

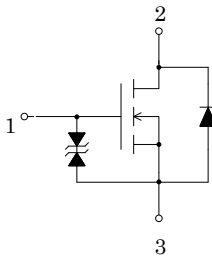
### Features

- Low on-resistance
- Built-in gate protection diode

### Applications

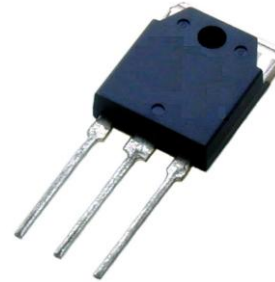
- Electric power steering
- High current switching

### Internal Equivalent Circuit



### Package

TO-3P



### Key Specifications

- $V_{(BR)DSS} = 60V$  ( $I_D=100\mu A$ )
- $R_{DS(ON)} = 4.8m\Omega$  max. ( $V_{GS}=10V, I_D=35A$ )
- $R_{DS(ON)} = 6.0m\Omega$  max. ( $V_{GS}=8V, I_D=35A$ )

### Absolute maximum ratings

( $T_a=25^\circ C$ )

Characteristic	Symbol	Rating	Unit
Drain to Source Voltage	$V_{DSS}$	60	V
Gate to Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$\pm 100$	A
Pulsed Drain Current	$I_{D(pulse)}^{*1}$	$\pm 200$	A
Maximum Power Dissipation	$P_D$	132 ( $T_c=25^\circ C$ )	W
Single Pulse Avalanche Energy	$E_{AS}^{*2}$	400	mJ
Channel Temperature	$T_{ch}$	175	$^\circ C$
Storage Temperature	$T_{stg}$	-55 to +175	$^\circ C$

\*1  $PW \leq 100\mu sec.$  duty cycle  $\leq 1\%$

\*2  $V_{DD}=20V, L=1mH, I_L=20A,$  unclamped, See Fig.1

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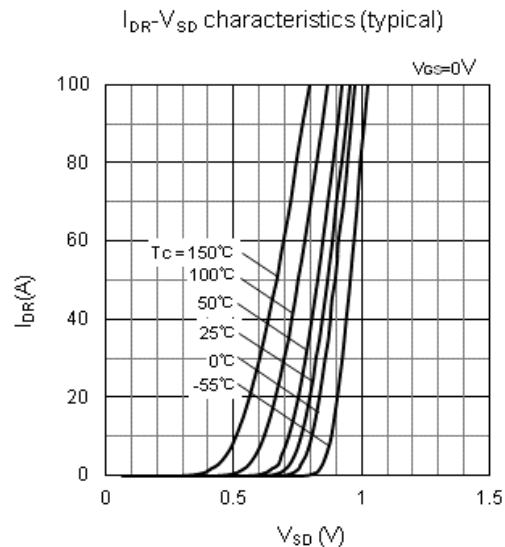
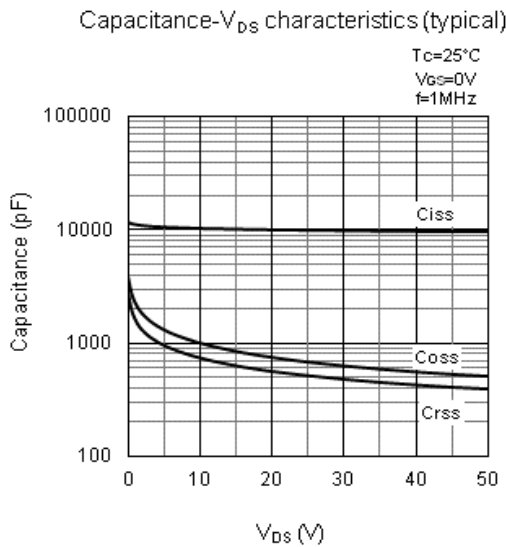
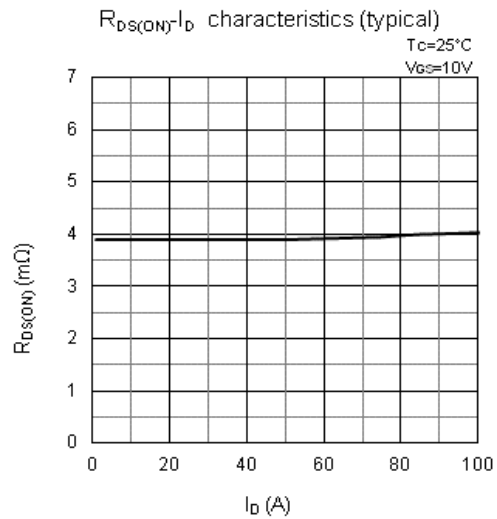
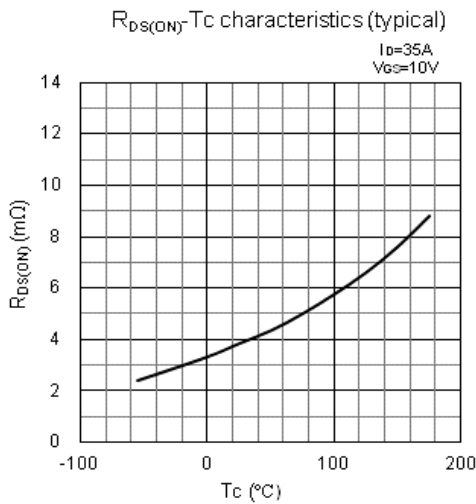
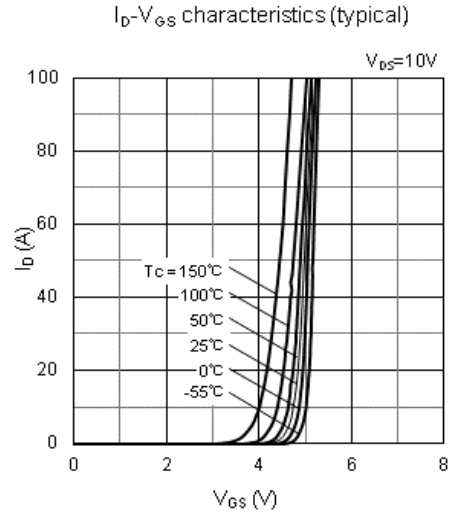
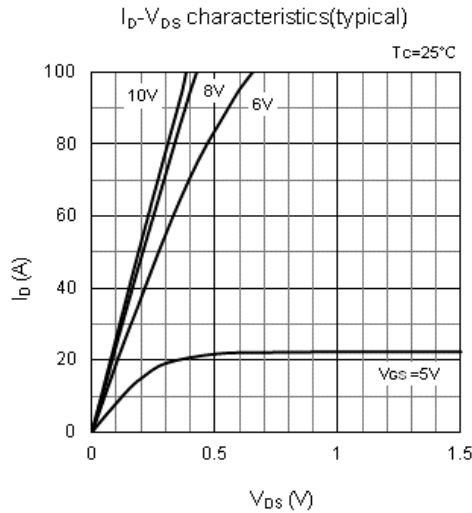
**Electrical characteristics**

(Ta=25°C)

Characteristic	Symbol	Test Conditions	Limits			Unit
			MIN	TYP	MAX	
Drain to Source breakdown Voltage	$V_{(BR)DSS}$	$I_D=100\mu A, V_{GS}=0V$	60			V
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 15V$			$\pm 10$	$\mu A$
Drain to Source Leakage Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			100	$\mu A$
Gate Threshold Voltage	$V_{TH}$	$V_{DS}=10V, I_D=1mA$	3.25	3.6	3.95	V
Forward Transconductance	$Re(yfs)$	$V_{DS}=10V, I_D=35A$	30	80		S
Static Drain to Source On-Resistance	$R_{DS(ON)}$	$I_D=35A, V_{GS}=10V$		3.8	4.8	m $\Omega$
Static Drain to Source On-Resistance	$R_{DS(ON)}$	$I_D=35A, V_{GS}=8V$		4.2	6.0	m $\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=10V$ $V_{GS}=0V$ $f=1MHz$	(8250)	10000	(11250)	pF
Output Capacitance	$C_{oss}$		(800)	1000	(1200)	
Reverse Transfer Capacitance	$C_{rss}$		(585)	730	(875)	
Turn-On Delay Time	$t_{d(on)}$	$I_D=40A$ $V_{DD} \approx 20V$ $R_G=30\Omega$ $R_L=0.5\Omega$ $V_{GS}=10V$ See Fig.2	(120)	160	(200)	ns
Rise Time	$t_r$		(290)	490	(690)	
Turn-Off Delay Time	$t_{d(off)}$		(240)	400	(500)	
Fall Time	$t_f$		(100)	200	(300)	
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_{SD}=50A,$ $V_{GS}=0V$		0.9	1.2	V
Source-Drain Diode Reverse Recovery Time	$t_{rr}$	$I_{SD}=25A,$ $di/dt=50A/\mu s$		80		ns
Thermal Resistance Junction to Case	$R_{th(ch-c)}$				1.13	$^{\circ}C/W$
Thermal Resistance Junction to Ambient	$R_{th(ch-a)}$				35.71	$^{\circ}C/W$

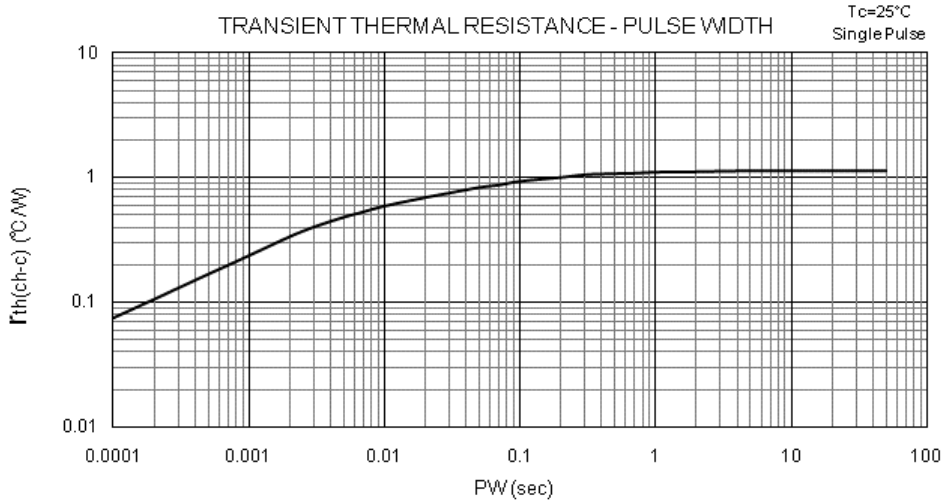
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**Characteristic Curves**

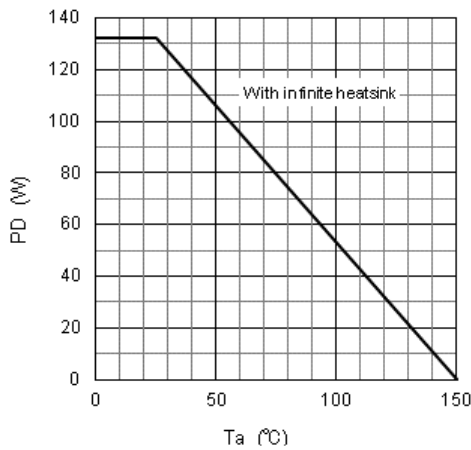


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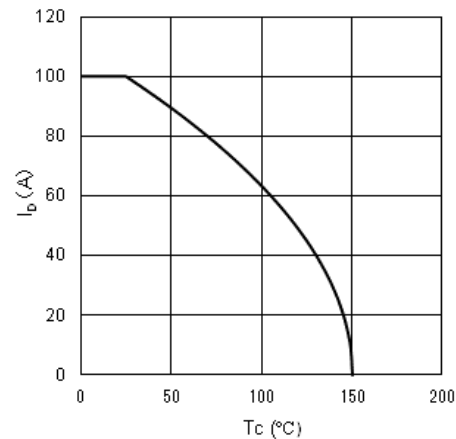
**Characteristic Curves**



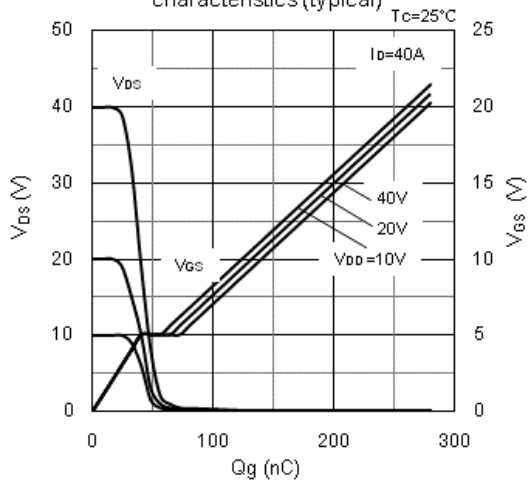
PD-Ta characteristics (typical)



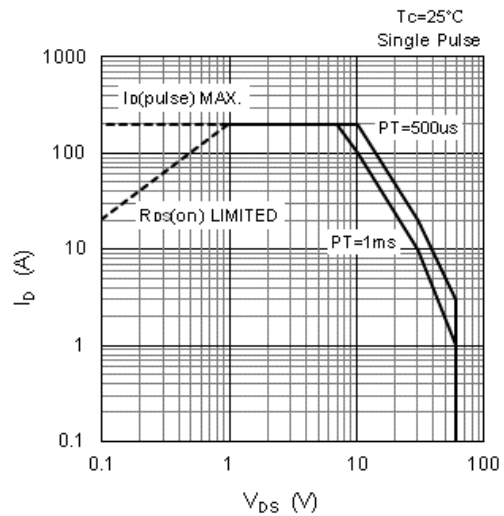
$I_b$ -Tc characteristics



DYNAMIC INPUT/OUTPUT characteristics (typical)

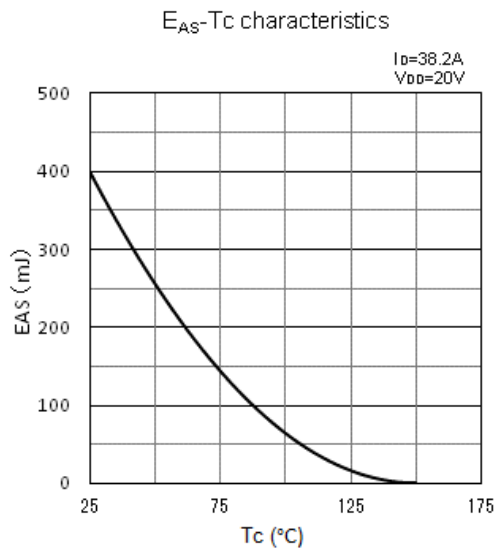


SAFE OPERATING AREA



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**Characteristic Curves**



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Fig.1 Unclamped Inductive Test Method

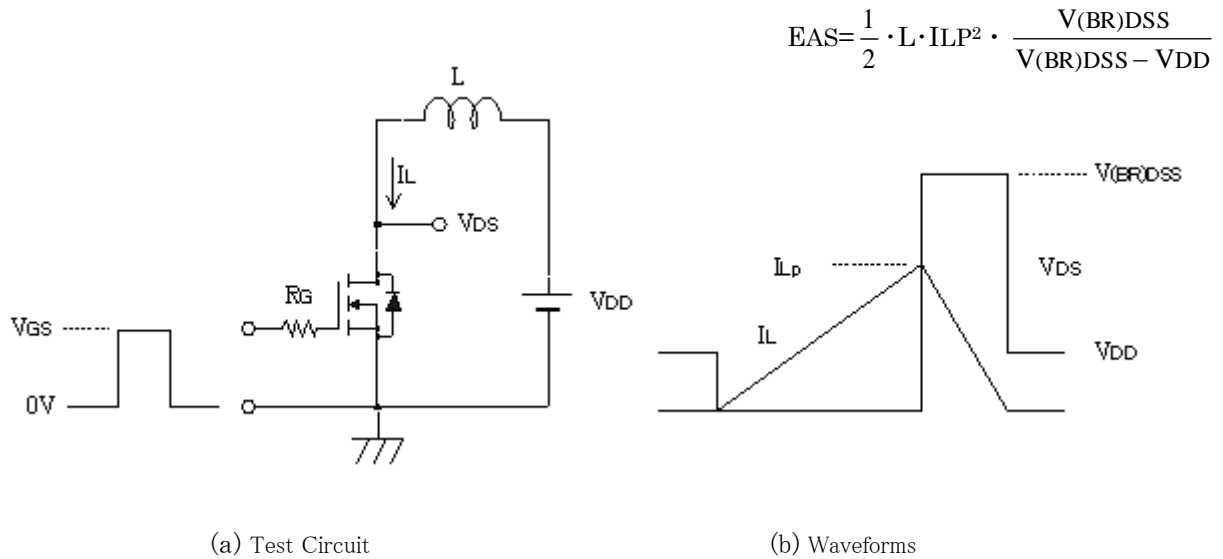
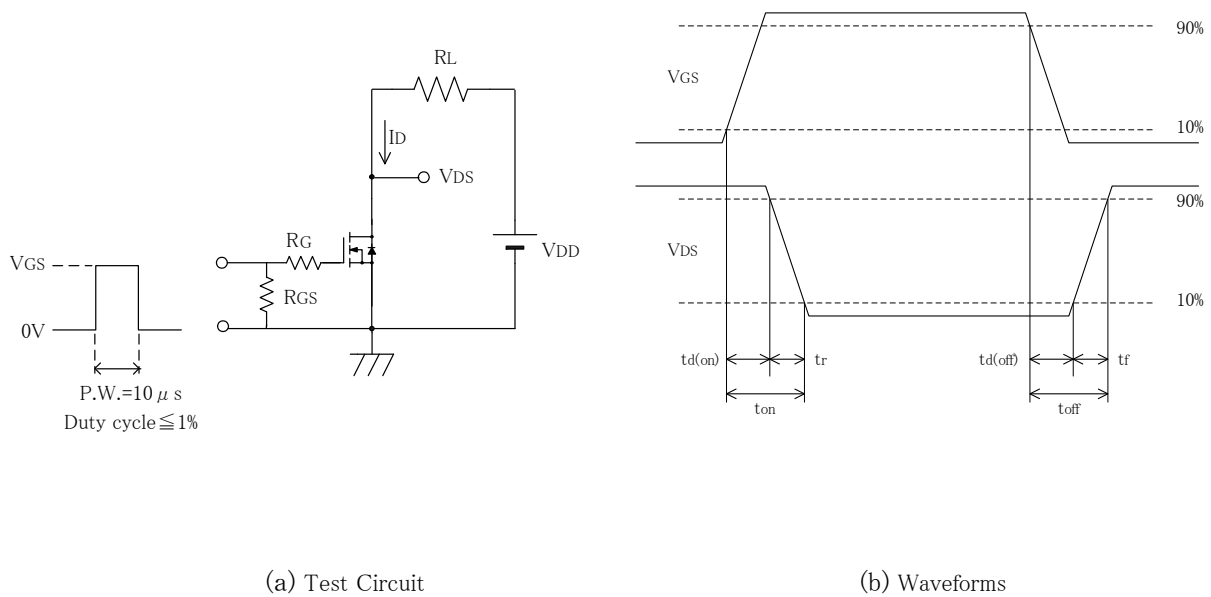


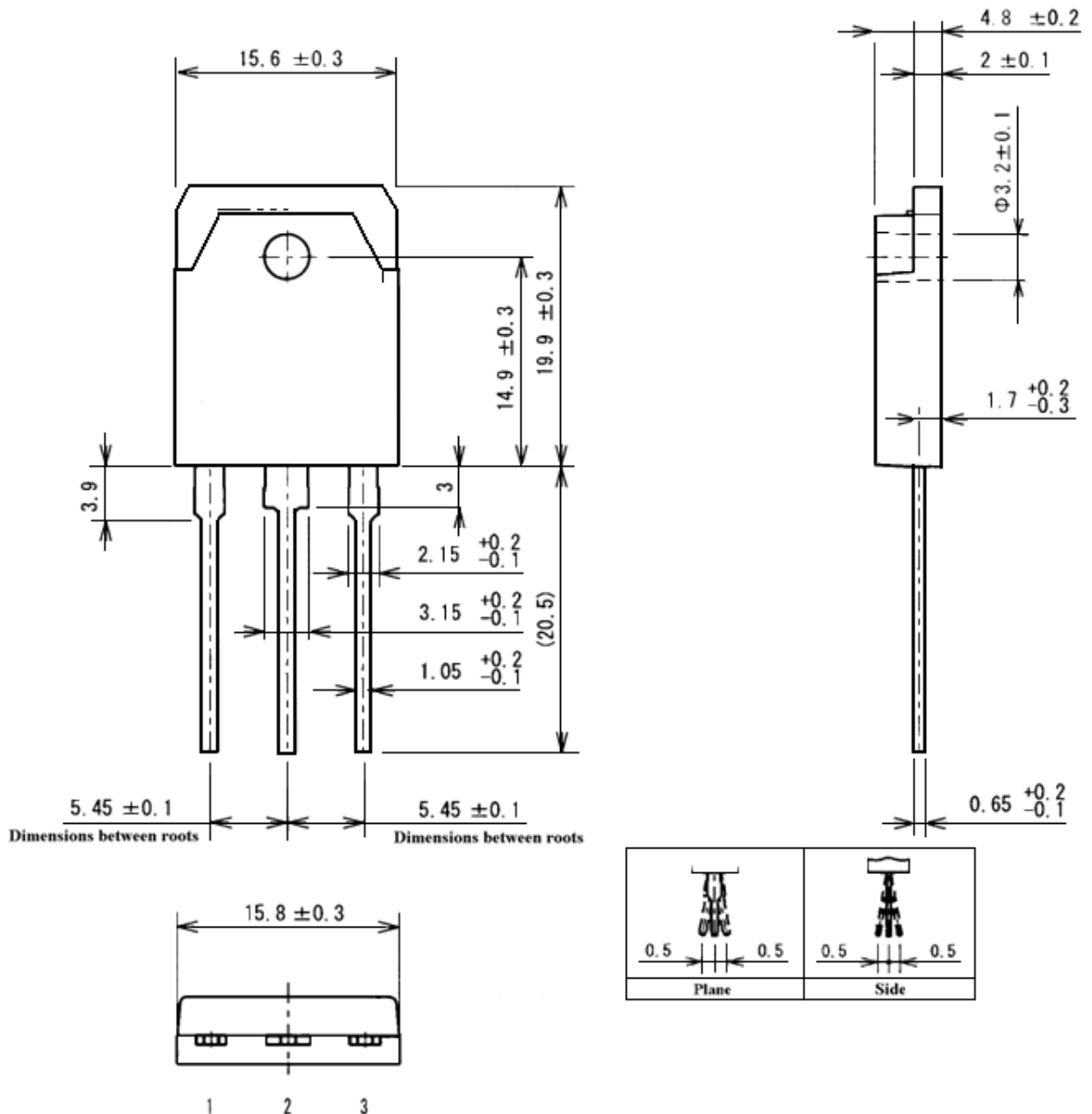
Fig.2 Switching Time Test Method



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Outline

TO3P



- (1) Gate
- (2) Drain (Back Side)
- (3) Source

Weight Approx. 6g

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