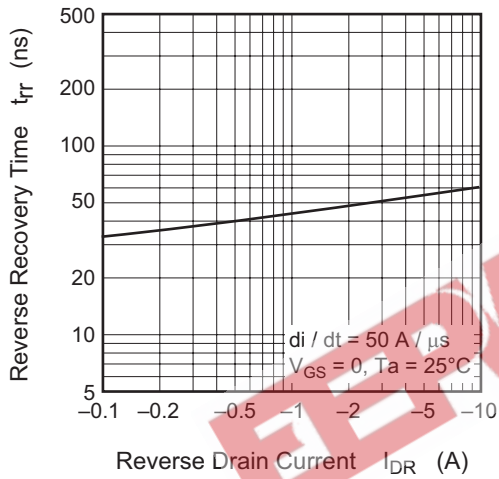
Static Drain to Source on State Resistance vs. Temperature



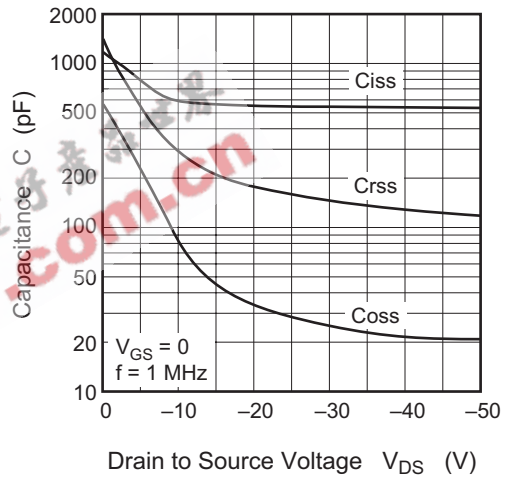
Forward Transfer Admittance vs. Drain Current



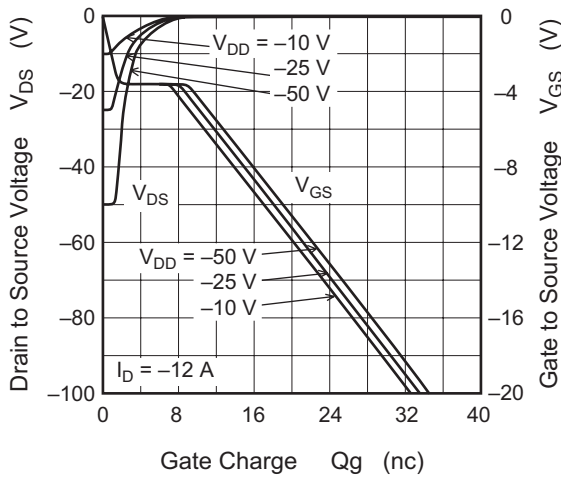
Body-Drain Diode Reverse Recovery Time



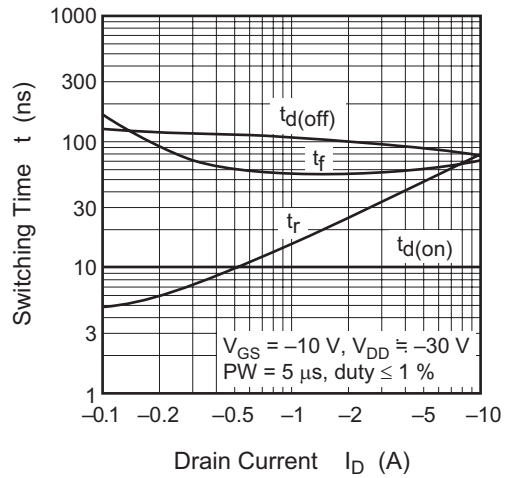
Typical Capacitance vs. Drain to Source Voltage

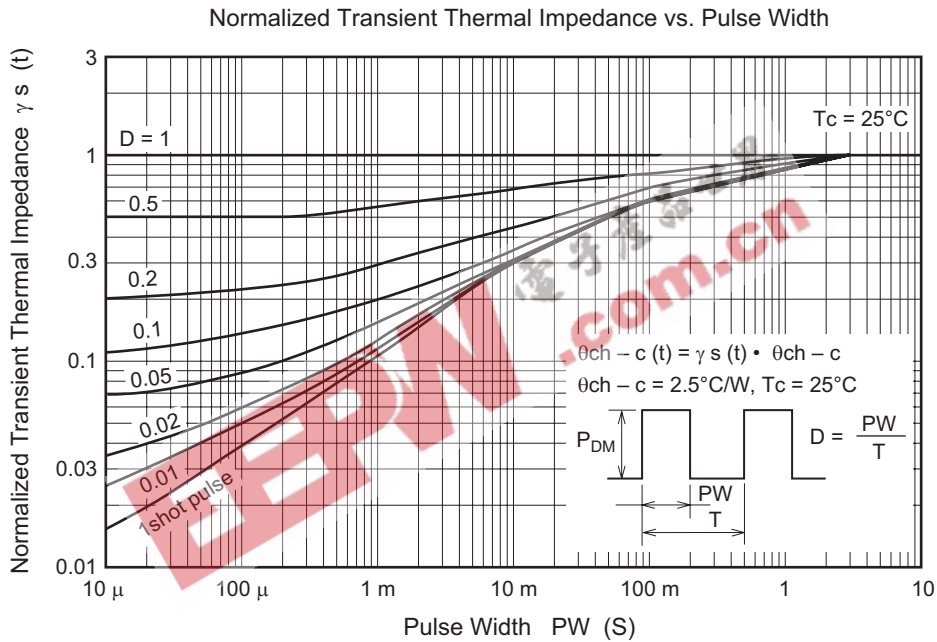
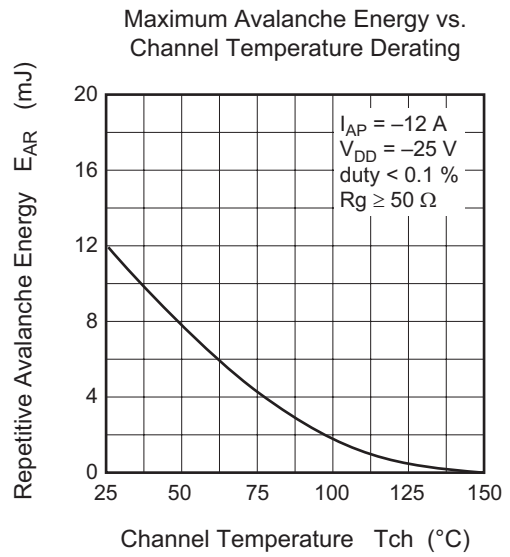
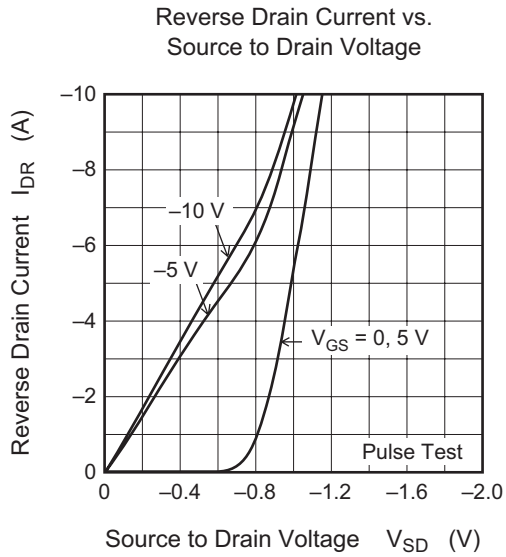


Dynamic Input Characteristics

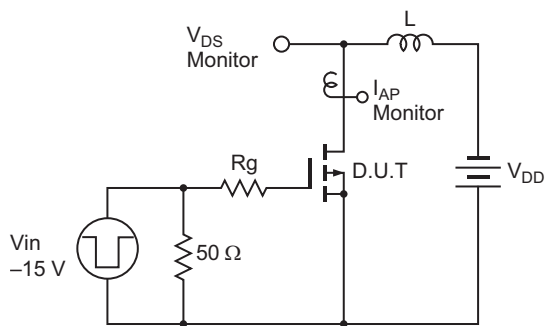


Switching Characteristics



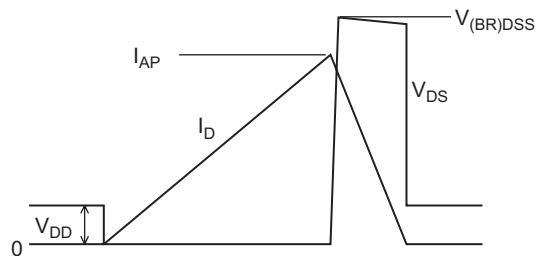


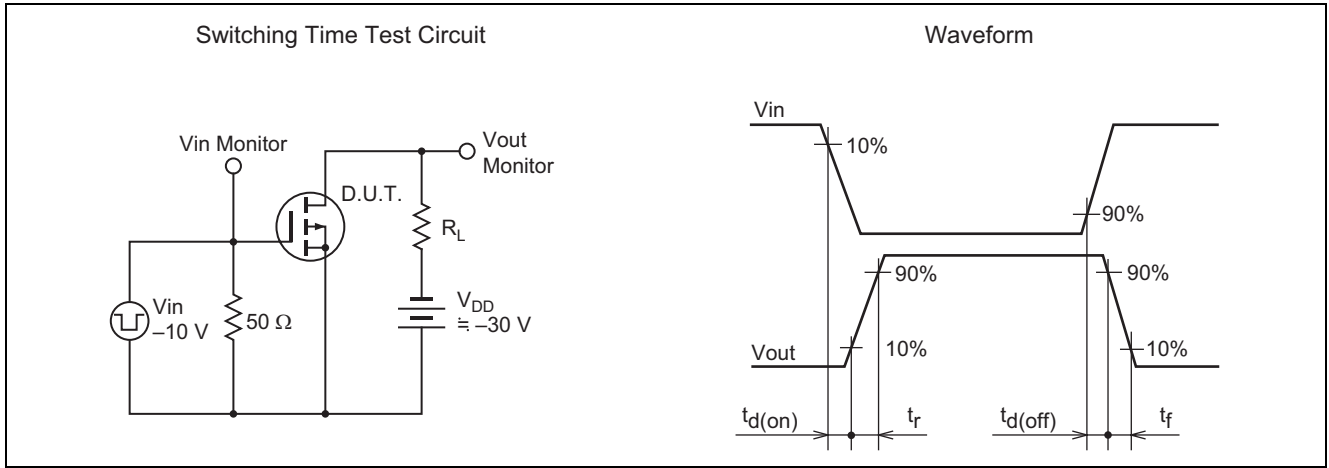
Avalanche Test Circuit



Avalanche Waveform

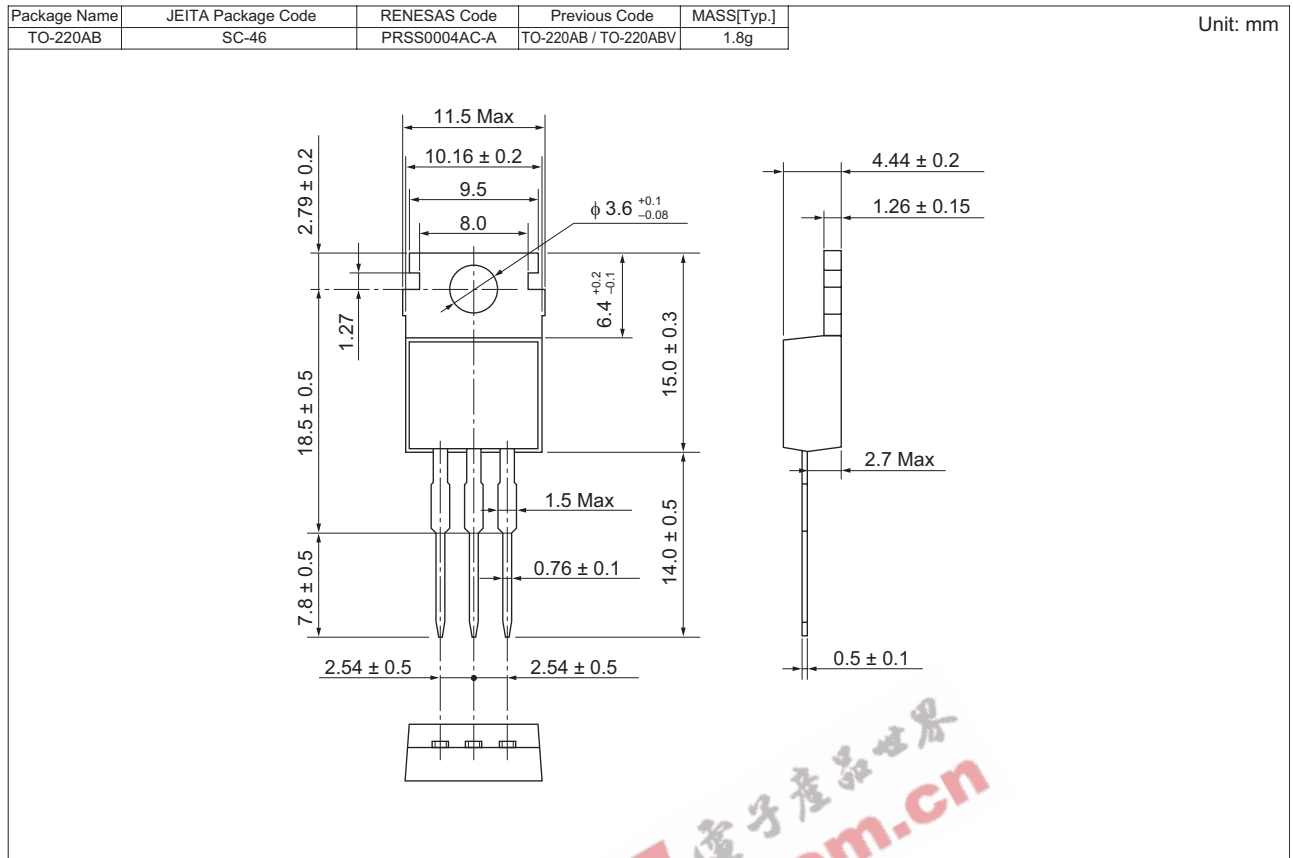
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$





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## Package Dimensions



## Ordering Information

Part Name	Quantity	Shipping Container
2SJ540-E	500 pcs	Box (Sack)

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