



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



$V_{DSS}$	600V
$R_{DS(on)}$ (Max.)	0.130Ω
$I_D$	30A
$P_D$	120W

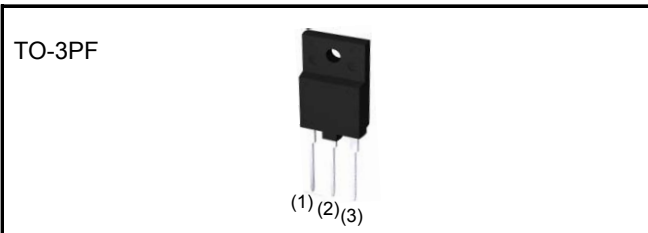
#### ●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Gate-source voltage ( $V_{GSS}$ ) guaranteed to be  $\pm 20V$ .
- 4) Drive circuits can be simple.
- 5) Parallel use is easy.
- 6) Pb-free lead plating ; RoHS compliant

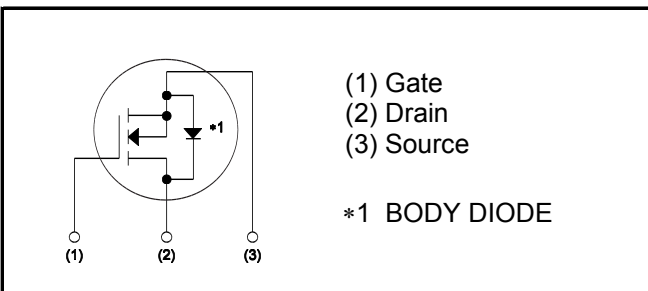
#### ●Application

Switching Power Supply

#### ●Outline



#### ●Inner circuit



#### ●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	360
	Taping code	C8
	Marking	R6030ENZ

#### ●Absolute maximum ratings ( $T_a = 25^\circ C$ )

Parameter	Symbol	Value	Unit	
Drain - Source voltage	$V_{DSS}$	600	V	
Continuous drain current	$T_c = 25^\circ C$	$I_D^{*1}$	$\pm 30$	A
	$T_c = 100^\circ C$	$I_D^{*1}$	$\pm 16.3$	A
Pulsed drain current	$I_{D,pulse}^{*2}$	$\pm 80$	A	
Gate - Source voltage	$V_{GSS}$	$\pm 20$	V	
Avalanche energy, single pulse	$E_{AS}^{*3}$	636	mJ	
Avalanche energy, repetitive	$E_{AR}^{*3}$	0.96	mJ	
Avalanche current, repetitive	$I_{AR}$	5.2	A	
Power dissipation ( $T_c = 25^\circ C$ )	$P_D$	120	W	
Junction temperature	$T_j$	150	$^\circ C$	
Range of storage temperature	$T_{stg}$	-55 to +150	$^\circ C$	
Reverse diode dv/dt	dv/dt <sup>*4</sup>	15	V/ns	

### ●Absolute maximum ratings

Parameter	Symbol	Conditions	Values	Unit
Drain - Source voltage slope	dv/dt	$V_{DS} = 480V$ $T_j = 25^\circ C$	50	V/ns

### ●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - case	$R_{thJC}$	-	-	1.04	$^\circ C/W$
Thermal resistance, junction - ambient	$R_{thJA}$	-	-	40	$^\circ C/W$
Soldering temperature, wavesoldering for 10s	$T_{sold}$	-	-	265	$^\circ C$

### ●Electrical characteristics ( $T_a = 25^\circ C$ )

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 1mA$	600	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 600V, V_{GS} = 0V$ $T_j = 25^\circ C$	-	0.1	100	$\mu A$
		$T_j = 125^\circ C$	-	-	1000	
Gate - Source leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = 10V, I_D = 1mA$	2	-	4	V
Static drain - source on - state resistance	$R_{DS(on)}^{*5}$	$V_{GS} = 10V, I_D = 14.5A$ $T_j = 25^\circ C$	-	0.115	0.130	$\Omega$
		$T_j = 125^\circ C$	-	0.255	-	
Gate input resistance	$R_G$	$f = 1MHz, \text{open drain}$	-	3.6	-	$\Omega$

**●Electrical characteristics (T<sub>a</sub> = 25°C)**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Transconductance	$g_{fs}^{*5}$	$V_{DS} = 10V, I_D = 15A$	8	16	-	S
Input capacitance	$C_{iss}$	$V_{GS} = 0V$	-	2100	-	pF
Output capacitance	$C_{oss}$	$V_{DS} = 25V$	-	1900	-	
Reverse transfer capacitance	$C_{rss}$	$f = 1MHz$	-	190	-	
Effective output capacitance, energy related	$C_{o(er)}$	$V_{GS} = 0V$ $V_{DS} = 0V \text{ to } 480V$	-	82	-	pF
Effective output capacitance, time related	$C_{o(tr)}$		-	400	-	
Turn - on delay time	$t_{d(on)}^{*5}$	$V_{DD} \approx 300V, V_{GS} = 10V$ $I_D = 15A$ $R_L = 20\Omega$ $R_G = 10\Omega$	-	40	-	ns
Rise time	$t_r^{*5}$		-	55	-	
Turn - off delay time	$t_{d(off)}^{*5}$		-	190	-	
Fall time	$t_f^{*5}$		-	60	-	

**●Gate Charge characteristics (T<sub>a</sub> = 25°C)**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	$Q_g^{*5}$	$V_{DD} \approx 300V$	-	85	-	nC
Gate - Source charge	$Q_{gs}^{*5}$	$I_D = 30A$	-	15	-	
Gate - Drain charge	$Q_{gd}^{*5}$	$V_{GS} = 10V$	-	45	-	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} \approx 300V, I_D = 30A$	-	6.5	-	V

\*1 Limited only by maximum temperature allowed.

\*2  $P_W \leq 10\mu s$ , Duty cycle  $\leq 1\%$

\*3  $I_D = 5.2A, V_{DD} = 50V$

\*4 Reference measurement circuits Fig.5-1.

\*5 Pulsed

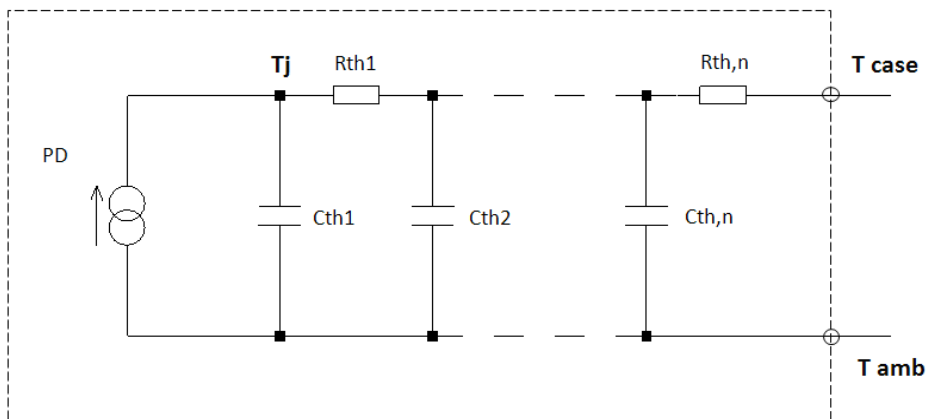
●Body diode electrical characteristics (Source-Drain) ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Inverse diode continuous, forward current	$I_S^{*1}$	$T_c = 25^\circ\text{C}$	-	-	30	A
Inverse diode direct current, pulsed	$I_{SM}^{*2}$		-	-	80	A
Forward voltage	$V_{SD}^{*5}$	$V_{GS} = 0\text{V}, I_S = 30\text{A}$	-	-	1.5	V
Reverse recovery time	$t_{rr}^{*5}$	$I_S = 30\text{A}$ $di/dt = 100\text{A}/\mu\text{s}$	-	660	-	ns
Reverse recovery charge	$Q_{rr}^{*5}$		-	15	-	$\mu\text{C}$
Peak reverse recovery current	$I_{rrm}^{*5}$		-	45	-	A

●Typical Transient Thermal Characteristics

Symbol	Value	Unit
$R_{th1}$	0.0865	K/W
$R_{th2}$	0.469	
$R_{th3}$	1.22	

Symbol	Value	Unit
$C_{th1}$	0.00598	Ws/K
$C_{th2}$	0.0547	
$C_{th3}$	1.09	



●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

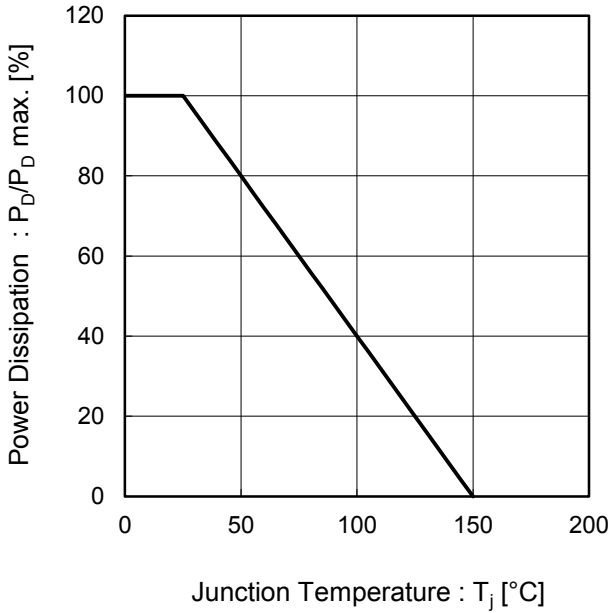


Fig.2 Normalized Transient Thermal Resistance vs. Pulse Width

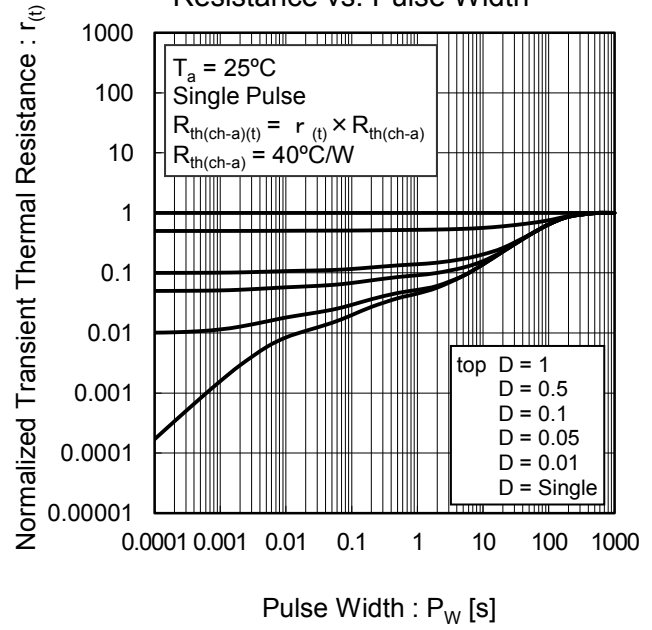
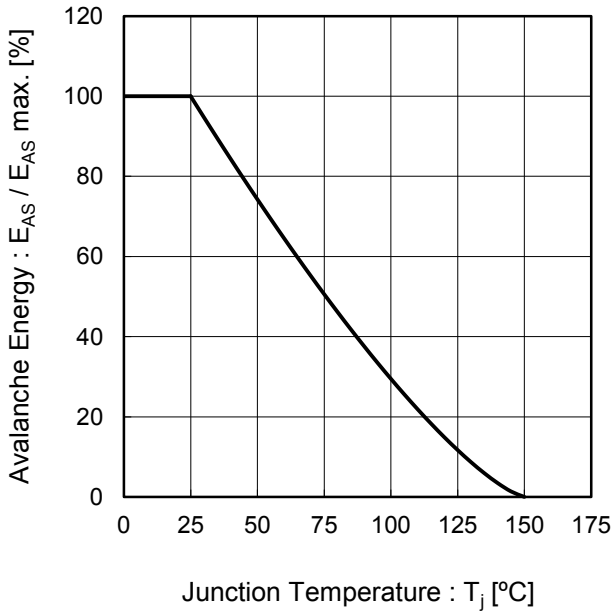


Fig.3 Avalanche Energy Derating Curve vs Junction Temperature



●Electrical characteristic curves

Fig.4 Typical Output Characteristics(I)

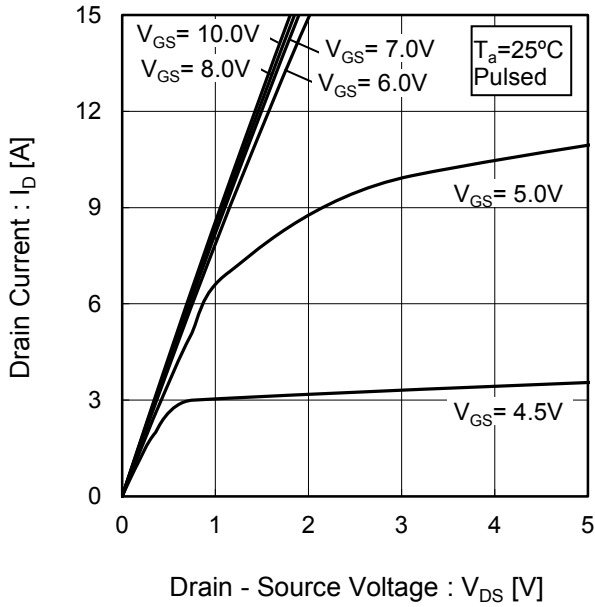


Fig.5 Typical Output Characteristics(II)

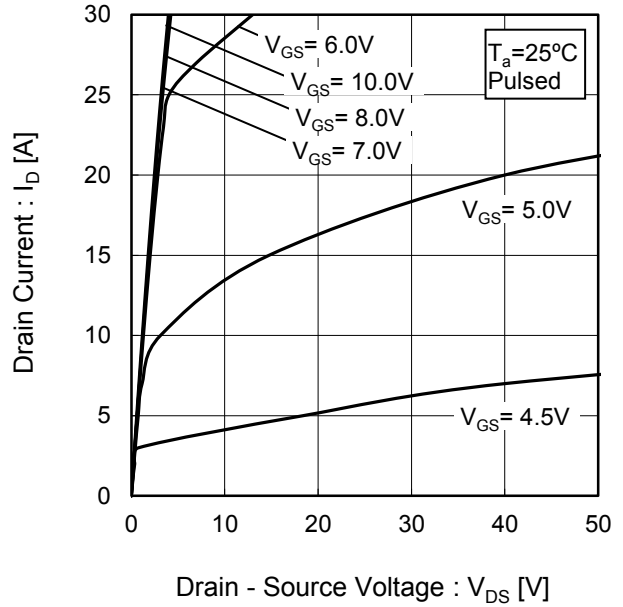


Fig.6  $T_j = 150^\circ\text{C}$  Typical Output Characteristics(I)

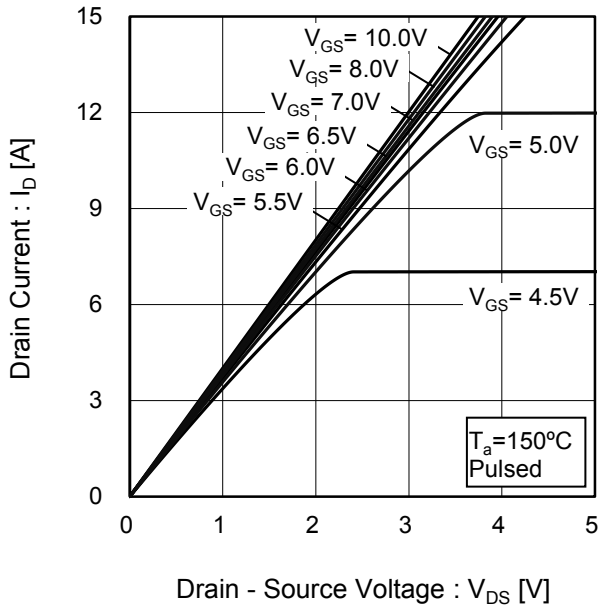
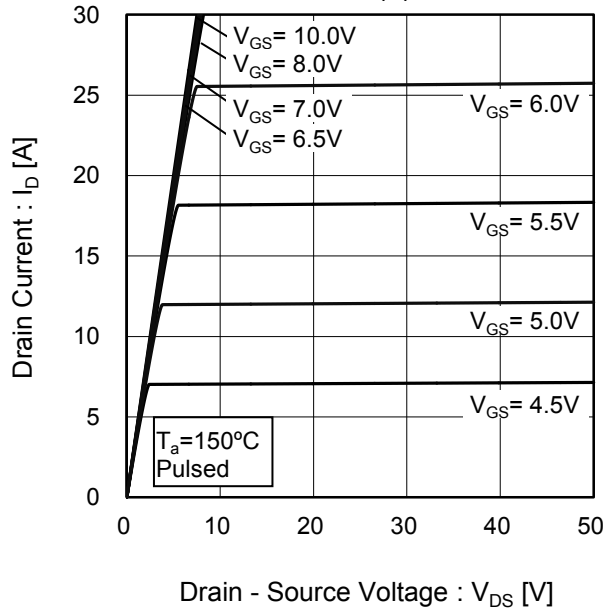


Fig.7  $T_j = 150^\circ\text{C}$  Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.8 Breakdown Voltage vs. Junction Temperature

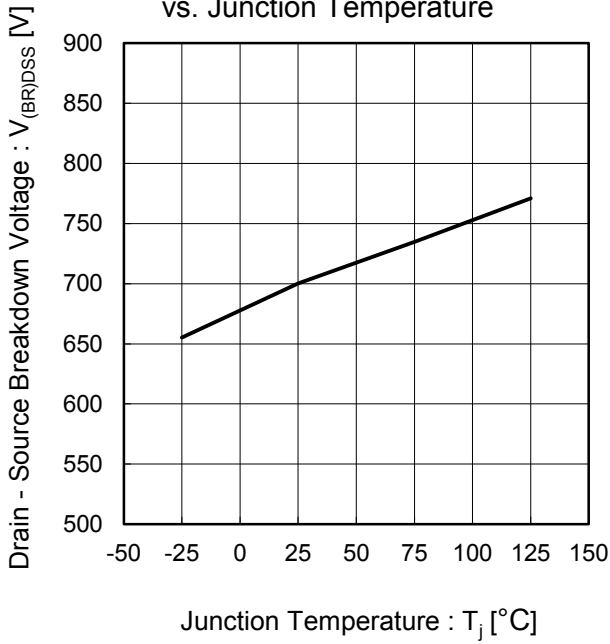


Fig.9 Typical Transfer Characteristics

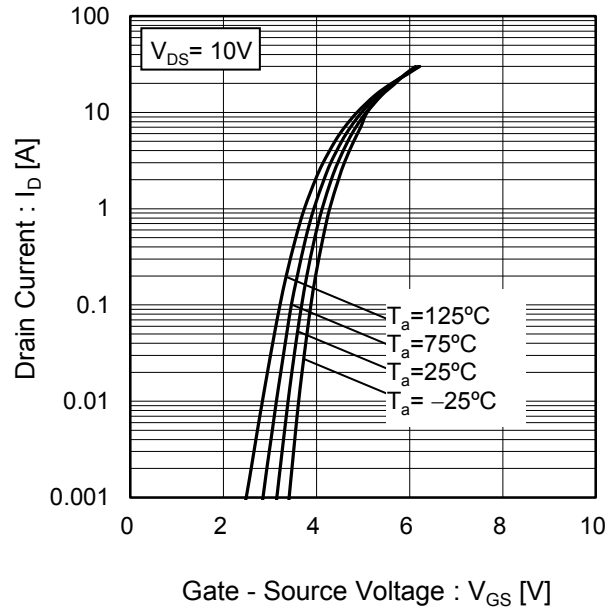


Fig.10 Gate Threshold Voltage vs. Junction Temperature

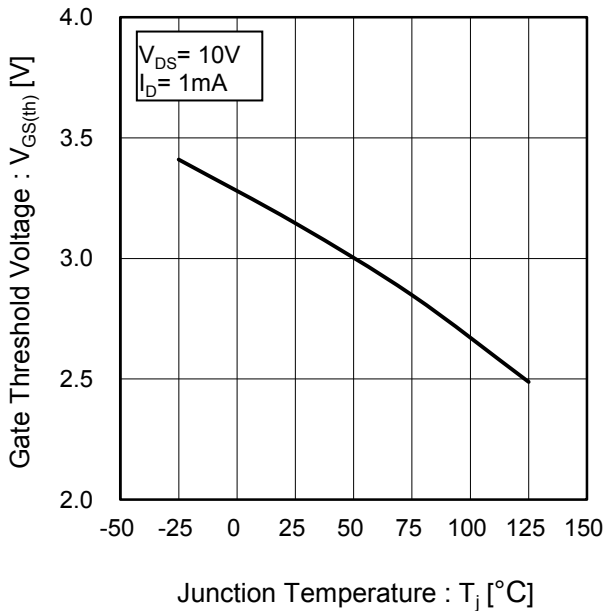
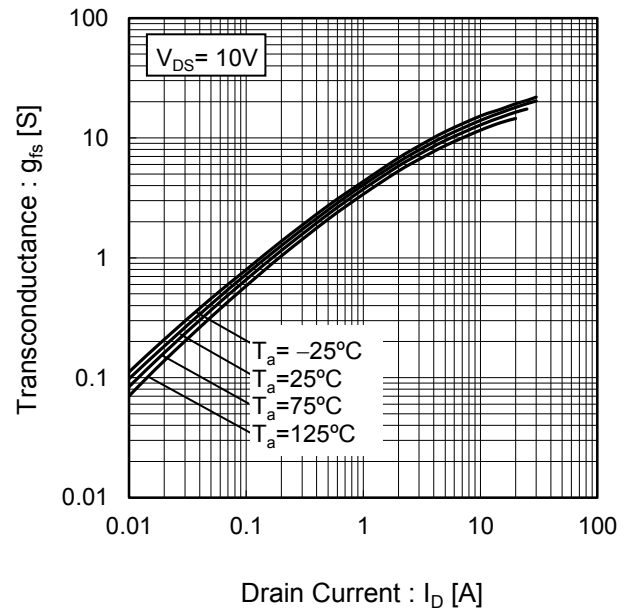


Fig.11 Transconductance vs. Drain Current



●Electrical characteristic curves

Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage

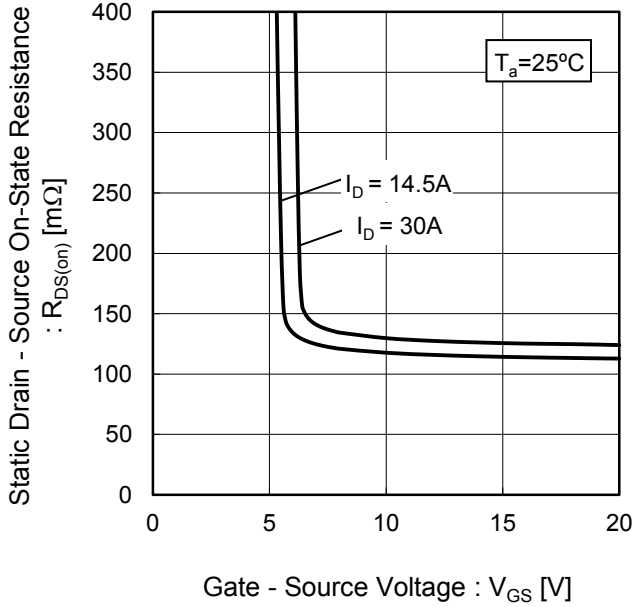


Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature

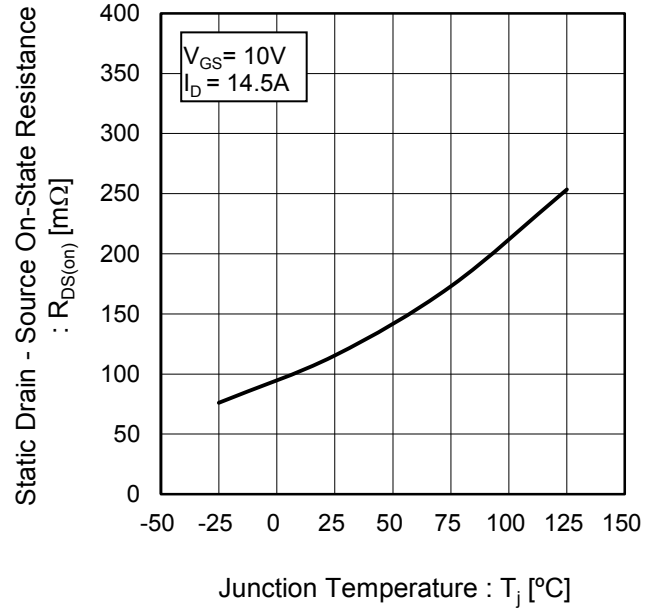


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current

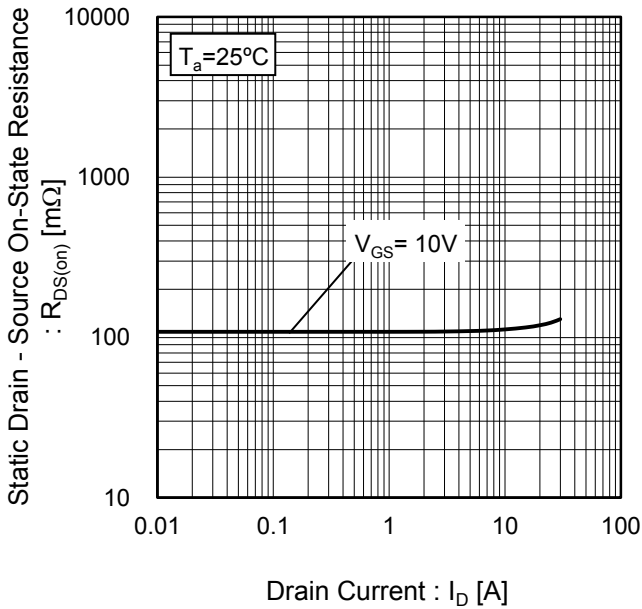
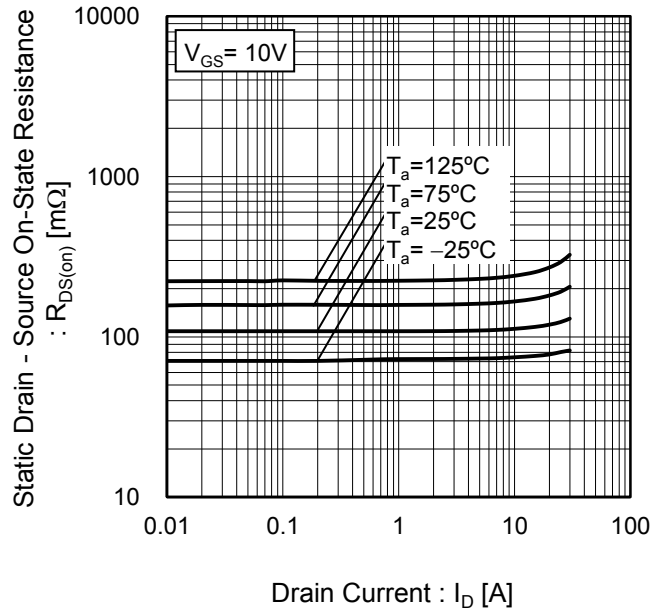


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current



●Electrical characteristic curves

Fig.16 Typical Capacitance vs. Drain - Source Voltage

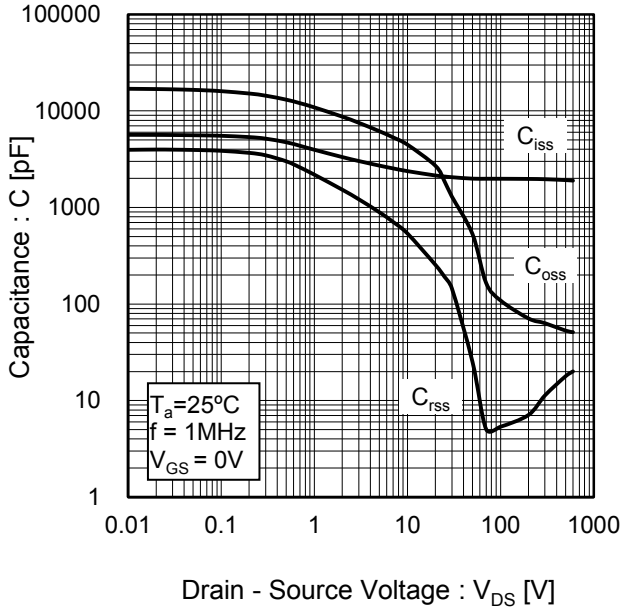


Fig.17 Coss Stored Energy

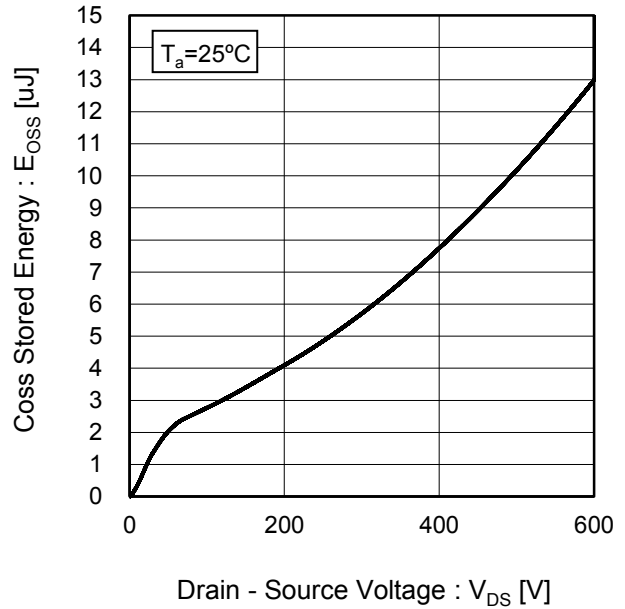


Fig.18 Switching Characteristics

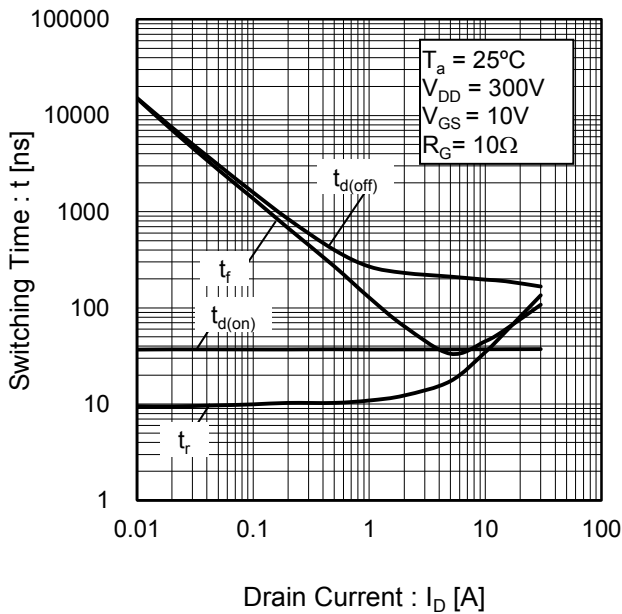
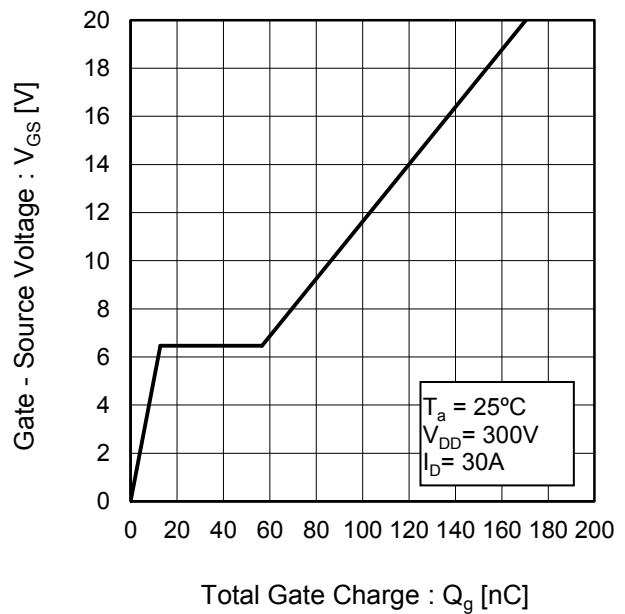


Fig.19 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.20 Inverse Diode Forward Current vs. Source - Drain Voltage

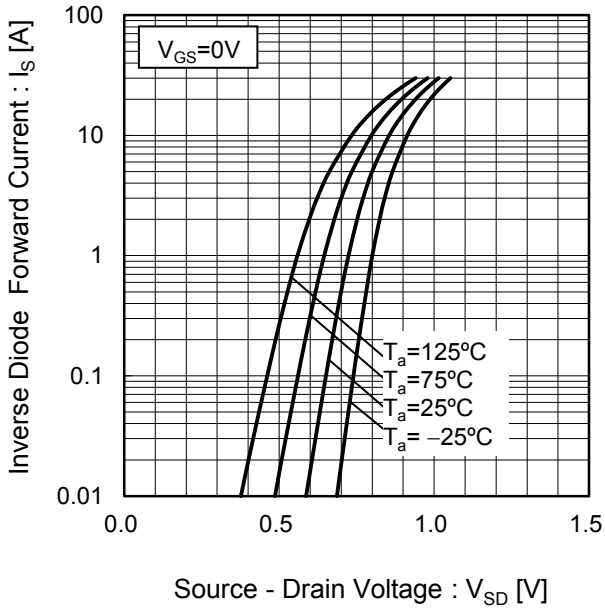
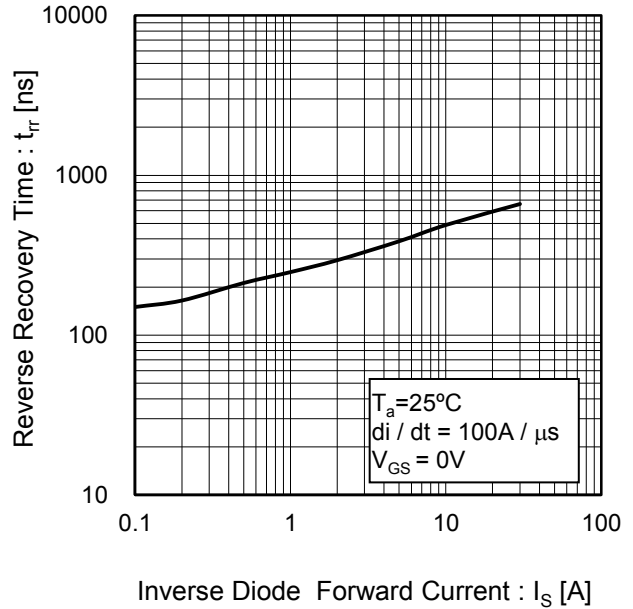


Fig.21 Reverse Recovery Time vs. Inverse Diode Forward Current



● Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

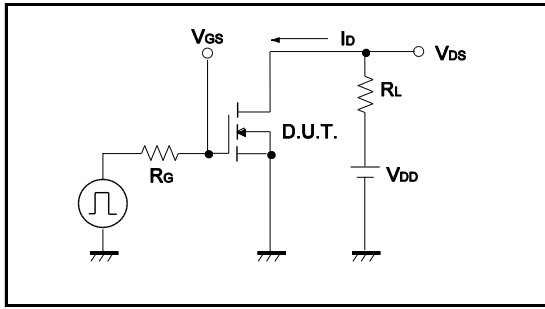


Fig.1-2 Switching Waveforms

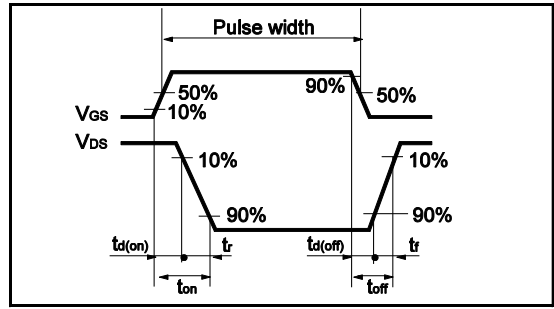


Fig.2-1 Gate Charge Measurement Circuit

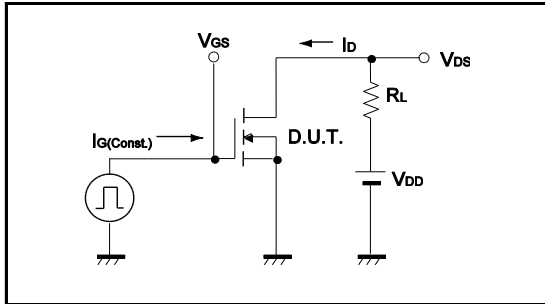


Fig.2-2 Gate Charge Waveform

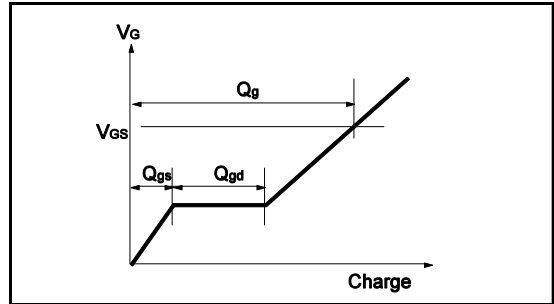


Fig.3-1 Avalanche Measurement Circuit

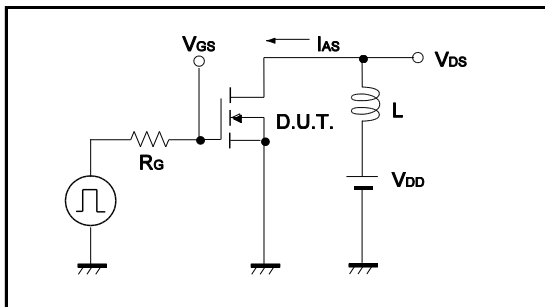


Fig.3-2 Avalanche Waveform

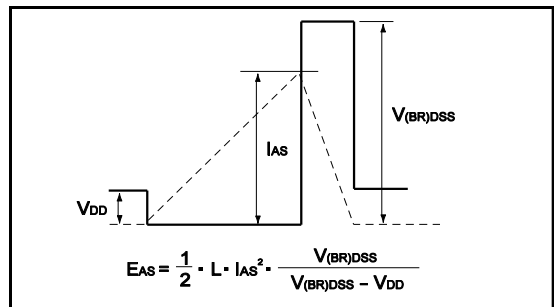


Fig.4-1 dv/dt Measurement Circuit

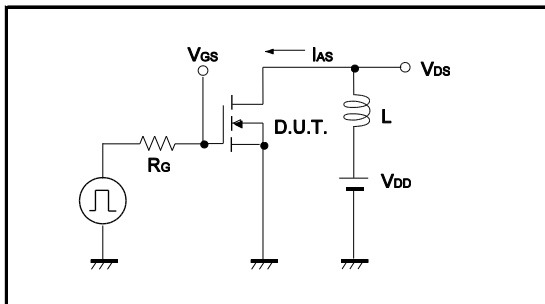


Fig.4-2 dv/dt Waveform

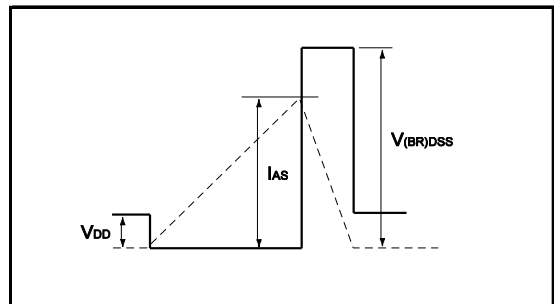


Fig.5-1 di/dt Measurement Circuit

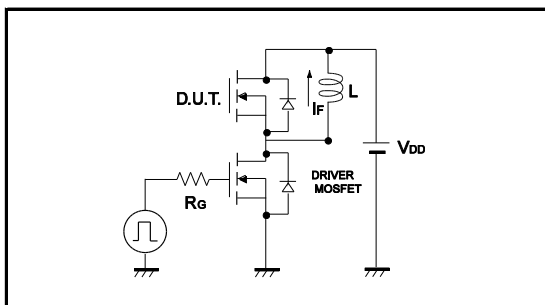
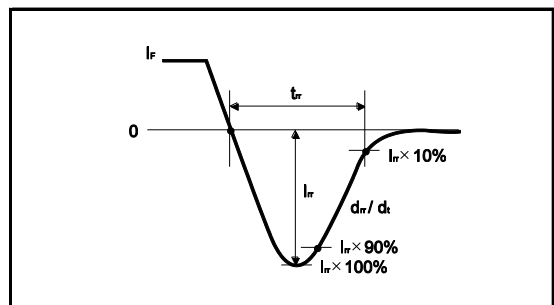
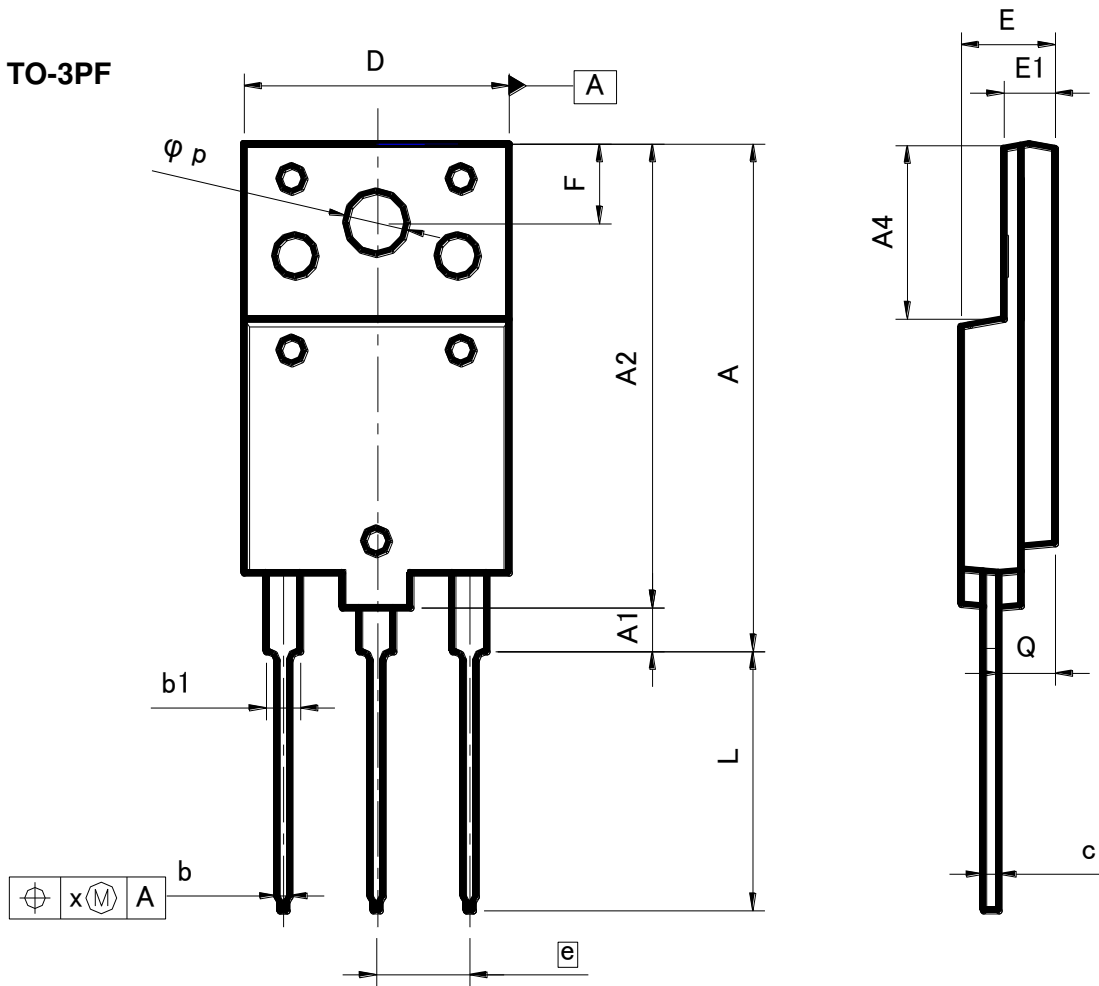


Fig.5-2 di/dt Waveform



●Dimensions (Unit : mm)



Dimension in mm / inches

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