



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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$V_{DSS}$	200V
$R_{DS(on)}$ (Max.)	325mΩ
$I_D$	12A
$P_D$	40W

#### ●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Drive circuits can be simple.
- 4) Parallel use is easy.
- 5) Pb-free lead plating ; RoHS compliant
- 6) 100% Avalanche tested

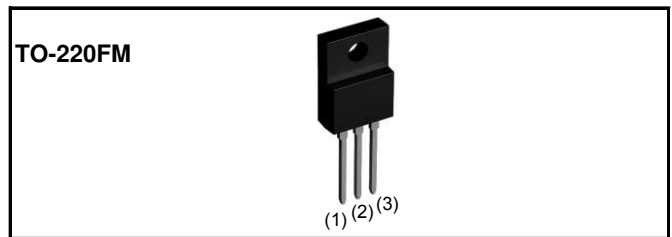
#### ●Application

Switching Power Supply  
 Automotive Motor Drive  
 Automotive Solenoid Drive

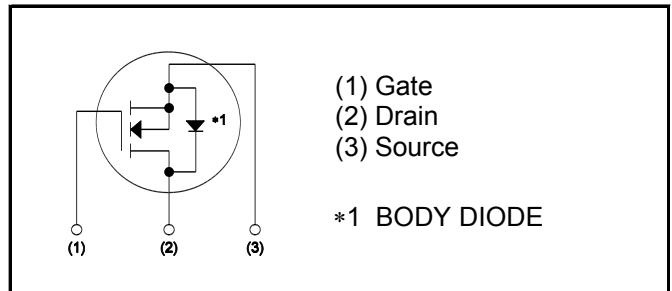
#### ●Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )

Parameter		Symbol	Value	Unit
Drain - Source voltage		$V_{DSS}$	200	V
Continuous drain current	$T_c = 25^\circ\text{C}$	$I_D^{*1}$	±12	A
	$T_c = 100^\circ\text{C}$	$I_D^{*1}$	±6.5	A
Pulsed drain current		$I_{D,pulse}^{*2}$	±48	A
Gate - Source voltage		$V_{GSS}$	±30	V
Avalanche energy, single pulse		$E_{AS}^{*3}$	11.6	mJ
Avalanche current		$I_{AR}^{*3}$	6.0	A
Power dissipation	$T_c = 25^\circ\text{C}$	$P_D$	40	W
	$T_a = 25^\circ\text{C}$	$P_D$	2.23	W
Junction temperature		$T_j$	150	°C
Range of storage temperature		$T_{stg}$	-55 to +150	°C

#### ●Outline



#### ●Inner circuit



#### ●Packaging specifications

Type	Packaging	Bulk
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	500
	Taping code	-
	Marking	RCX120N20

### ●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - case	$R_{thJC}$	-	-	3.125	°C/W
Thermal resistance, junction - ambient	$R_{thJA}$	-	-	56	°C/W
Soldering temperature, wavesoldering for 10s	$T_{sold}$	-	-	265	°C

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 1mA$	200	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 200V, V_{GS} = 0V$ $T_j = 25^\circ\text{C}$	-	-	10	$\mu\text{A}$
		$V_{DS} = 200V, V_{GS} = 0V$ $T_j = 125^\circ\text{C}$	-	-	100	
Gate - Source leakage current	$I_{GSS}$	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = 10V, I_D = 1mA$	3.25	-	5.25	V
Static drain - source on - state resistance	$R_{DS(on)}^{*4}$	$V_{GS} = 10V, I_D = 6.0A$	-	250	325	$m\Omega$
		$V_{GS} = 10V, I_D = 6.0A$ $T_j = 125^\circ\text{C}$	-	565	790	
Forward transfer admittance	$g_{fs}$	$V_{DS} = 10V, I_D = 6.0A$	2.75	5.50	-	S

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V	-	740	-	pF
Output capacitance	C <sub>oss</sub>	V <sub>DS</sub> = 25V	-	57	-	
Reverse transfer capacitance	C <sub>rss</sub>	f = 1MHz	-	26	-	
Turn - on delay time	t <sub>d(on)</sub> <sup>*4</sup>	V <sub>DD</sub> ≈ 100V, V <sub>GS</sub> = 10V	-	20	-	ns
Rise time	t <sub>r</sub> <sup>*4</sup>	I <sub>D</sub> = 6.0A	-	33	-	
Turn - off delay time	t <sub>d(off)</sub> <sup>*4</sup>	R <sub>L</sub> = 16.67Ω	-	27	-	
Fall time	t <sub>f</sub> <sup>*4</sup>	R <sub>G</sub> = 10Ω	-	11	-	

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q <sub>g</sub> <sup>*4</sup>	V <sub>DD</sub> ≈ 100V	-	15	-	nC
Gate - Source charge	Q <sub>gs</sub> <sup>*4</sup>	I <sub>D</sub> = 12A	-	6	-	
Gate - Drain charge	Q <sub>gd</sub> <sup>*4</sup>	V <sub>GS</sub> = 10V	-	6	-	
Gate plateau voltage	V <sub>(plateau)</sub>	V <sub>DD</sub> ≈ 100V, I <sub>D</sub> = 12A	-	7.4	-	V

**●Body diode electrical characteristics (Source-Drain)(T<sub>a</sub> = 25°C)**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Continuous source current	I <sub>S</sub> <sup>*1</sup>	T <sub>c</sub> = 25°C	-	-	12	A
Pulsed source current	I <sub>SM</sub> <sup>*2</sup>		-	-	48	A
Forward voltage	V <sub>SD</sub> <sup>*4</sup>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 12A	-	-	1.5	V
Reverse recovery time	t <sub>rr</sub> <sup>*4</sup>	I <sub>S</sub> = 6.0A	-	80	-	ns
Reverse recovery charge	Q <sub>rr</sub> <sup>*4</sup>	di/dt = 100A/μs	-	290	-	nC

\*1 Limited only by maximum temperature allowed.

\*2 P<sub>w</sub> ≤ 10μs, Duty cycle ≤ 1%

\*3 L ≈ 500μH, V<sub>DD</sub> = 50V, R<sub>G</sub> = 25Ω, starting T<sub>j</sub> = 25°C

\*4 Pulsed

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

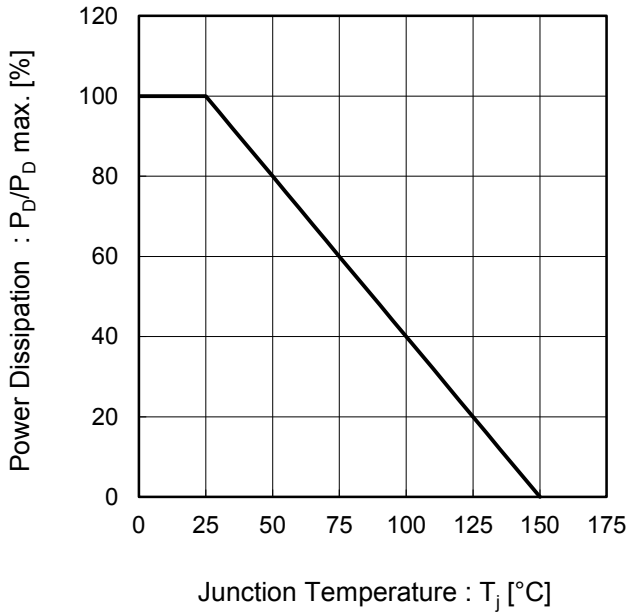


Fig.2 Maximum Safe Operating Area

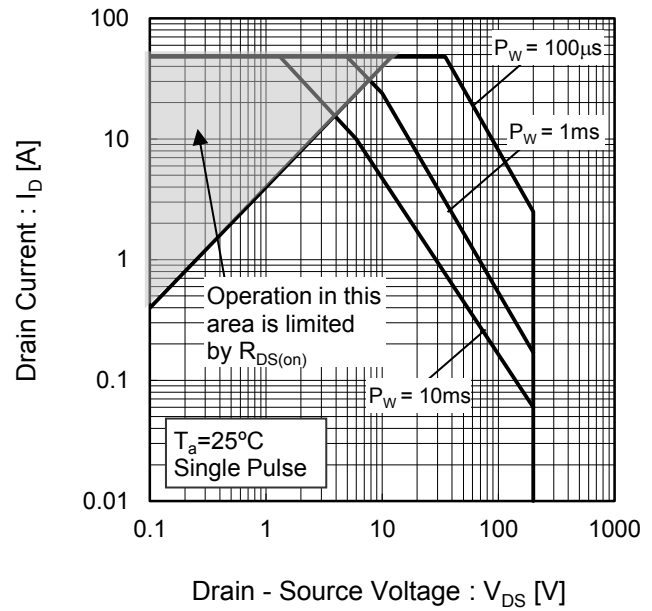
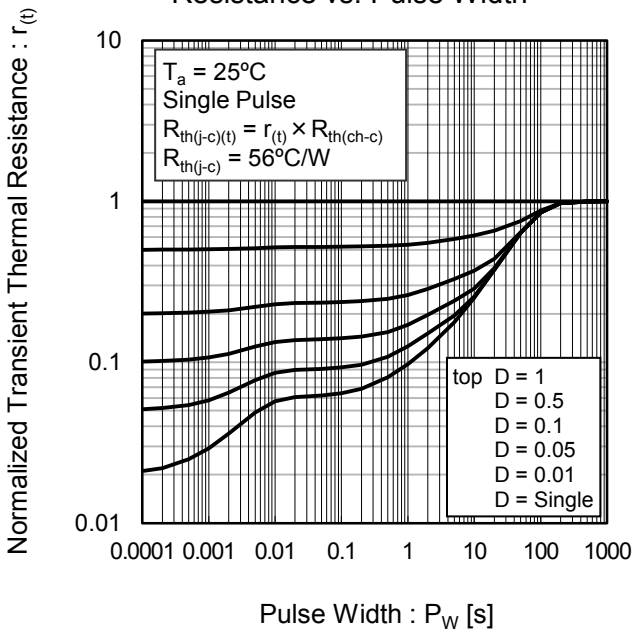


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width



●Electrical characteristic curves

Fig.4 Avalanche Current vs Inductive Load

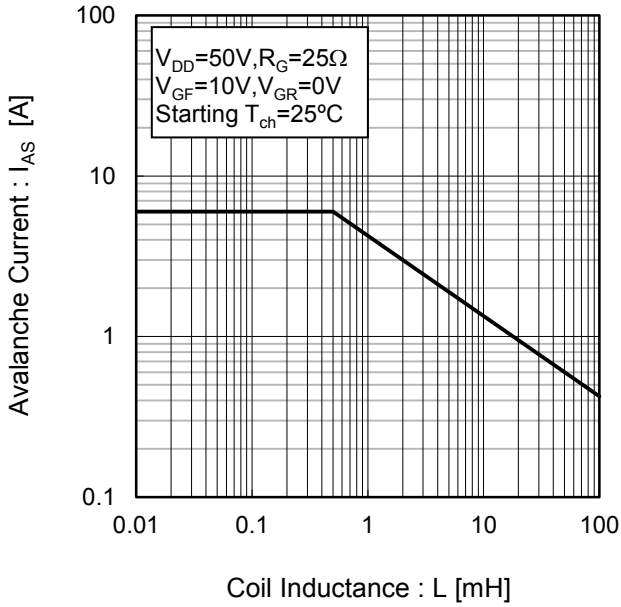


Fig.5 Avalanche Energy Derating Curve vs Junction Temperature

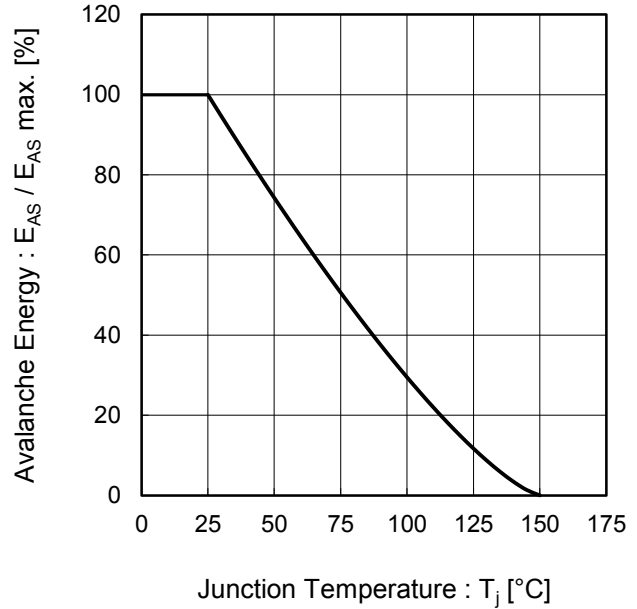


Fig.6 Typical Output Characteristics(I)

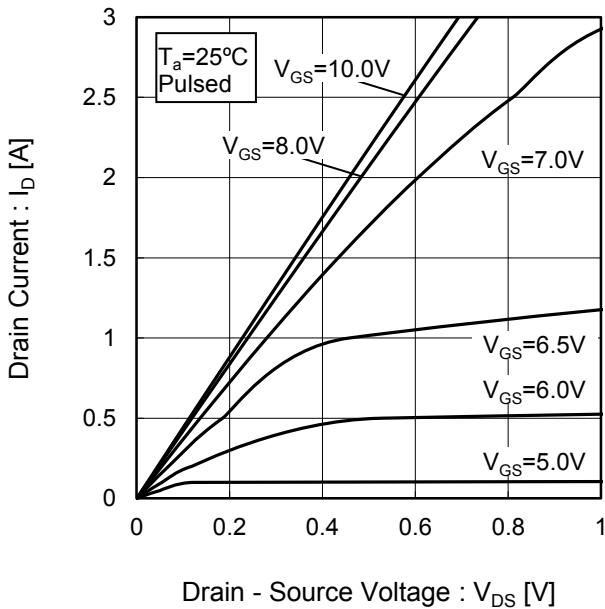
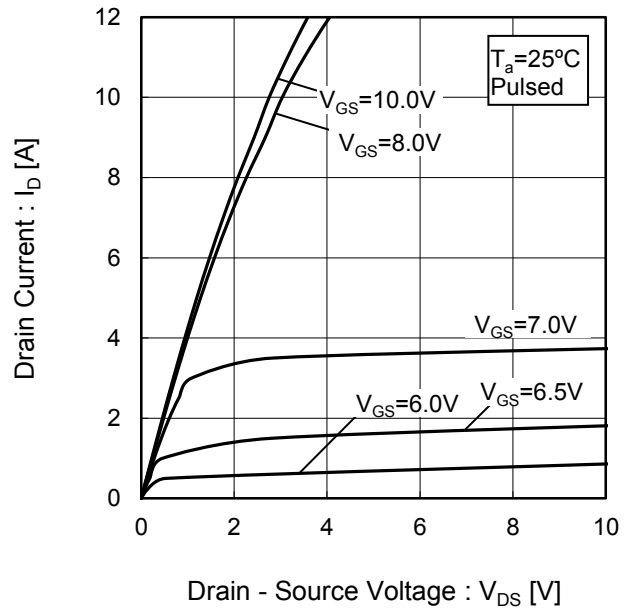


Fig.7 Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.8 Breakdown Voltage vs. Junction Temperature

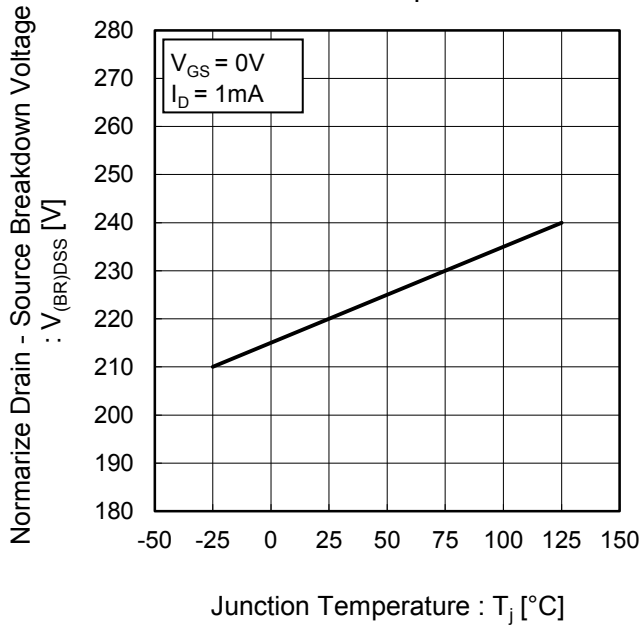


Fig.9 Typical Transfer Characteristics

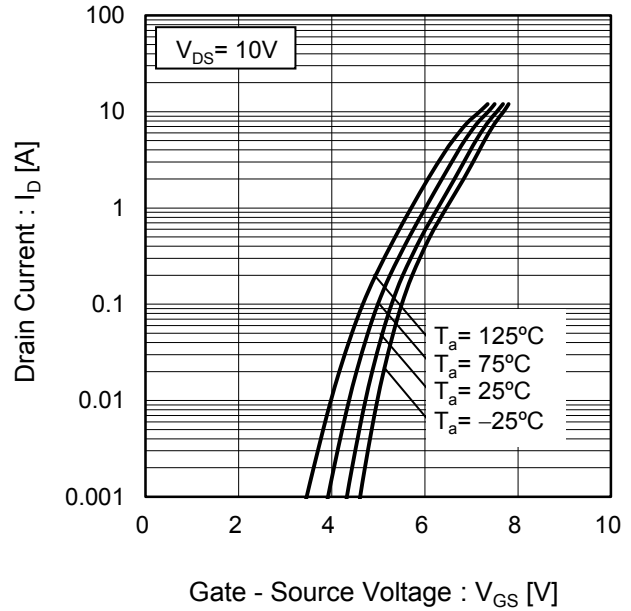


Fig.10 Gate Threshold Voltage vs. Junction Temperature

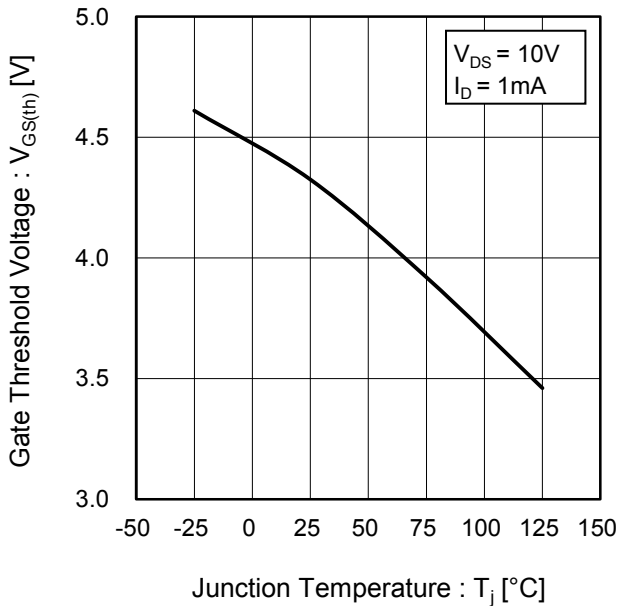
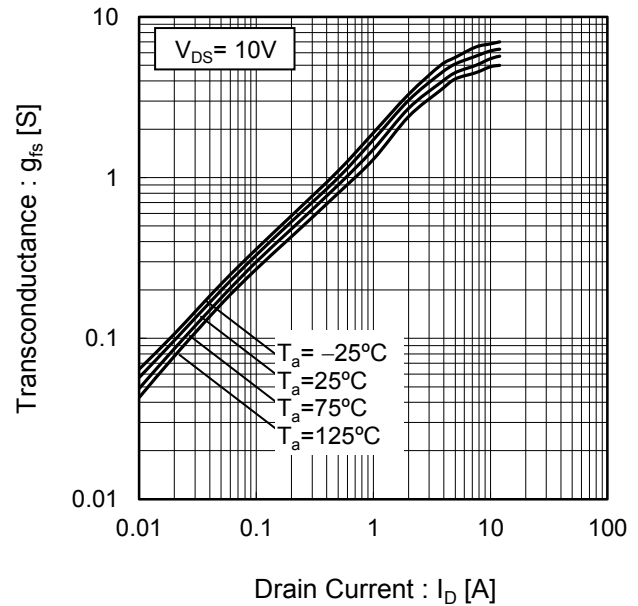


Fig.11 Transconductance vs. Drain Current



●Electrical characteristic curves

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

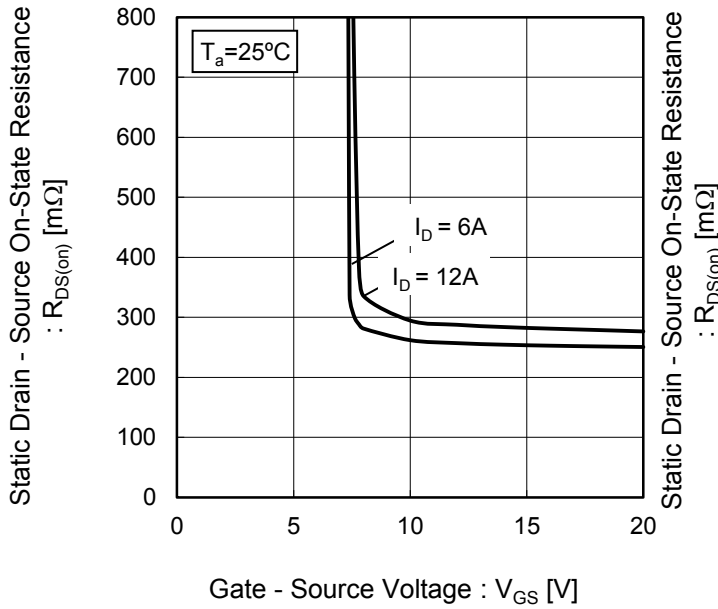


Fig.13 Static Drain - Source On - State Resistance vs. Drain Current(I)

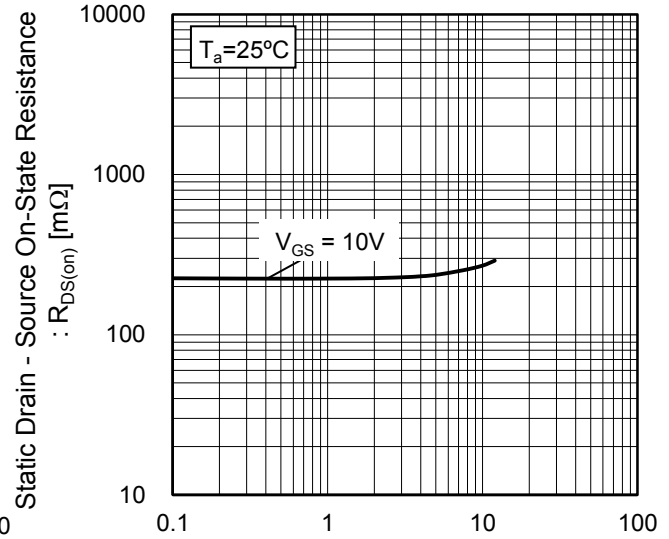
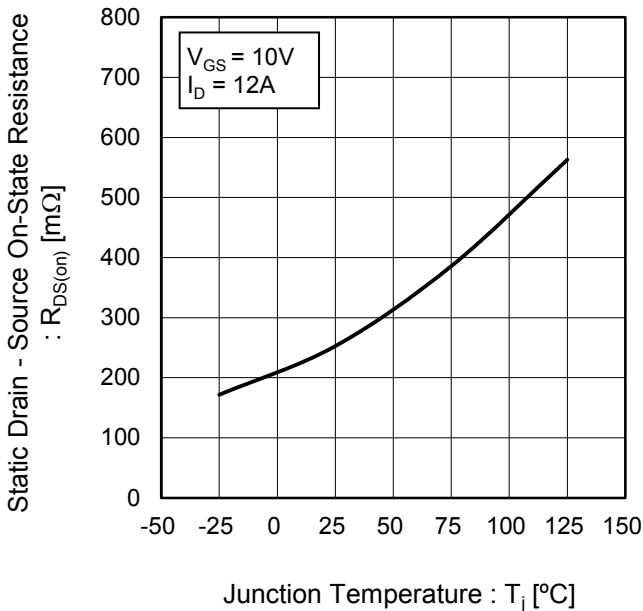


Fig.14 Static Drain - Source On - State Resistance vs. Junction Temperature



●Electrical characteristic curves

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

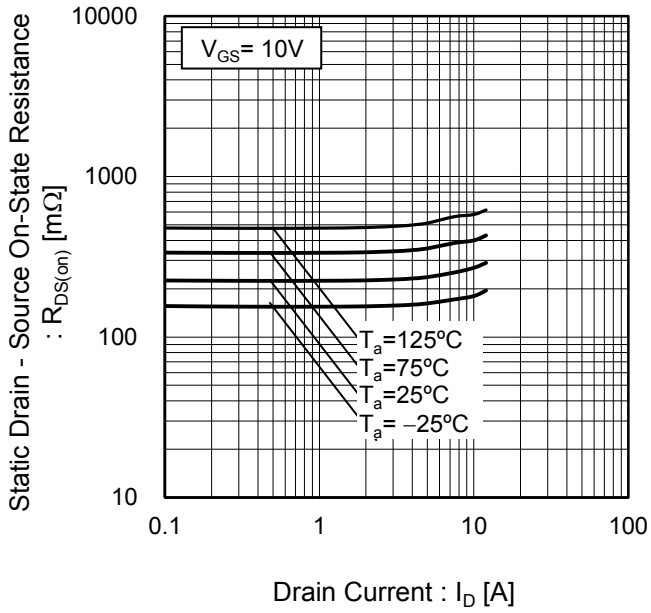
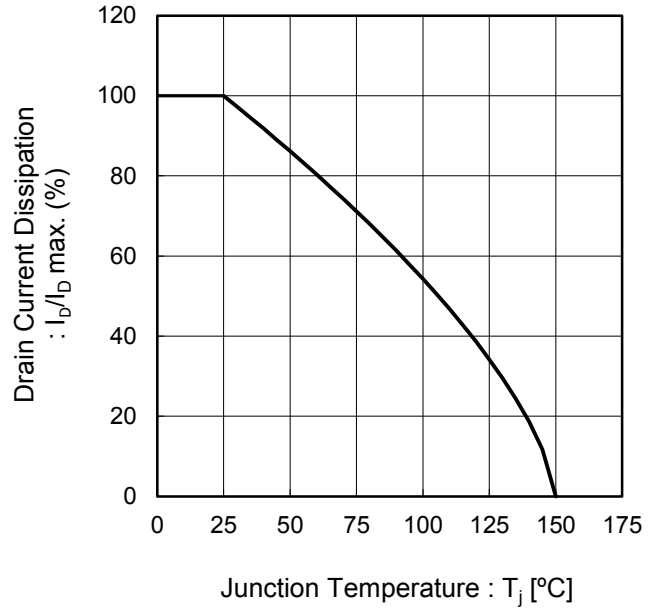


Fig.16 Drain Current Derating Curve



●Electrical characteristic curves

Fig.17 Typical Capacitance vs. Drain - Source Voltage

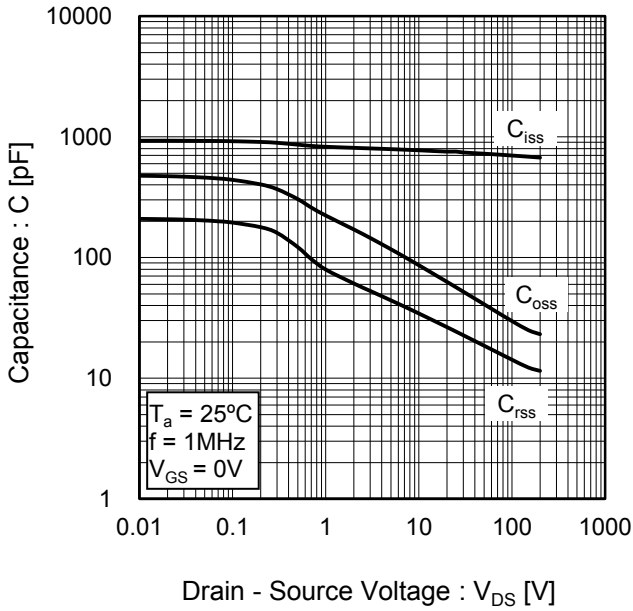


Fig.18 Switching Characteristics

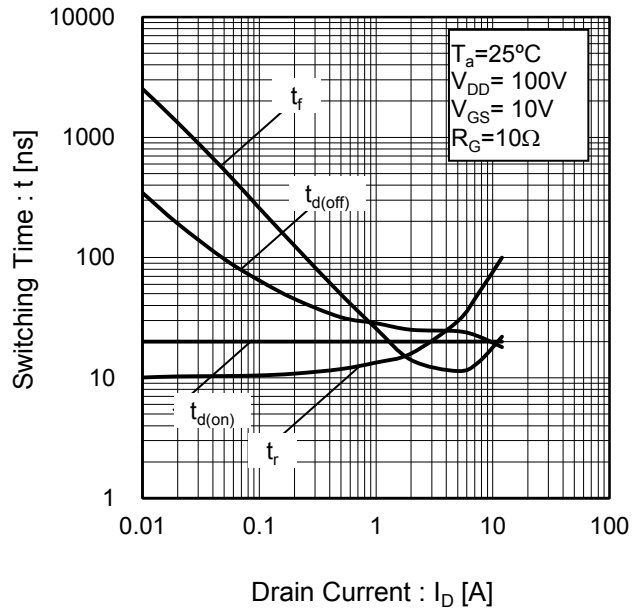
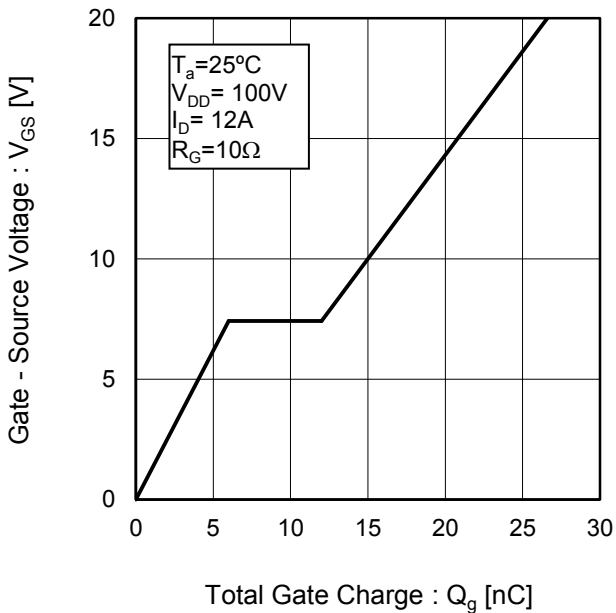


Fig.19 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.20 Source Current vs. Source - Drain Voltage

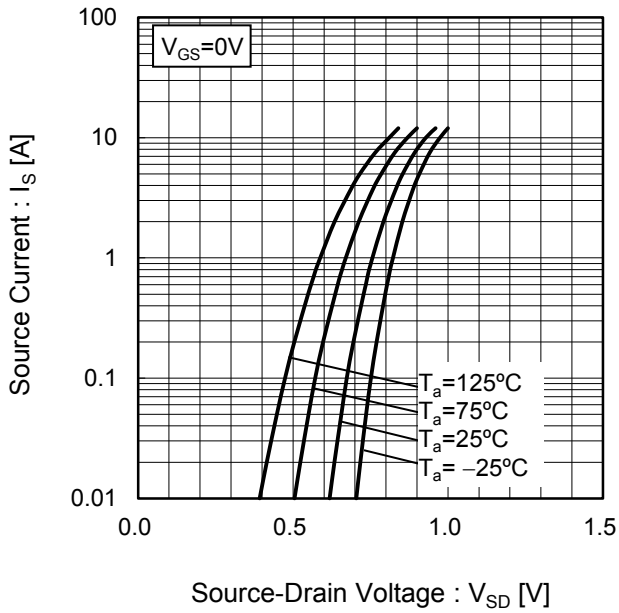
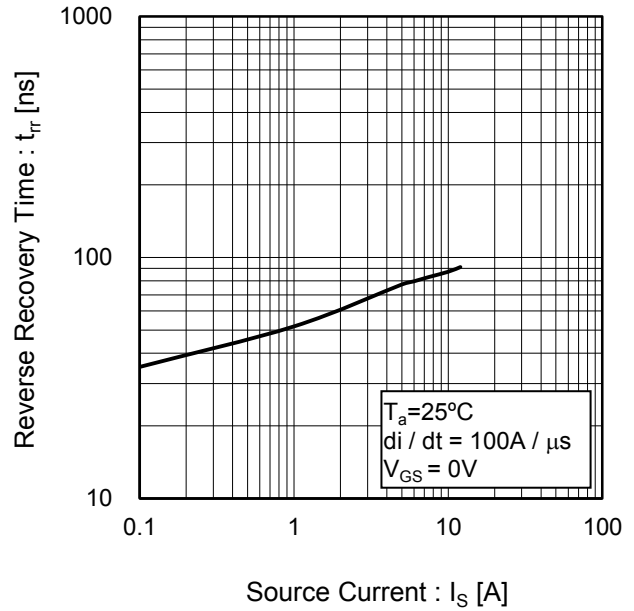


Fig.21 Reverse Recovery Time vs. Source Current



●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

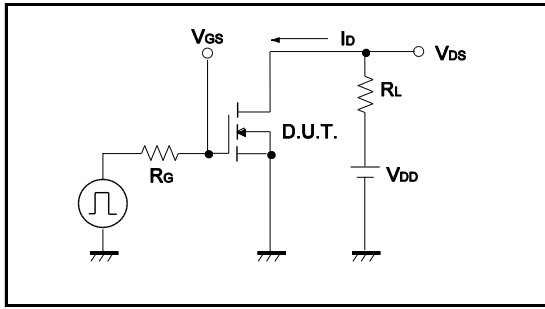


Fig.1-2 Switching Waveforms

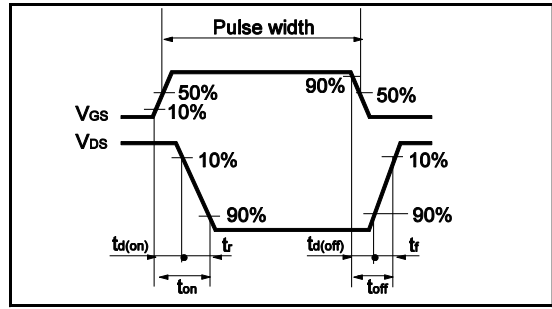


Fig.2-1 Gate Charge Measurement Circuit

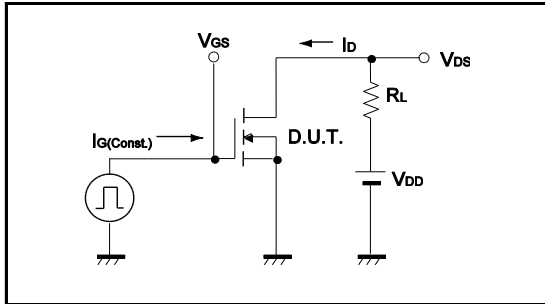


Fig.2-2 Gate Charge Waveform

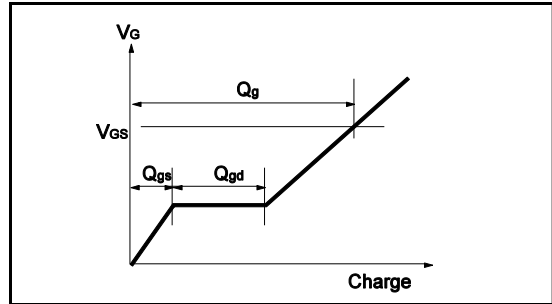


Fig.3-1 Avalanche Measurement Circuit

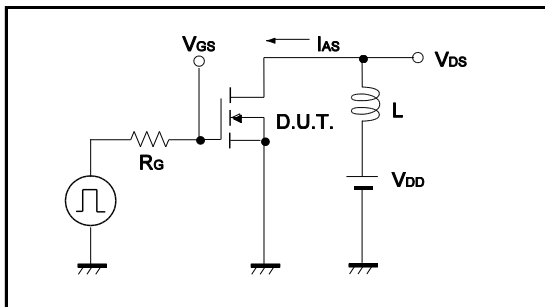
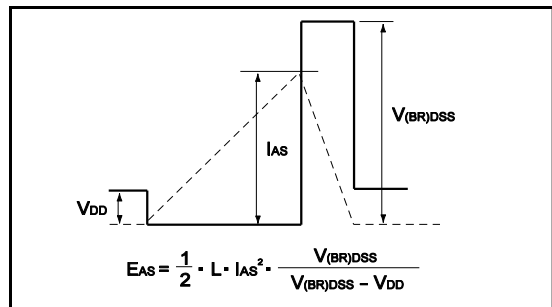
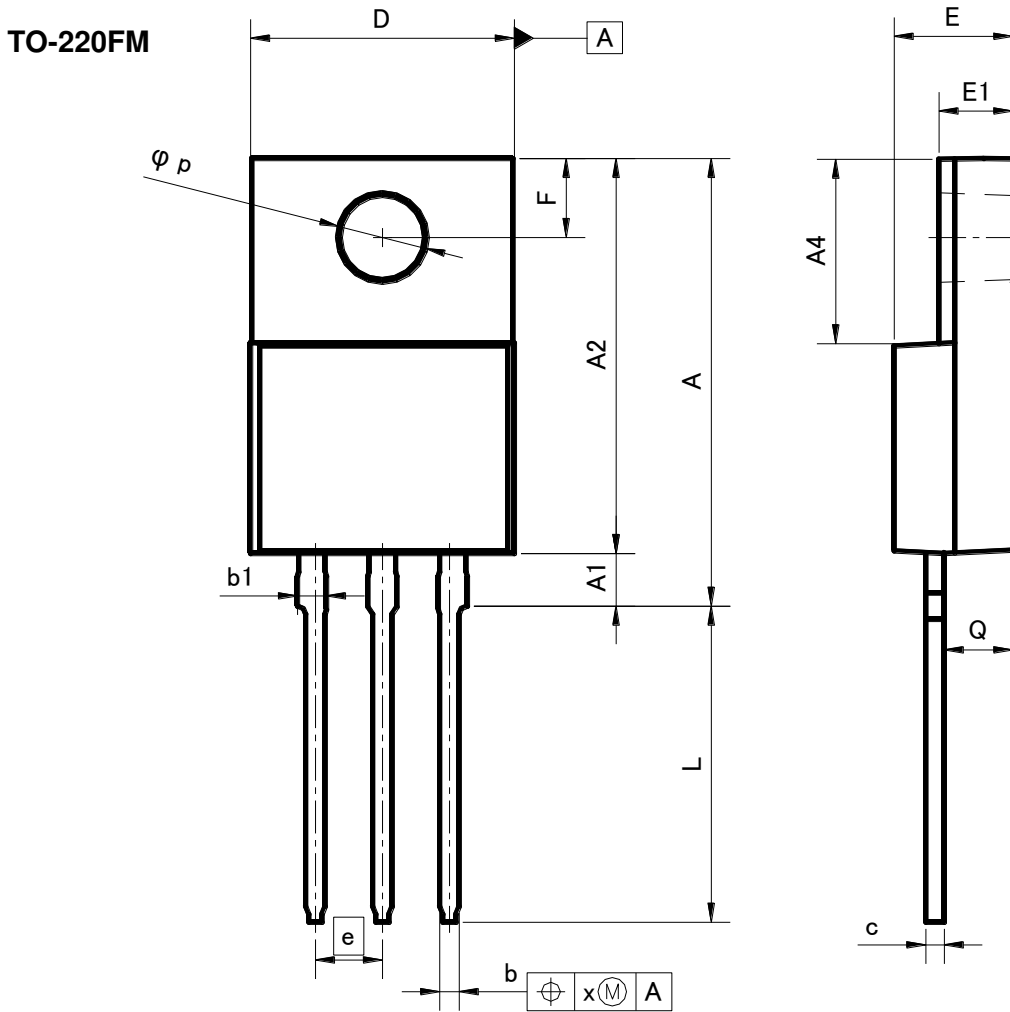


Fig.3-2 Avalanche Waveform



●Dimensions (Unit : mm)



DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	16.60	17.60	0.654	0.693
A1	1.80	2.20	0.071	0.087
A2	14.80	15.40	0.583	0.606
A4	6.80	7.20	0.268	0.283
b	0.70	0.85	0.028	0.033
b1	1.10	1.50	0.043	0.059
c	0.70	0.85	0.028	0.033
D	9.90	10.30	0.39	0.406
E	4.40	4.80	0.173	0.189
e	2.54		0.10	
E1	2.70	3.00	0.106	0.118
F	2.80	3.20	0.11	0.126
L	11.50	12.50	0.453	0.492
p	3.00	3.40	0.118	0.134
Q	2.10	3.10	0.083	0.122
x	-	0.381	-	0.015

Dimension in mm/inches

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