

N-Channel Enhancement Mode Field Effect Transistor

PK6D0BA

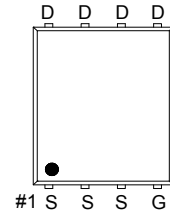
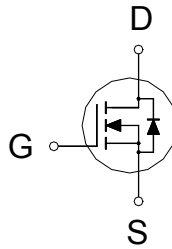
PDFN 5x6P

Halogen-Free & Lead-Free



PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
30V	10.5m Ω	40A



G. GATE
D. DRAIN
S. SOURCE

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}	± 20	V
Continuous Drain Current	$T_C = 25\text{ }^{\circ}\text{C}$	I_D	40	A
	$T_C = 100\text{ }^{\circ}\text{C}$		25	
Pulsed Drain Current ¹		I_{DM}	80	
Continuous Drain Current	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	10	
	$T_A = 70\text{ }^{\circ}\text{C}$		8.3	
Avalanche Current		I_{AS}	21	
Avalanche Energy	$L = 0.1\text{mH}$	E_{AS}	22	mJ
Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	P_D	31	W
	$T_C = 100\text{ }^{\circ}\text{C}$		12	
Power Dissipation	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	2	W
	$T_A = 70\text{ }^{\circ}\text{C}$		1.3	
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 ²	$R_{\theta JA}$		60	$^{\circ}\text{C} / \text{W}$
Junction-to-Case	$R_{\theta JC}$		4	

¹Pulse width limited by maximum junction temperature.

²The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^{\circ}\text{C}$.

ELECTRICAL CHARACTERISTICS ($T_J = 25\text{ }^{\circ}\text{C}$, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.3	1.75	2.3	

N-Channel Enhancement Mode Field Effect Transistor

PK6D0BA

PDFN 5x6P

Halogen-Free & Lead-Free

Gate-Body Leakage	I_{GSS}		$V_{DS} = 0V, V_{GS} = \pm 20V$				± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}		$V_{DS} = 24V, V_{GS} = 0V$				1	μA
			$V_{DS} = 20V, V_{GS} = 0V, T_J = 55\text{ }^{\circ}C$				10	
Drain-Source On-State Resistance ¹	$R_{DS(ON)}$		$V_{GS} = 4.5V, I_D = 13A$			10	14	m Ω
			$V_{GS} = 10V, I_D = 13A$			7	10.5	
Forward Transconductance ¹	g_{fs}		$V_{DS} = 5V, I_D = 13A$			42		S
DYNAMIC								
Input Capacitance	C_{iss}		$V_{GS} = 0V, V_{DS} = 15V, f = 1MHz$			529		pF
Output Capacitance	C_{oss}					142		
Reverse Transfer Capacitance	C_{rss}					64		
Gate Resistance	R_g		$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$			1		Ω
Total Gate Charge ²	Q_g	$V_{GS} = 10V$	$V_{DS} = 15V, V_{GS} = 10V, I_D = 13A$			10.3		nC
		$V_{GS} = 4.5V$				6		
Gate-Source Charge ²	Q_{gs}					1.4		
Gate-Drain Charge ²	Q_{gd}					3		
Turn-On Delay Time ²	$t_{d(on)}$		$V_{DS} = 15V, I_D \cong 13A, V_{GS} = 10V, R_{GEN} = 6\Omega$			15		nS
Rise Time ²	t_r					13		
Turn-Off Delay Time ²	$t_{d(off)}$					21		
Fall Time ²	t_f					15		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J = 25\text{ }^{\circ}C$)								
Continuous Current	I_S						25	A
Forward Voltage ¹	V_{SD}		$I_F = 13A, V_{GS} = 0V$				1.2	V
Reverse Recovery Time	t_{rr}		$I_F = 13A, di_F/dt = 100A / \mu S$			8.2		nS
Reverse Recovery Charge	Q_{rr}					1.3		nC

¹Pulse test : Pulse Width $\leq 300 \mu sec$, Duty Cycle $\leq 2\%$.

²Independent of operating temperature.

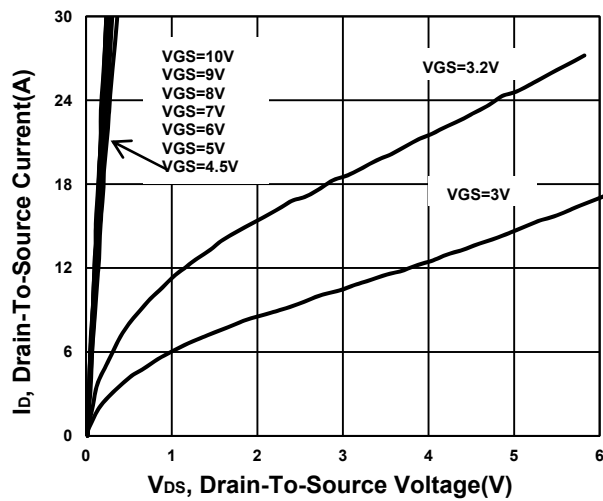
N-Channel Enhancement Mode Field Effect Transistor

PK6D0BA

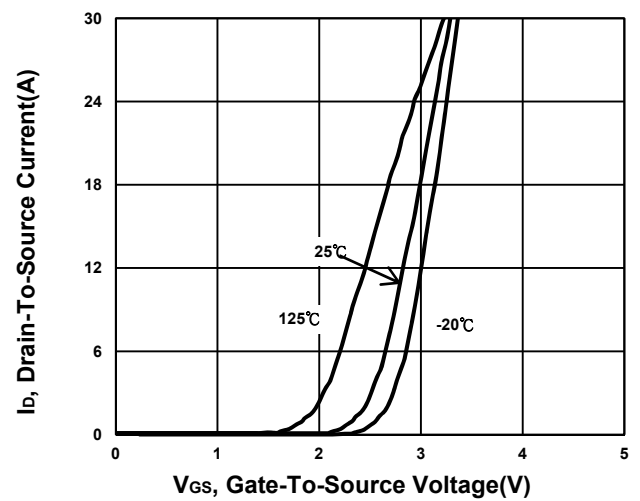
PDFN 5x6P

Halogen-Free & Lead-Free

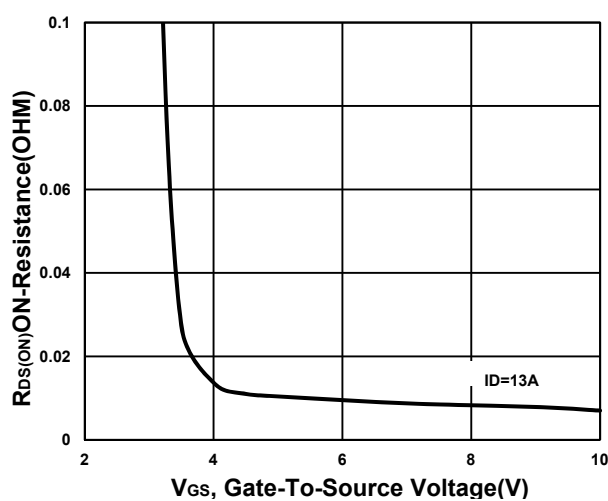
Output Characteristics



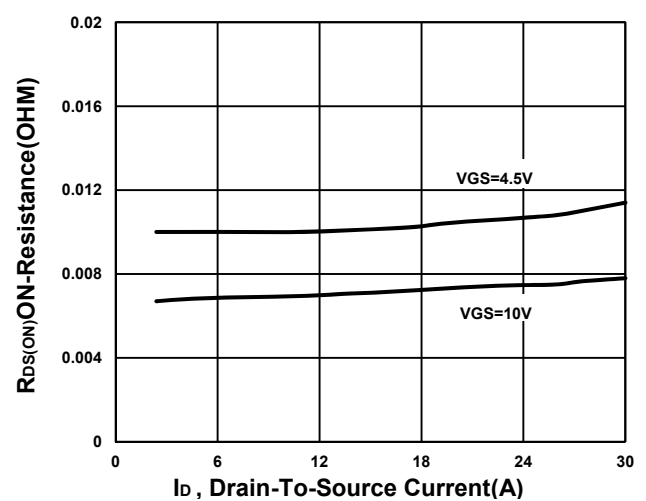
Transfer Characteristics



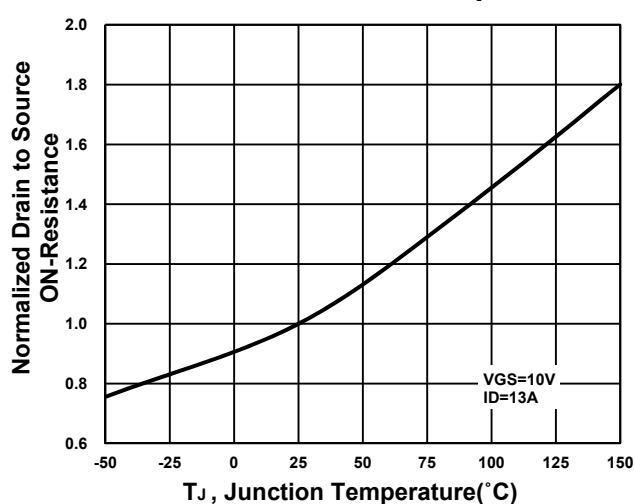
On-Resistance VS Gate-To-Source



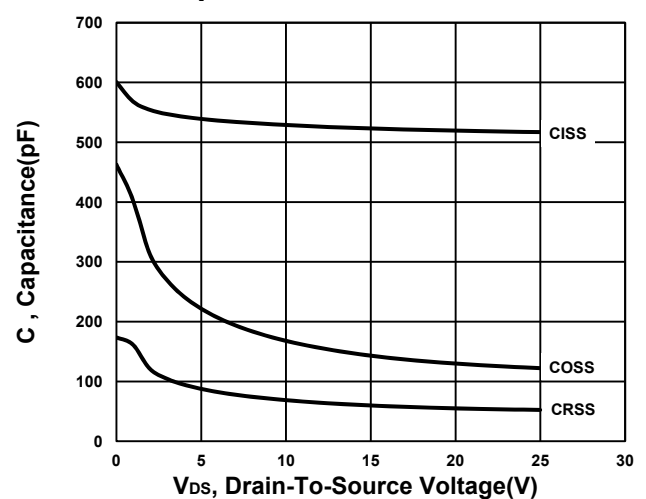
On-Resistance VS Drain Current



On-Resistance VS Temperature



Capacitance Characteristic



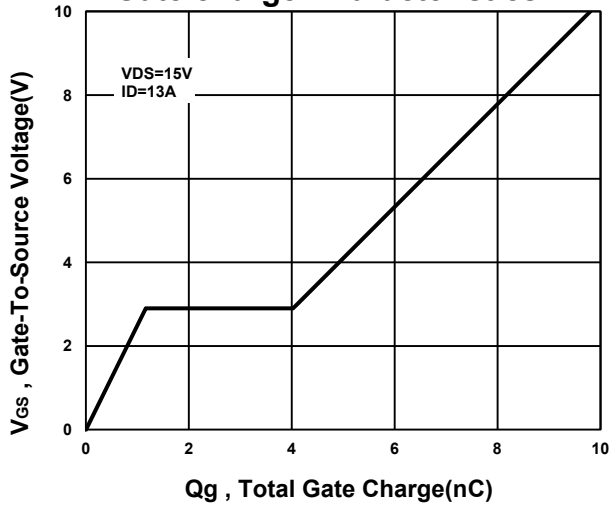
N-Channel Enhancement Mode Field Effect Transistor

PK6D0BA

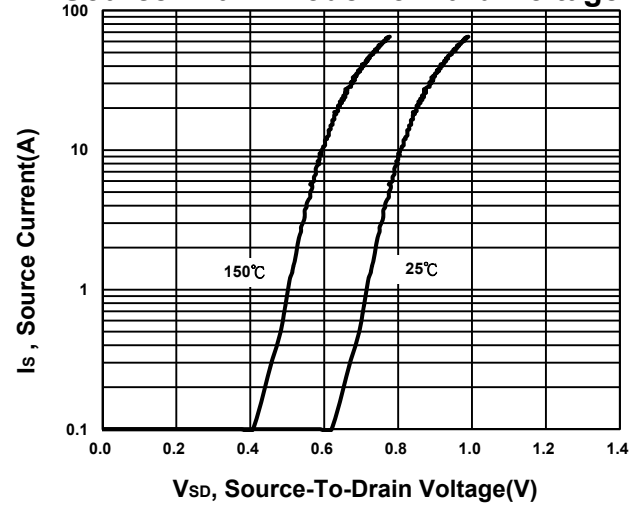
PDFN 5x6P

Halogen-Free & Lead-Free

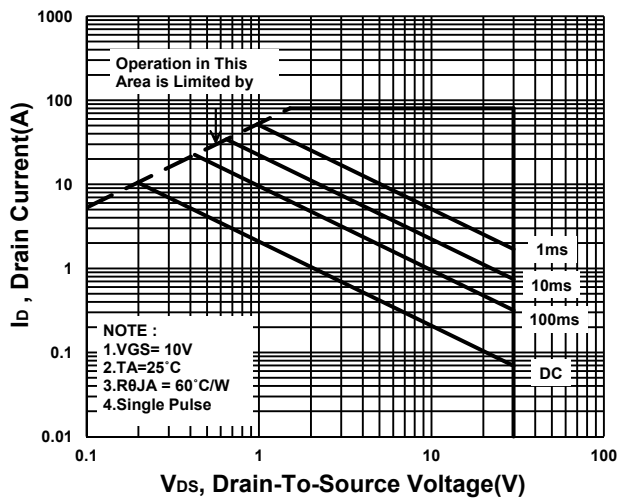
Gate charge Characteristics



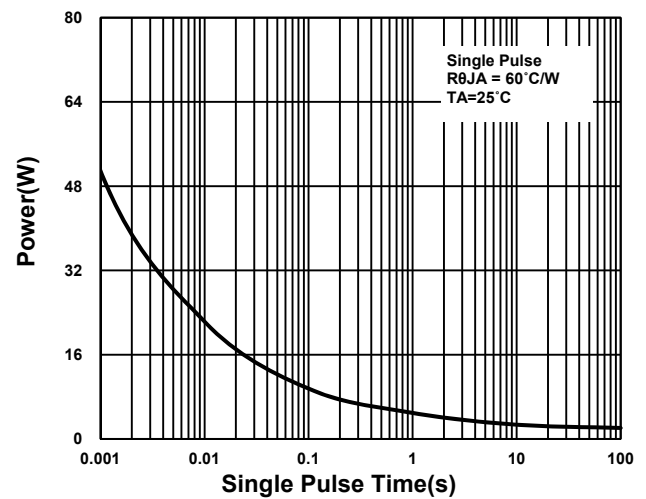
Source-Drain Diode Forward Voltage



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

