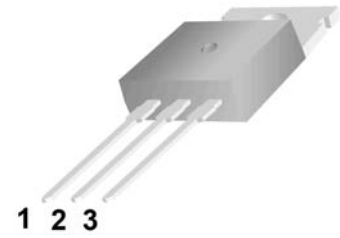
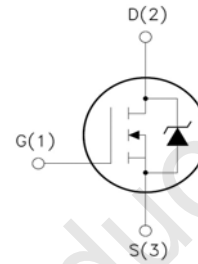


**●Features:**

- 14A, 650V,  $R_{DS(on)(Typ)} = 0.6\Omega @ V_{GS}=10V$
- Low Gate Charge
- Low  $C_{rSS}$
- 100% Avalanche Tested
- Fast Switching
- Improved dv/dt Capability

**●Application:**

- High Frequency Switching Mode Power Supply
- Active Power Factor Correction


**TO-220**


- 1.Gate (G)
- 2.Drain (D)
- 3.Source (S)

**Absolute Maximum Ratings**( $T_C=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain-Source Voltage	650	V
$I_D$	Drain Current - Continuous( $T_C=25^\circ\text{C}$ ) - Continuous( $T_C=100^\circ\text{C}$ )	14*	A
		8.6*	A
$I_{DM}$	Drain Current -Pulsed (Note1)	56*	A
$V_{GSS}$	Gate-Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note2)	940	mJ
$I_{AR}$	Avalanche Current (Note1)	14.0	A
$E_{AR}$	Repetitive Avalanche Energy (Note1)	28	mJ
dv/dt	Peak Diode Recovery dv/dt (Note3)	4.5	V/ns
$P_D$	Power Dissipation( $T_C =25^\circ\text{C}$ ) -Derate above $25^\circ\text{C}$	54	W
		0.43	W/ $^\circ\text{C}$
$T_j$	Operating Junction Temperature	150	$^\circ\text{C}$
$T_{stg}$	Storage Temperature Range	-55 to+150	$^\circ\text{C}$

\* Drain Current Limited by Maximum Junction Temperature.

**Thermal Characteristics**

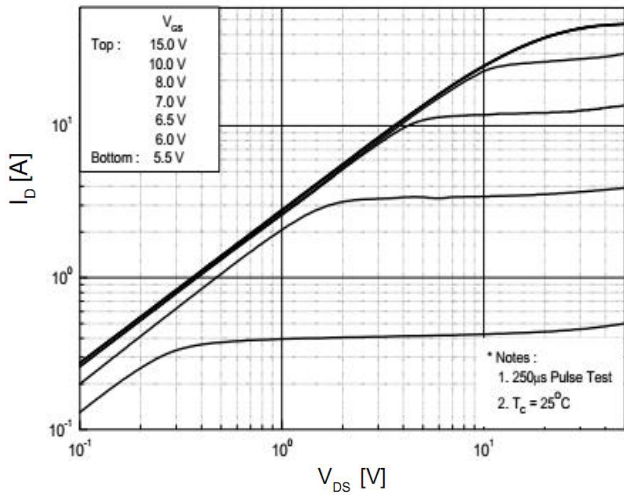
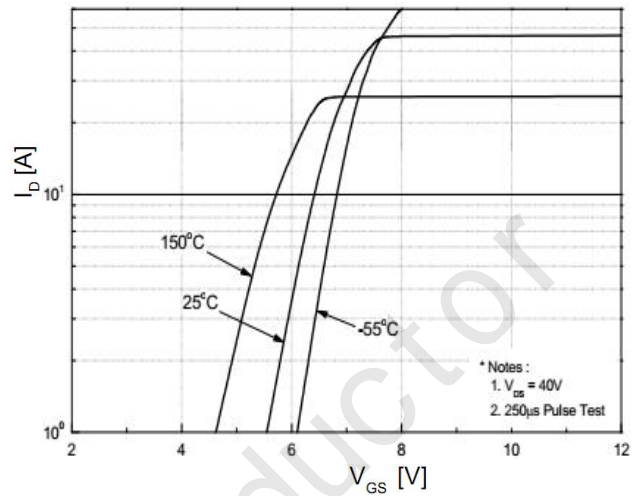
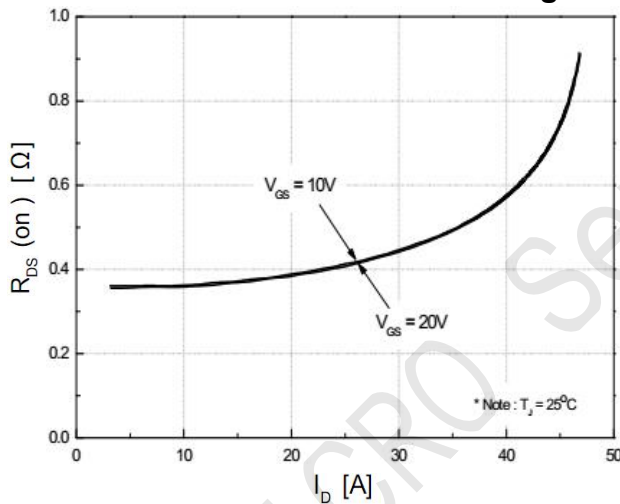
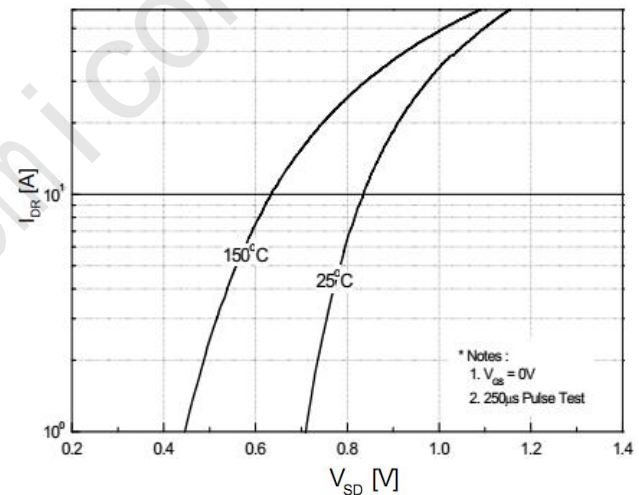
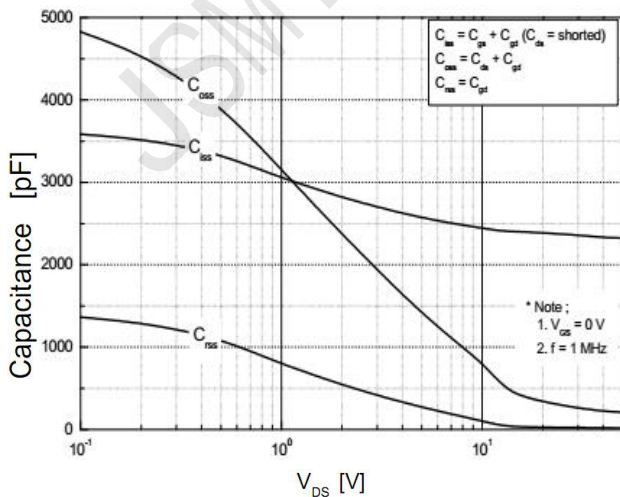
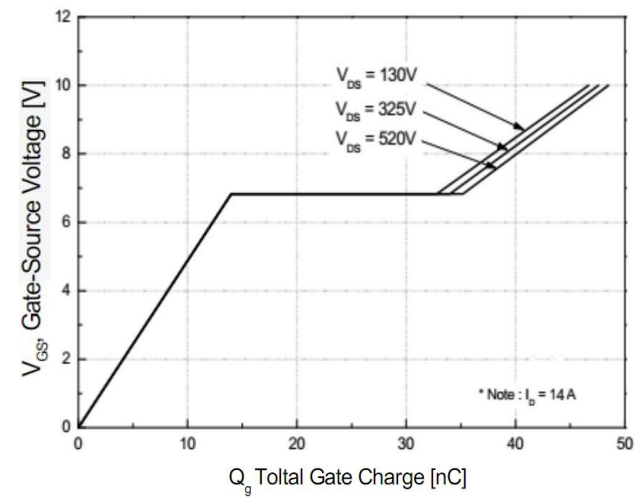
Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Thermal Resistance,Junction to Case	2.31	$^\circ\text{C} / \text{W}$
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	62.5	$^\circ\text{C} / \text{W}$

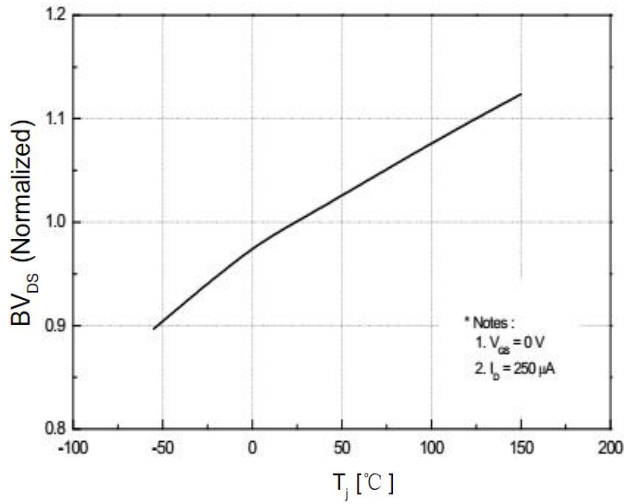
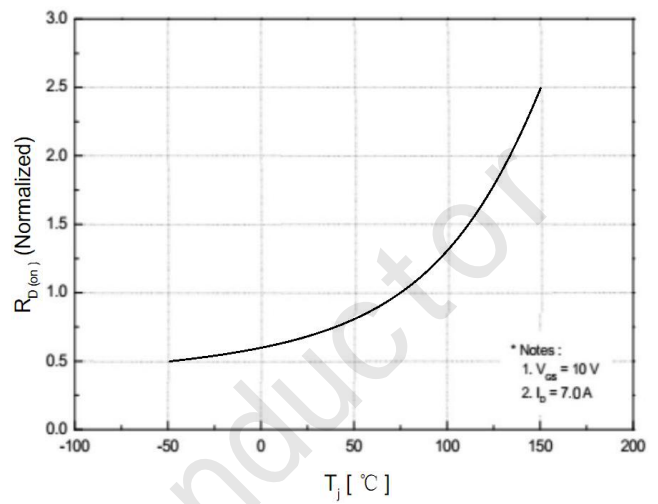
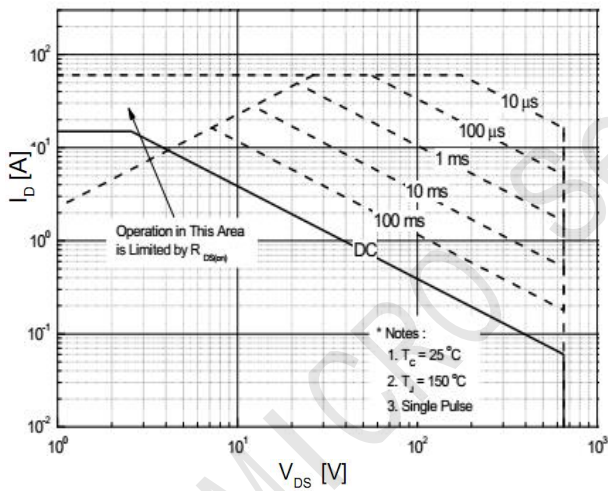
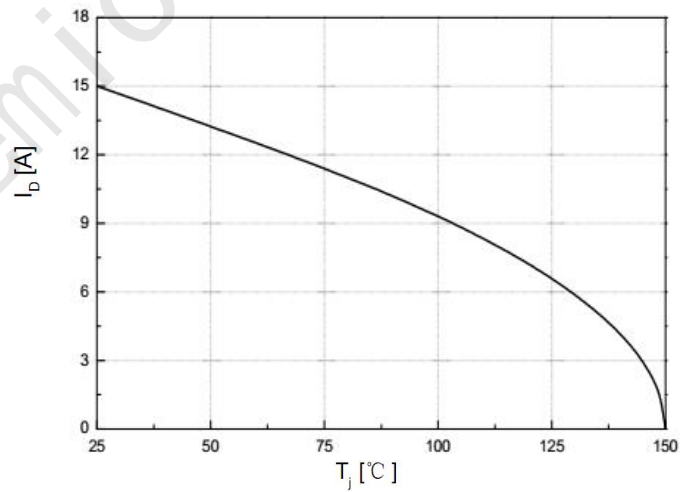
**Electrical Characteristics**(Tc=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
BV <sub>DSS</sub>	Drain-source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	650	--	--	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	I <sub>D</sub> =250μA (Referenced to 25°C)	--	0.65	--	V/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =650V, V <sub>GS</sub> =0V	--	--	1	μA
		V <sub>DS</sub> =520V, Tc=125°C	--	--	10	μA
I <sub>GSSF</sub>	Gate-Body Leakage Current, Forward	V <sub>GS</sub> =+30V, V <sub>DS</sub> =0V	--	--	100	nA
I <sub>GSSR</sub>	Gate-Body Leakage Current, Reverse	V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V	--	--	-100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	--	4.0	V
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10 V, I <sub>D</sub> =7.0A	--	0.6	0.75	Ω
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =40 V, I <sub>D</sub> =7.0A (Note4)	--	9.0	--	S
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	--	2150	--	pF
C <sub>oss</sub>	Output Capacitance		--	255	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	22.5	--	pF
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = 325 V, I <sub>D</sub> = 14 A, R <sub>G</sub> = 25 Ω (Note4,5)	--	55	--	ns
t <sub>r</sub>	Turn-On Rise Time		--	100	--	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		--	115	--	ns
t <sub>f</sub>	Turn-Off Fall Time		--	75.0	--	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = 520 V, I <sub>D</sub> =14.0 A, V <sub>GS</sub> = 10 V (Note4,5)	--	49	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	12	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	22	--	nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain-Source Diode Forward Current		--	--	14	A
I <sub>SM</sub>	Maximum Pulsed Drain-Source Diode Forward Current		--	--	56	A
V <sub>SD</sub>	Drain-Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =14.0A	--	--	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> =14.0A, d I <sub>F</sub> /dt=100A/μs (Note4)	--	480	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	5.25	--	μC

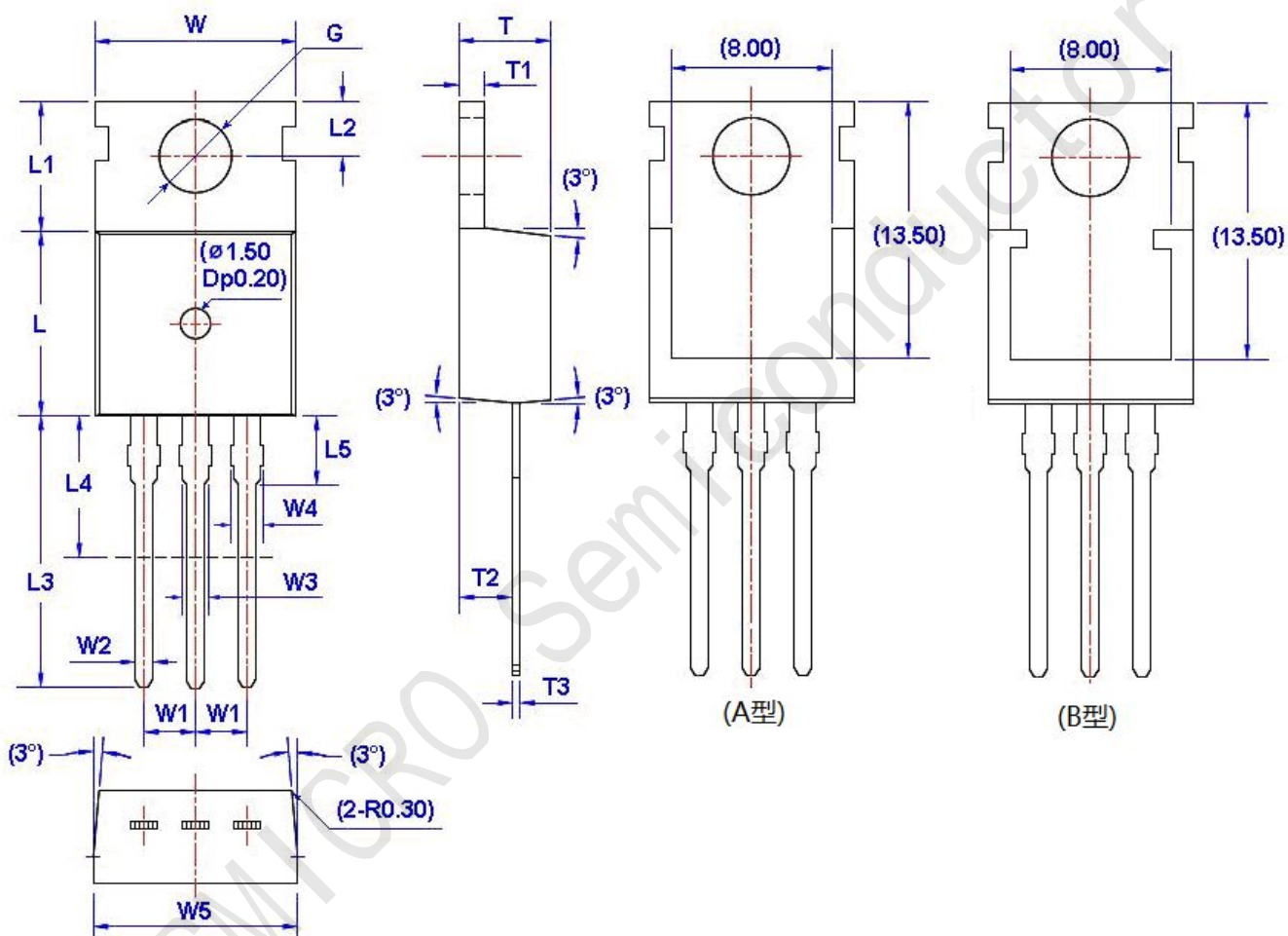
**Notes:**

- 1、Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature.
- 2、L = 10mH, I<sub>AS</sub> =14.0A, V<sub>DD</sub> = 50V, R<sub>G</sub> = 25 Ω, Starting T<sub>J</sub> = 25°C.
- 3、I<sub>SD</sub>≤14.0A, di/dt≤200A/μs, V<sub>DD</sub>≤BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25°C.
- 4、Pulse Test : Pulse Width ≤300 μ s, Duty Cycle≤2%.
- 5、Essentially Independent of Operating Temperature.

**On-Regin Characteristics**

**Transfer Characteristics**

**On-Resistance Variation vs. Drain Current and Gate Voltage**

**Body Diode Forward Voltage Variation vs. Source Current and Temperature**

**Capacitance Characteristics**

**Gate Charge Characteristics**


**Breakdown Voltage Variation vs. Temperature**

**On-Resistance Variation vs. Temperature**

**Maximum Safe Operating Area**

**Maximum Drain Current Vs. Case Temperature**


## TO-220 Package Dimensions



Unit: mm

Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	9.66	10.28	W5	9.80	10.20	L4**	6.20	6.60	T3	0.45	0.60
W1	2.54 (TYP)		L	9.00	9.40	L5	2.79	3.30	G( $\Phi$ )	3.50	3.70
W2	0.70	0.95	L1	6.40	6.80	T	4.30	4.70			
W3	1.17	1.37	L2	2.70	2.90	T1	1.15	1.40			
W4*	1.32	1.72	L3	12.70	14.27	T2	2.20	2.60			