N-Channel Enhancement Mode Field Effect Transistor

PD618BA
TO-252
Halogen-Free & Lead-Free

Yixin

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
30V	5.5mΩ	74A
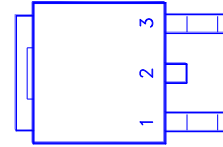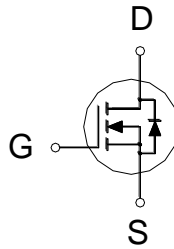
1. GATE
2. DRAIN
3. SOURCE

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[2]	T_C = 25 °C	I_D	74	A
	T_C = 100 °C		46	
Pulsed Drain Current[1]		I_{DM}	150	
Avalanche Current		I_{AS}	31	
Avalanche Energy	L = 0.1mH	E_{AS}	48	mJ
Power Dissipation	T_C = 25 °C	P_D	54	W
	T_C = 100 °C		21	
Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		2.3	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	

[1]Pulse width limited by maximum junction temperature.
[2]Package limitation current is 40A

ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	30			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.3	1.7	2.3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V			1	μA
		V_{DS} = 20V, V_{GS} = 0V, T_J = 125 °C			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 15A		4.3	8	mΩ
		V_{GS} = 10V , I_D = 20A		3.3	5.5	

REV 1.0

Forward Transconductance[1]	g_{fs}	$V_{DS} = 5V$, $I_D = 20A$		60		S
DYNAMIC						
Input Capacitance	C_{iss}	$V_{GS} = 0V$, $V_{DS} = 15V$, $f = 1MHz$		1435		pF
Output Capacitance	C_{oss}			259		
Reverse Transfer Capacitance	C_{rss}			162		
Gate Resistance	R_g	$V_{GS} = 0V$, $V_{DS} = 0V$, $f = 1MHz$		1.3		Ω
Total Gate Charge[2]	$Q_{g(VGS=10V)}$	$V_{DS} = 15V$, $I_D = 20A$		28.3		nC
	$Q_{g(VGS=4.5V)}$			15.4		
Gate-Source Charge[2]	Q_{gs}			3.5		
Gate-Drain Charge[2]	Q_{gd}			7.7		
Turn-On Delay Time[2]	$t_{d(on)}$	$V_{DS} = 15V$ $I_D \cong 20A$, $V_{GS} = 10V$, $R_{GEN} = 6\Omega$		35		nS
Rise Time[2]	t_r			25		
Turn-Off Delay Time[2]	$t_{d(off)}$			70		
Fall Time[2]	t_f			25		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current[3]	I_S				45	A
Forward Voltage[1]	V_{SD}	$I_F = 20A$, $V_{GS} = 0V$			1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 20A$, $dI_F/dt = 100A / \mu S$		24		nS
Reverse Recovery Charge	Q_{rr}			11		nC

[1]Pulse test : Pulse Width $\leq$ 300 μsec, Duty Cycle $\leq 2\%$.
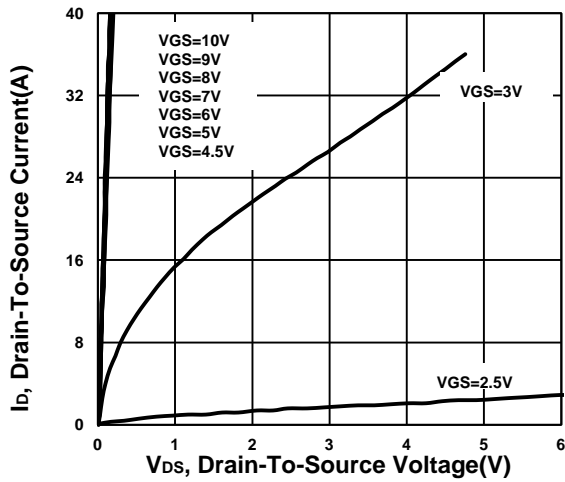[2]Independent of operating temperature.
[3]Package limitation current is 40A

N-Channel Enhancement Mode
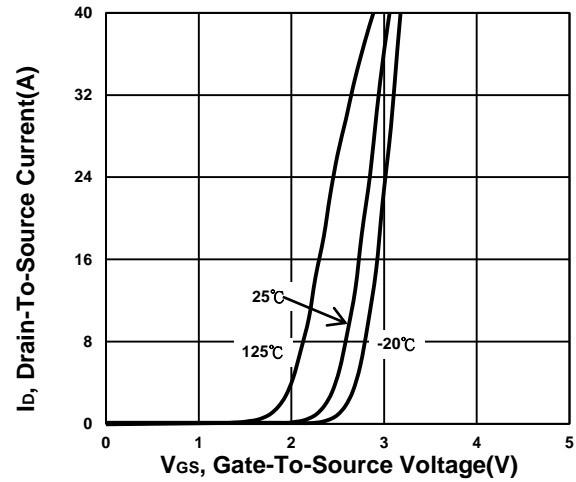# Field Effect Transistor

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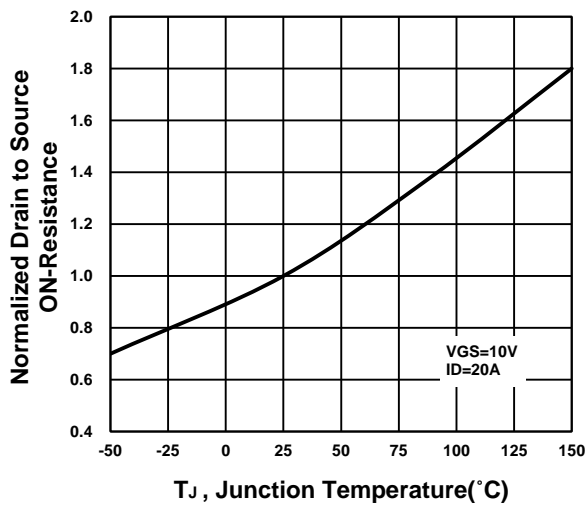**Halogen-Free & Lead-Free**

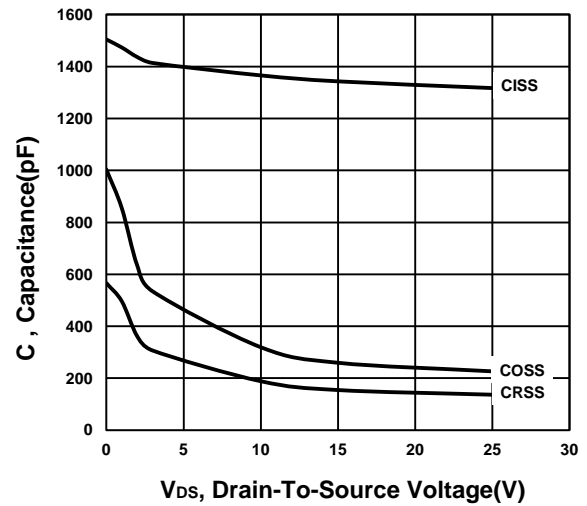## Output Characteristics

Transfer Characteristics

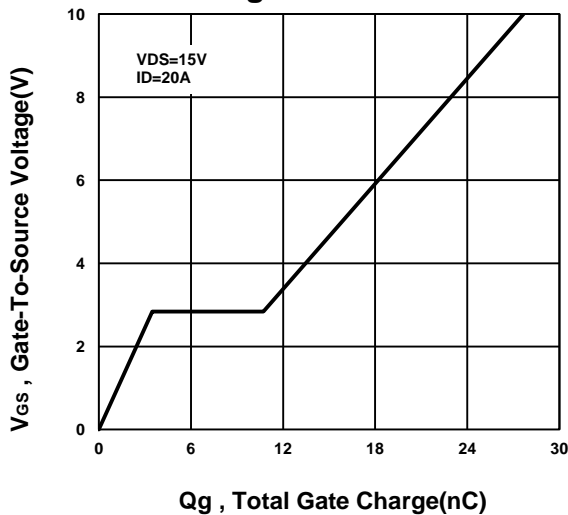## On-Resistance VS Temperature

Capacitance Characteristic

Gate charge Characteristics

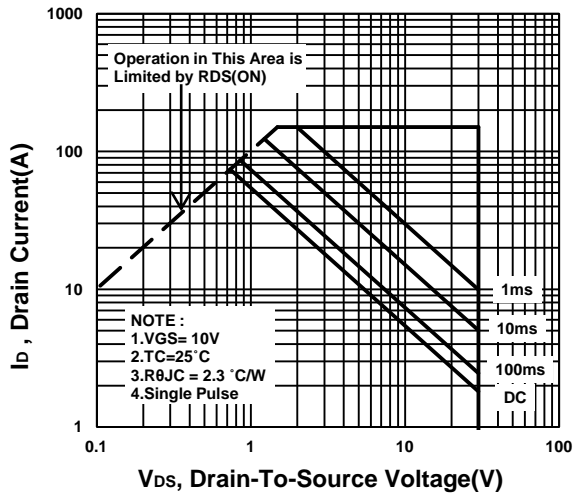## Source-Drain Diode Forward Voltage
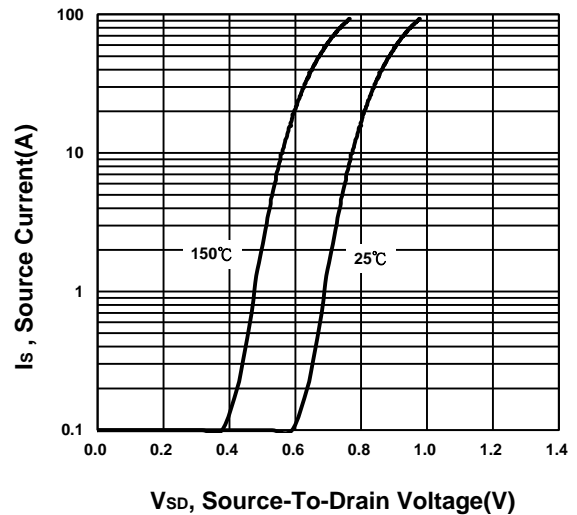
Safe Operating Area

Operation in This Area is Limited by RDS(ON)

I_D , Drain Current(A)

1000
100
10
1

1ms
10ms
100ms
DC

NOTE :
1.VGS= 10V
2.TC=25°C
3.RθJC = 2.3 °C/W
4.Single Pulse

0.1   1   10   100

VDS, Drain-To-Source Voltage(V)

Single Pulse Maximum Power Dissipation

Power(W)

300
240
180
120
60
0

Single Pulse
RθJC = 2.3 °C/W
TC=25°C

0.001   0.01   0.1   1   10   100

Single Pulse Time(s)
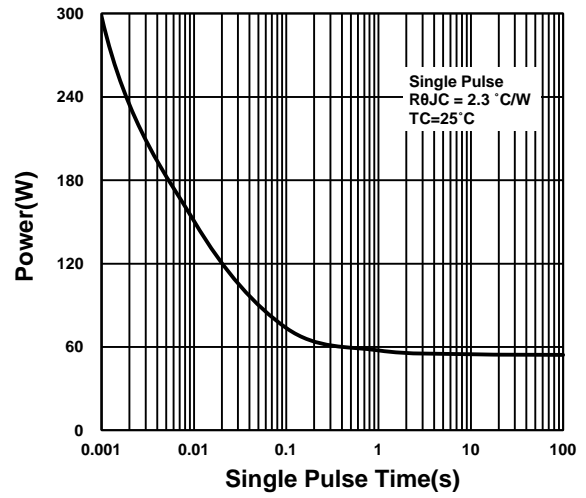
Transient Thermal Response Curve

r(t) , Normalized Effective Transient Thermal Resistance

10
1
0.1
0.01

Duty cycle=0.5
0.2
0.1
0.05
0.02
0.01

single pulse

Notes
P_{DM}
t1
t2

1.Duty cycle, D= t1 / t2
2.RthJC = 2.3 °C/W
3.TJ-TC = P*RthJC(t)
4.RthJC(t) = r(t)*RthJC

0.0001   0.001   0.01   0.1   1   10   100

T1 , Square Wave Pulse Duration[sec]