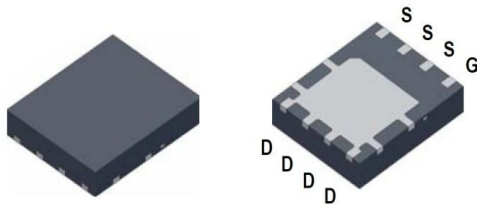


# PK616BA

## N-Channel Enhancement Mode MOSFET

### PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$
30V	7m $\Omega$ @ $V_{GS} = 10V$	50A



### PDFN 5X6P

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25\text{ }^\circ\text{C}$ Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS	SYMBOL	LIMITS	UNITS	
Drain-Source Voltage	$V_{DS}$	30	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V	
Continuous Drain Current	$I_D$	$T_c = 25\text{ }^\circ\text{C}$	50	
		$T_c = 100\text{ }^\circ\text{C}$	31.5	
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	120	A	
Continuous Drain Current	$I_D$	$T_A = 25\text{ }^\circ\text{C}$		13
		$T_A = 70\text{ }^\circ\text{C}$		10.5
Avalanche Current	$I_{AS}$	24		
Avalanche Energy	$L = 0.1\text{mH}$	$E_{AS}$	28.5	mJ
Power Dissipation		$T_c = 25\text{ }^\circ\text{C}$	31	W
		$T_c = 100\text{ }^\circ\text{C}$	12.5	
Power Dissipation		$T_A = 25\text{ }^\circ\text{C}$	2.2	W
		$T_A = 70\text{ }^\circ\text{C}$	1.4	
Operating Junction & Storage Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ\text{C}$	

### THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient <sup>2</sup>	$R_{\theta JA}$		57	$^\circ\text{C} / \text{W}$
Junction-to-Case	$R_{\theta JC}$		4	

<sup>1</sup>Pulse width limited by maximum junction temperature.

<sup>2</sup>The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

# PK616BA

## N-Channel Enhancement Mode MOSFET

### ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNITS
			MIN	TYP	MAX	
<b>STATIC</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	30			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.35	1.7	3	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V			1	μA
		V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 55 °C			10	
Drain-Source On-State Resistance <sup>1</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 13A		6.3	9.5	mΩ
		V <sub>GS</sub> = 10V, I <sub>D</sub> = 13A		4.8	7	
Forward Transconductance <sup>1</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 13A		60		S
<b>DYNAMIC</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V, f = 1MHz		847		pF
Output Capacitance	C <sub>oss</sub>			163		
Reverse Transfer Capacitance	C <sub>rss</sub>			97		
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz		2.3		Ω
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	V <sub>GS</sub> = 10V	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 13A	17.5		nC
		V <sub>GS</sub> = 4.5V		9.3		
Gate-Source Charge <sup>2</sup>	Q <sub>gs</sub>	2.1				
Gate-Drain Charge <sup>2</sup>	Q <sub>gd</sub>	5.4				
Turn-On Delay Time <sup>2</sup>	t <sub>d(on)</sub>	I <sub>D</sub> ≅ 13A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = 6Ω			27	
Rise Time <sup>2</sup>	t <sub>r</sub>			23		
Turn-Off Delay Time <sup>2</sup>	t <sub>d(off)</sub>			51		
Fall Time <sup>2</sup>	t <sub>f</sub>			24		
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T<sub>J</sub> = 25 °C)</b>						
Continuous Current	I <sub>S</sub>				25.8	A
Forward Voltage <sup>1</sup>	V <sub>SD</sub>	I <sub>F</sub> = 13A, V <sub>GS</sub> = 0V			1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 13A, dI <sub>F</sub> /dt = 100A / μS		10.8		nS
Reverse Recovery Charge	Q <sub>rr</sub>			2.3		nC

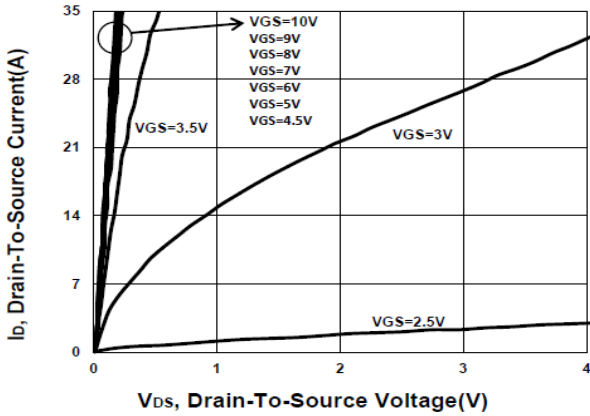
<sup>1</sup>Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

<sup>2</sup>Independent of operating temperature.

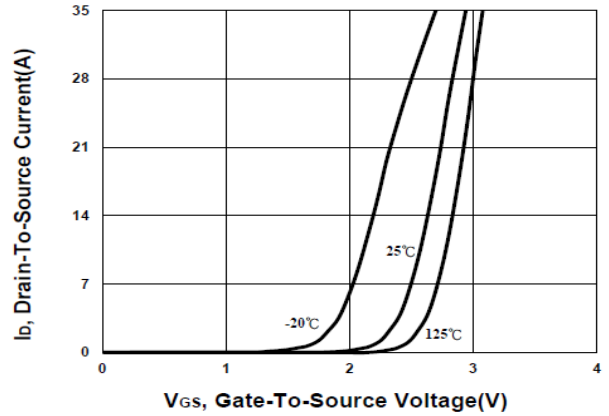
# PK616BA

## N-Channel Enhancement Mode MOSFET

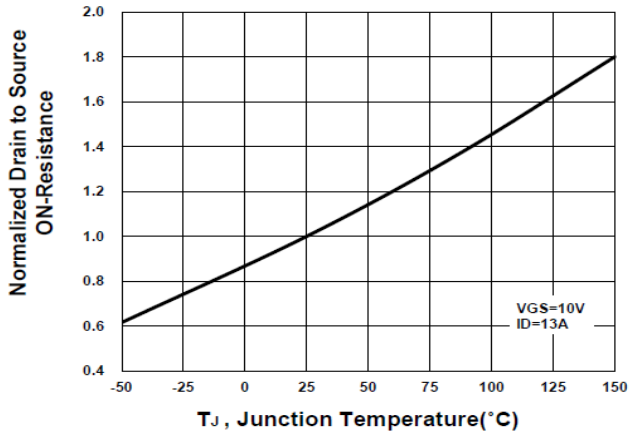
**Output Characteristics**



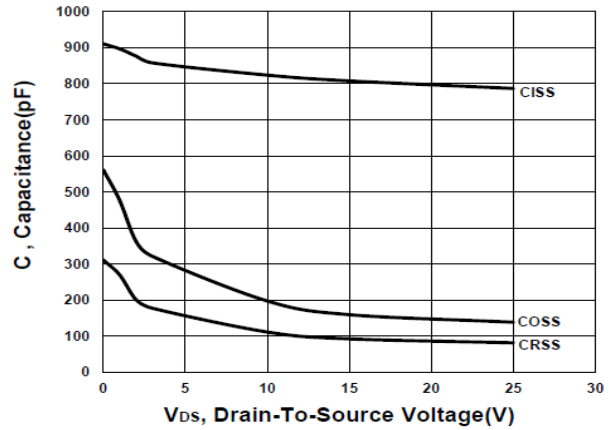
**Transfer Characteristics**



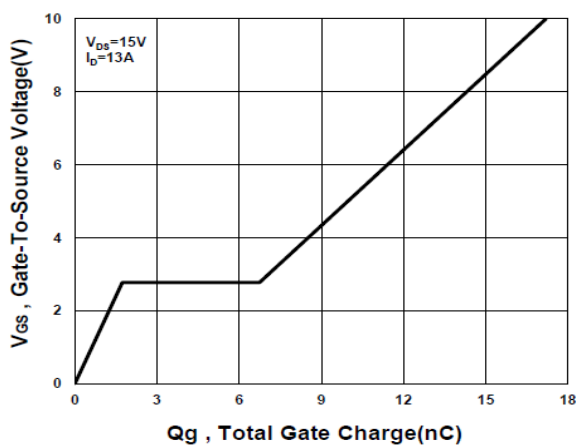
**On-Resistance VS Temperature**



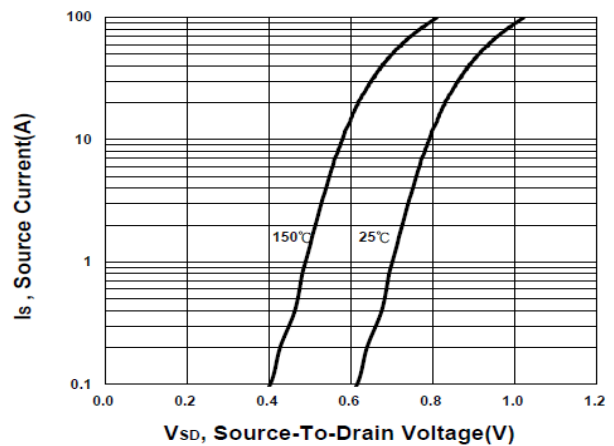
**Capacitance Characteristic**



**Gate charge Characteristics**



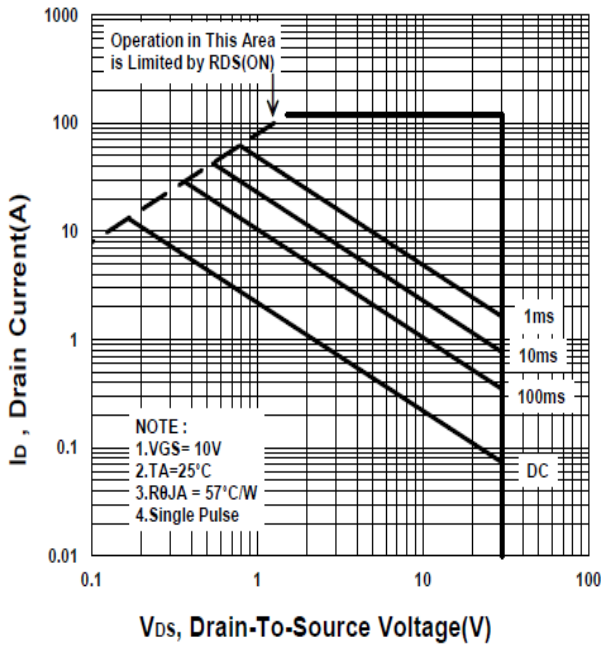
**Source-Drain Diode Forward Voltage**



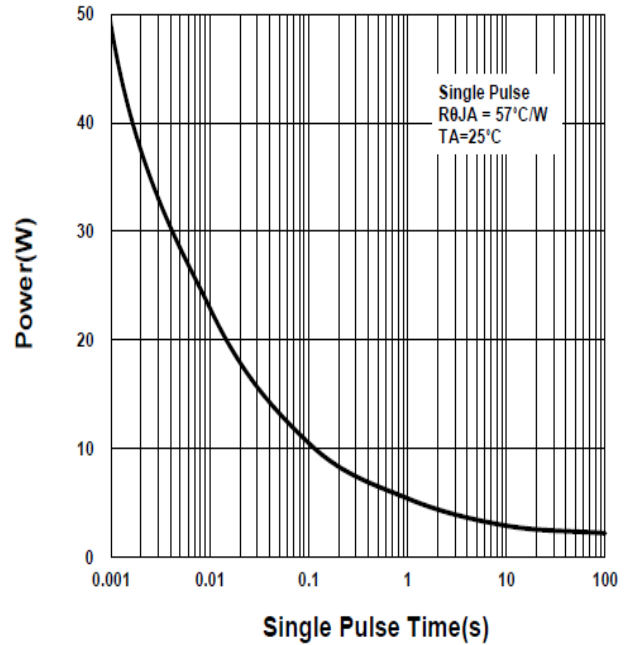
# PK616BA

## N-Channel Enhancement Mode MOSFET

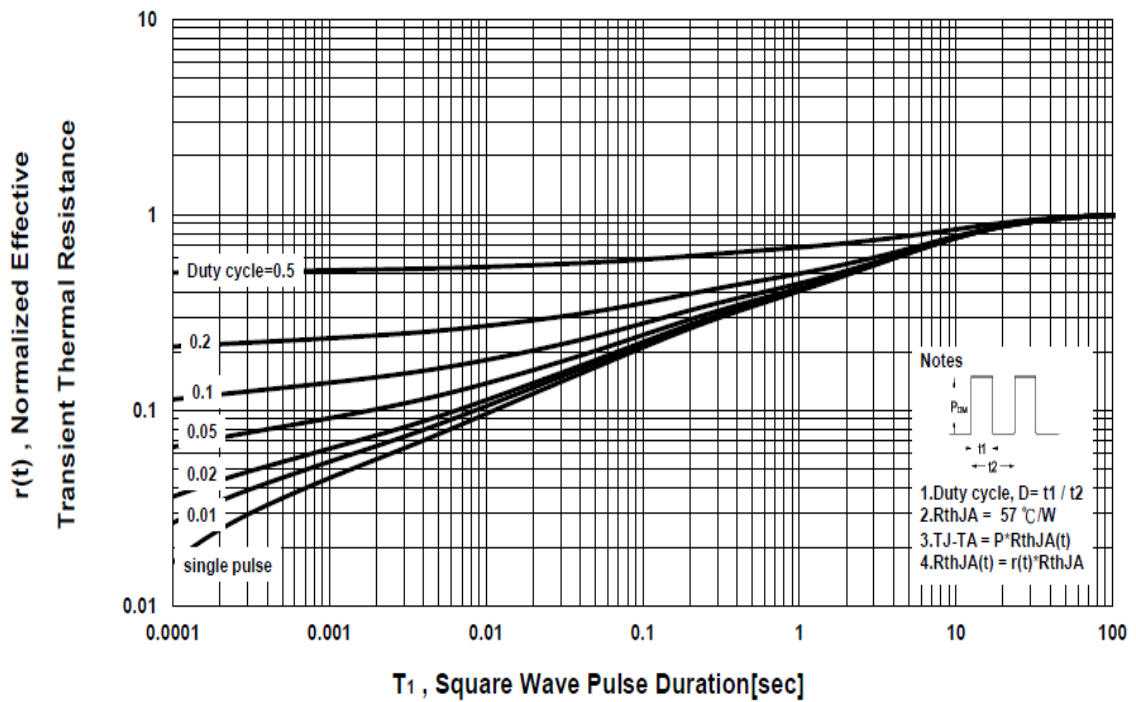
**Safe Operating Area**



**Single Pulse Maximum Power Dissipation**



**Transient Thermal Response Curve**



**PK616BA**  
**N-Channel Enhancement Mode MOSFET**

**PDFN 5x6P MECHANICAL DATA**

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	4.8		5.15	J	3.33		3.78
B	5.44		5.9	K	0.9		
C	5.9		6.35	L	0.35		0.712
D	0.33		0.51	M	0°		12°
E		1.27		N	4.8		5.5
F	0.8		1.25	O	0.05		0.3
G	0.15		0.34	P	0.06		0.2
H	3.61		4.31	S	3.69		4.19
I	0.35		0.71				

