

2SK3142

Silicon N Channel MOS FET
High Speed Power Switching

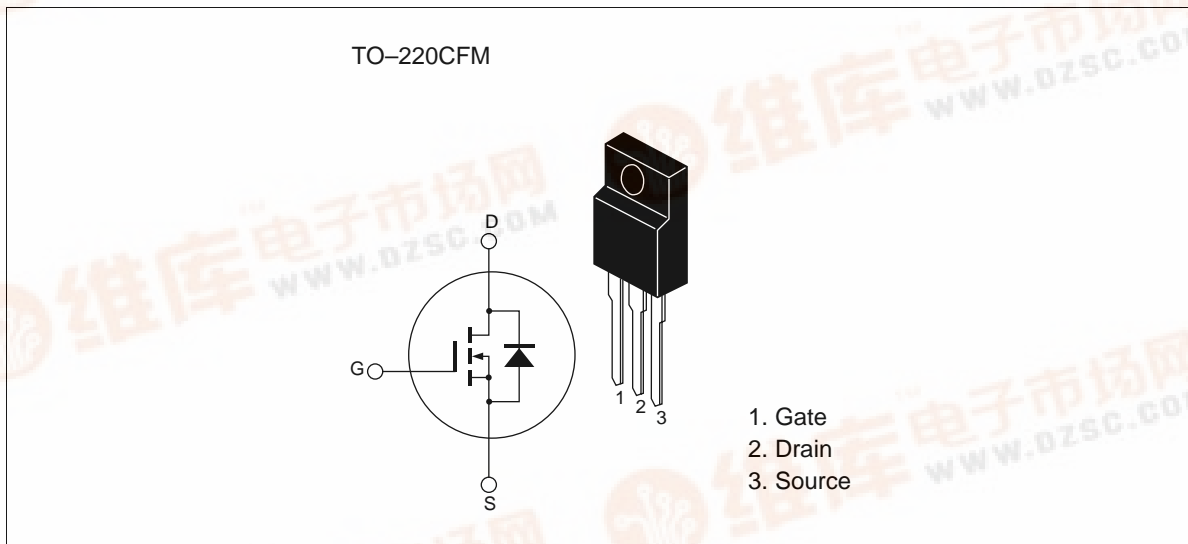
HITACHI

ADE-208-681A (Z)
2nd. Edition
February 1999

Features

- Low on-resistance
 $R_{DS(on)} = 4 \text{ m}\Omega$ typ.
- Low drive current
- 4 V gate drive device can be driven from 5 V source

Outline



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Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	30	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	60	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	240	A
Body-drain diode reverse drain current	I_{DR}	60	A
Avalanche current	I_{AP} ^{Note 3}	35	A
Avalanche energy	E_{AR} ^{Note 3}	122	mJ
Channel dissipation	P_{ch} ^{Note 2}	35	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

- Note: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$
2. Value at $T_c = 25^\circ C$
3. Value at $T_{ch} = 25^\circ C$, $R_g \geq 50 \Omega$

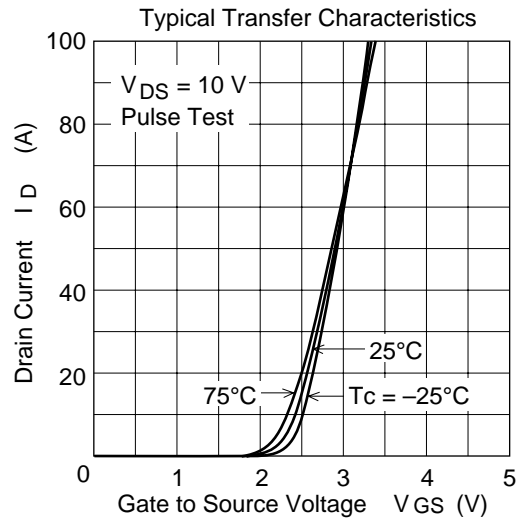
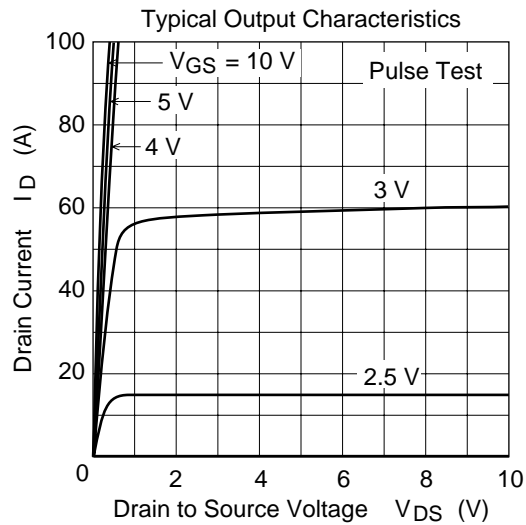
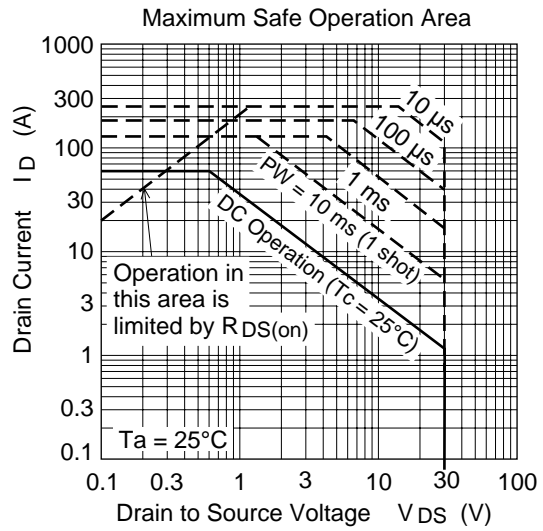
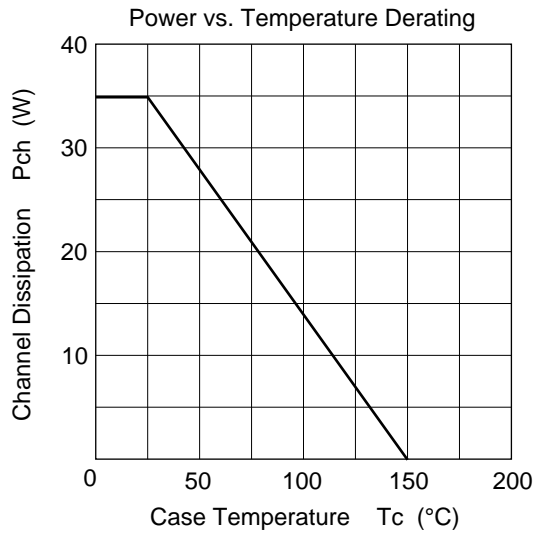
Electrical Characteristics (Ta = 25°C)

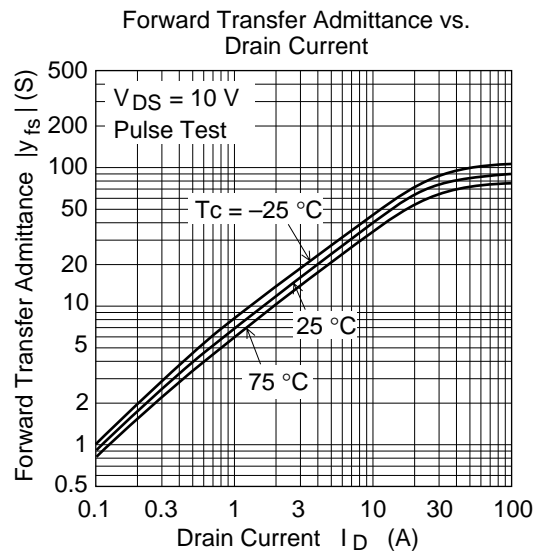
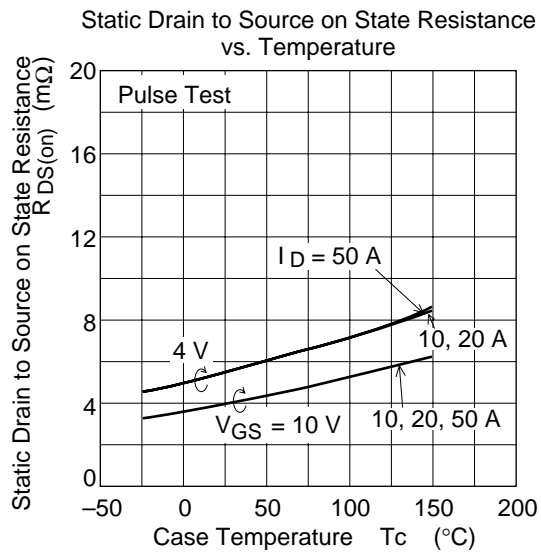
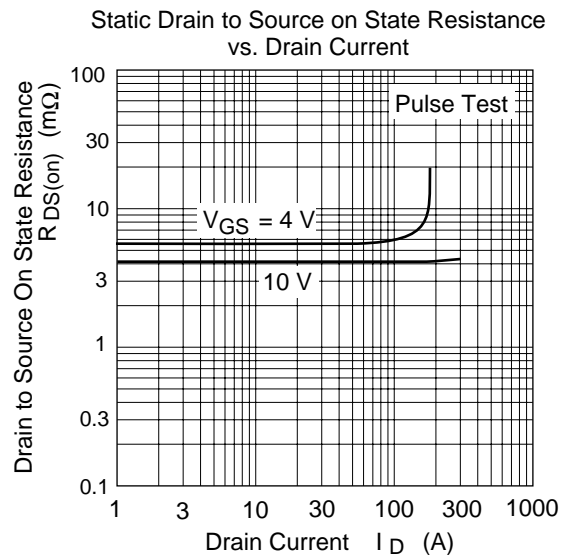
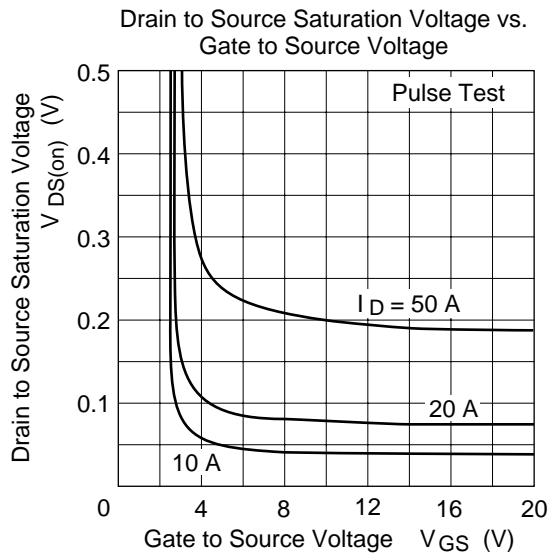
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$ ^{Note 1}
Static drain to source on state resistance	$R_{DS(on)}$	—	4.0	5.0	$\text{m}\Omega$	$I_D = 30 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 1}
		—	5.5	8.5	$\text{m}\Omega$	$I_D = 30 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note 1}
Forward transfer admittance	$ y_{fs} $	45	75	—	S	$I_D = 30 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 1}
Input capacitance	C_{iss}	—	6800	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	1550	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	500	—	pF	$f = 1\text{MHz}$
Total gate charge	Q_g	—	130	—	nc	$V_{DD} = 10 \text{ V}$
Gate to source charge	Q_{gs}	—	16	—	nc	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	30	—	nc	$I_D = 60 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	50	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 30 \text{ A}$
Rise time	t_r	—	340	—	ns	$R_L = 0.33 \Omega$
Turn-off delay time	$t_{d(off)}$	—	560	—	ns	
Fall time	t_f	—	350	—	ns	
Body-drain diode forward voltage	V_{DF}	—	1.0	—	V	$I_F = 60 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	70	—	ns	$I_F = 60 \text{ A}$, $V_{GS} = 0$ $diF/dt = 50 \text{ A}/\mu\text{s}$

Note: 1. Pulse test

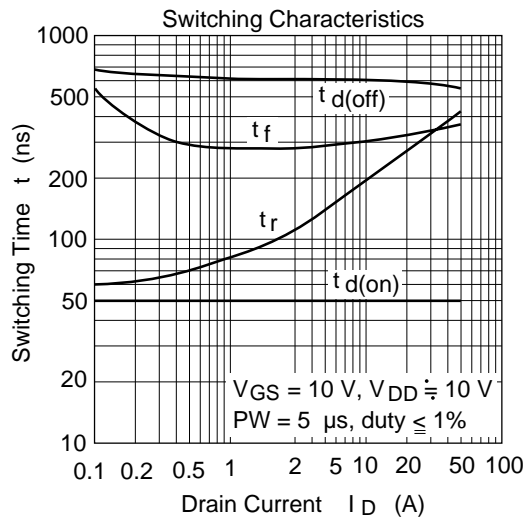
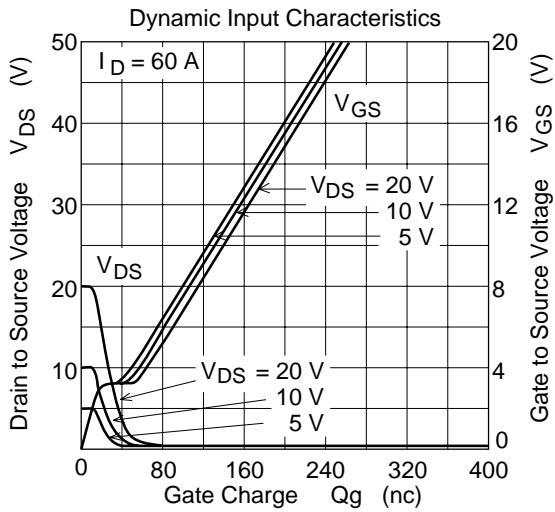
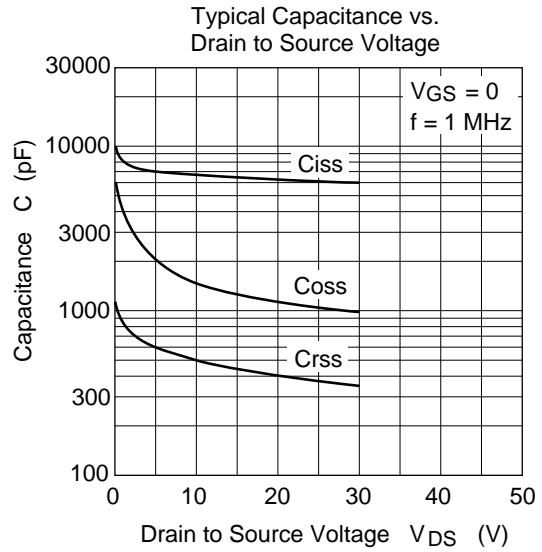
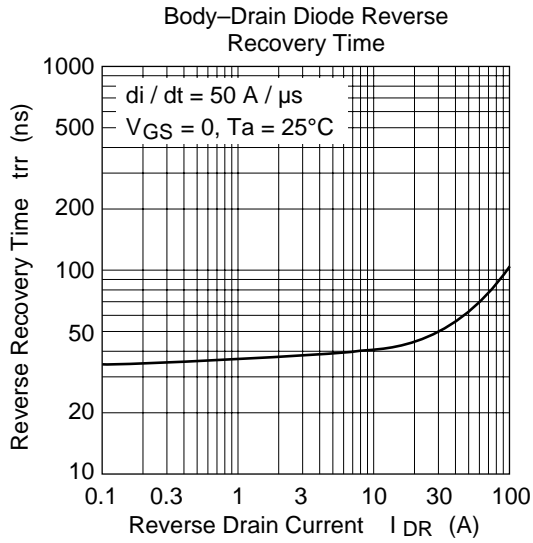
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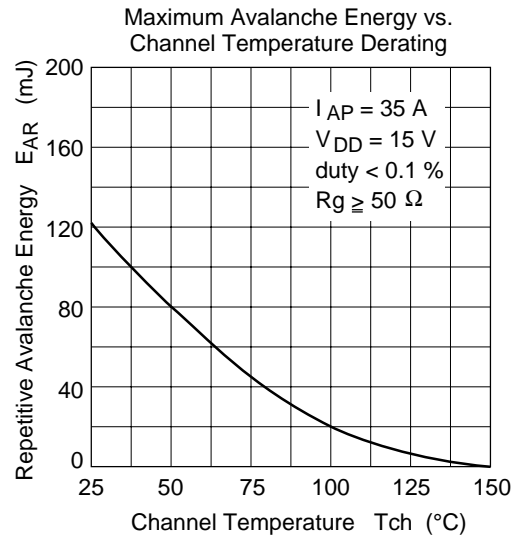
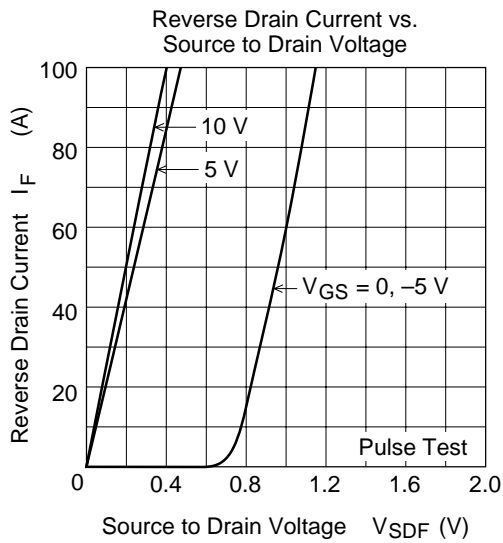
Main Characteristics



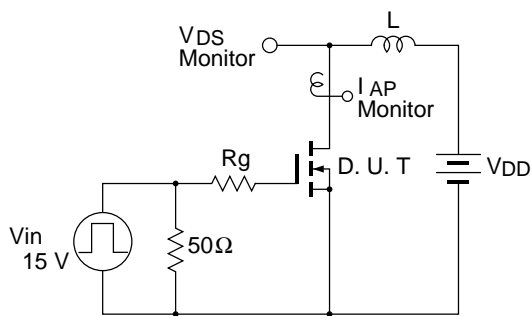


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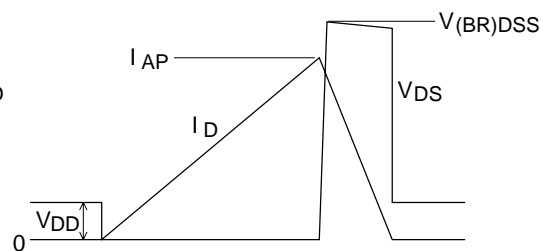


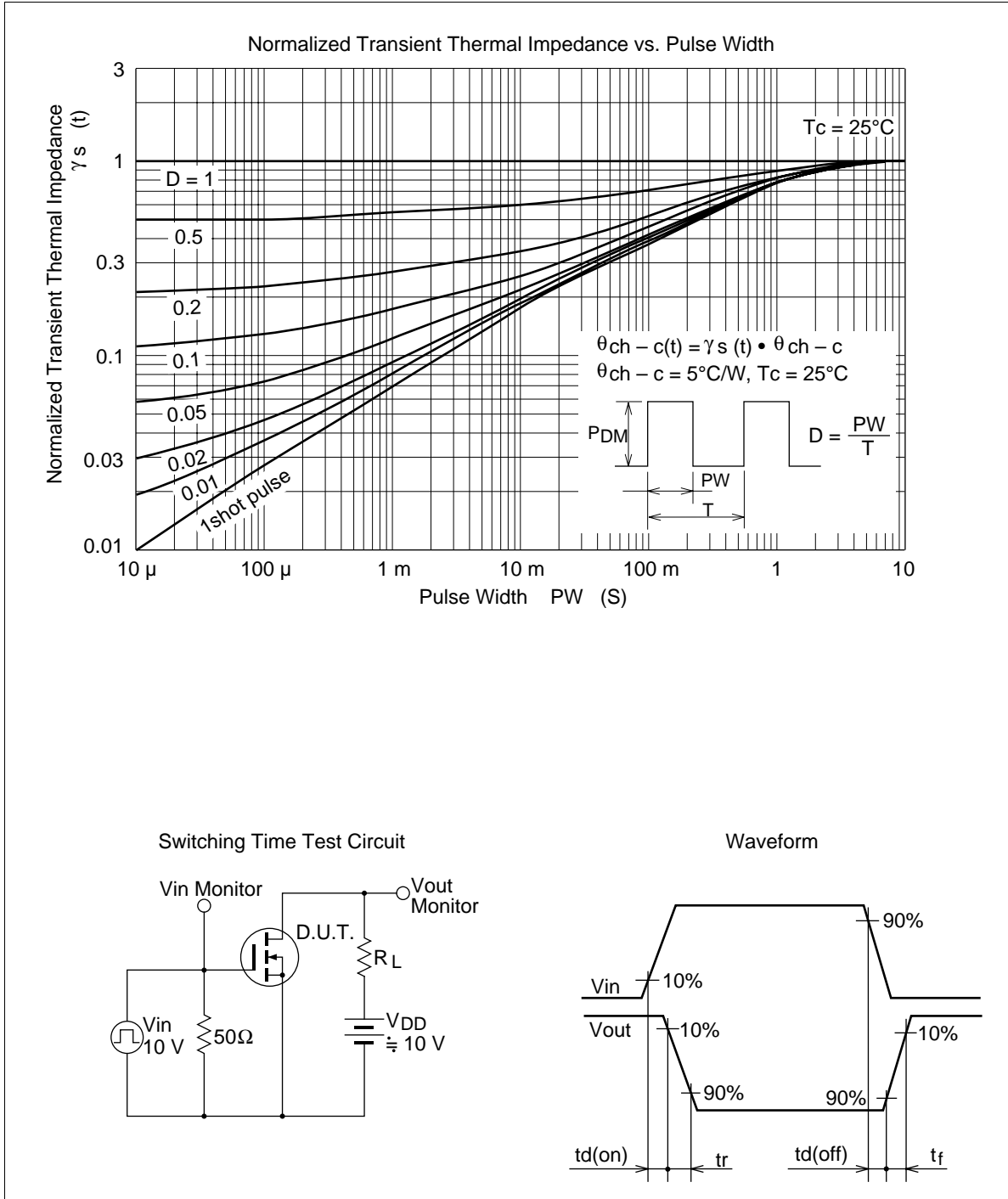
Avalanche Test Circuit



Avalanche Waveform

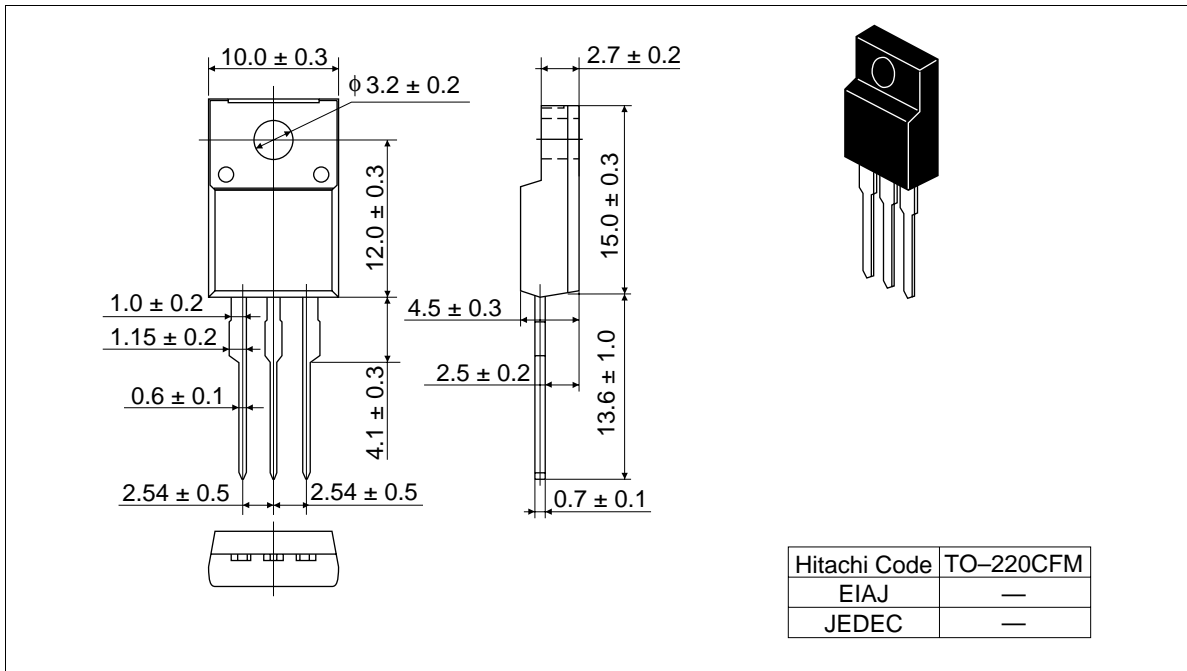
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$





Package Dimensions

Unit: mm



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