NIKO-SEM

N-Channel Logic Level Enhancement Mode Field Effect Transistor

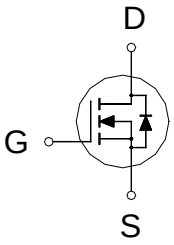
P1703BDG

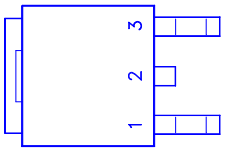
TO-252

Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
25	14mΩ	46A





1. GATE
2. DRAIN
3. SOURCE

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25 °C	I_D	46	A
	T_C = 100 °C		28	
Pulsed Drain Current[1]		I_{DM}	140	
Avalanche Current		I_{AR}	20	
Avalanche Energy	L = 0.1mH	E_{AS}	140	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	5.6	
Power Dissipation	T_C = 25 °C	P_D	42	W
	T_C = 100 °C		17	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C
Lead Temperature ($^1/_{16}$" from case for 10 sec.)		T_L	275	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		3	°C / W
Junction-to-Ambient	$R_{\theta JA}$		70	
Case-to-Heatsink	$R_{\theta CS}$	0.7		

[1]Pulse width limited by maximum junction temperature.
[2]Duty cycle ≤ 1%

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

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250µA	25			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	1	1.6	2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V			25	µA
		V_{DS} = 20V, V_{GS} = 0V, T_J = 125 °C			250	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 10V, V_{GS} = 10V	45			A

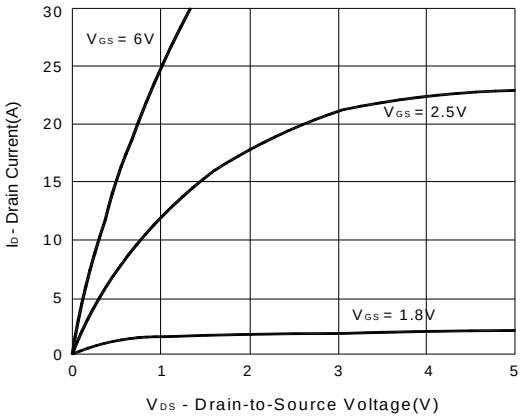
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 7V, I_D = 18A		18	25	mΩ
		V_{GS} = 4.5V, I_D = 10A		14.6	19.4	
		V_{GS} = 10V, I_D = 20A		11.5	14	
Forward Transconductance[1]	g_{fs}	V_{DS} = 15V, I_D = 30A		16		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		600		pF
Output Capacitance	C_{oss}			290		
Reverse Transfer Capacitance	C_{rss}			100		
Total Gate Charge[2]	Q_g	V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = 10V, I_D = 20A		25		nC
Gate-Source Charge[2]	Q_{gs}			2.9		
Gate-Drain Charge[2]	Q_{gd}			7.0		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = 15V, R_L = 1Ω, I_D ≅ 30A, V_{GS} = 10V, R_{GS} = 2.5Ω		7.0		nS
Rise Time[2]	t_r			7.0		
Turn-Off Delay Time[2]	$t_{d(off)}$			24		
Fall Time[2]	t_f			6.0		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				30	A
Pulsed Current[3]	I_{SM}				150	
Forward Voltage[1]	V_{SD}	I_F = I_S, V_{GS} = 0V			1.3	V
Reverse Recovery Time	t_{rr}	I_F = I_S, dI_F/dt = 100A / μS		37		nS
Peak Reverse Recovery Current	$I_{RM(REC)}$			200		A
Reverse Recovery Charge	Q_{rr}			0.043		μC

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Pulse width limited by maximum junction temperature.

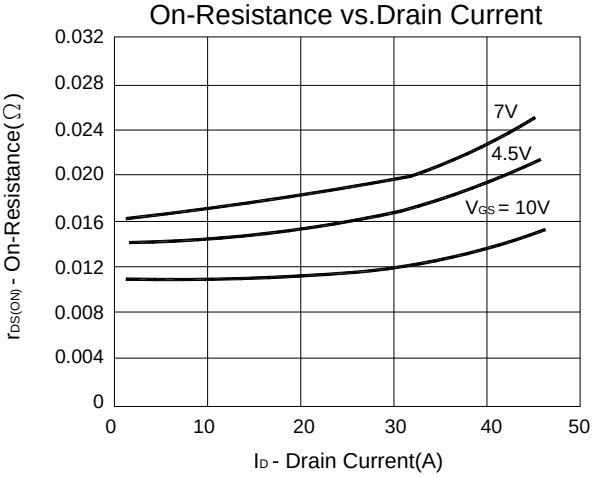
REMARK: THE PRODUCT MARKED WITH "P1703BDG", DATE CODE or LOT #

TYPICAL CHARACTERISTICS

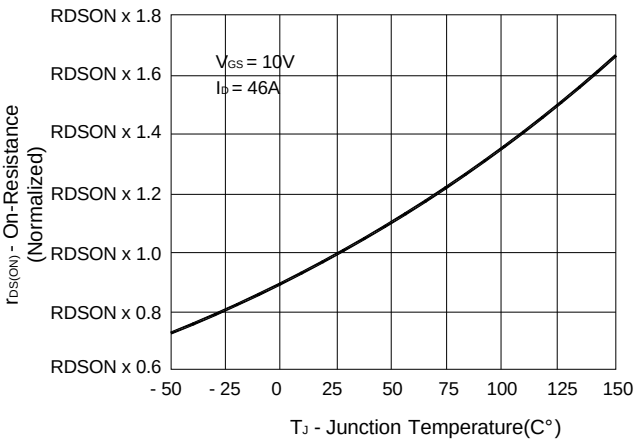
Output Characteristics



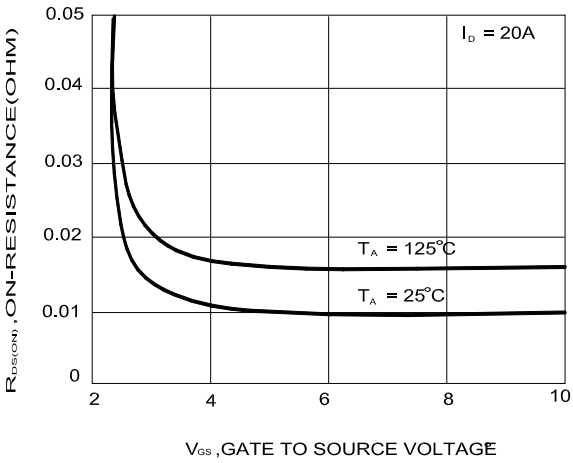
On-Resistance vs.Drain Current



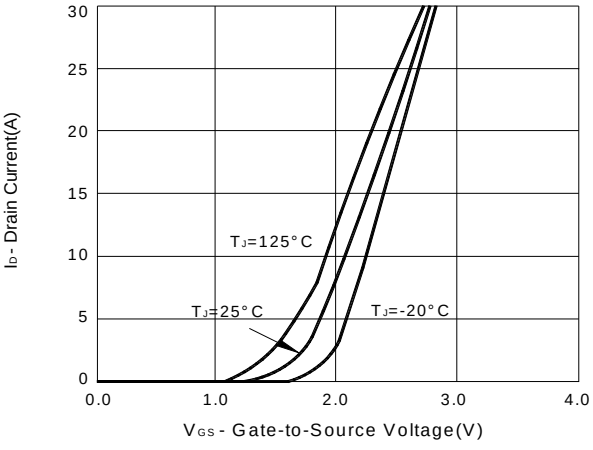
On-Resistance vs. Junction Temperature



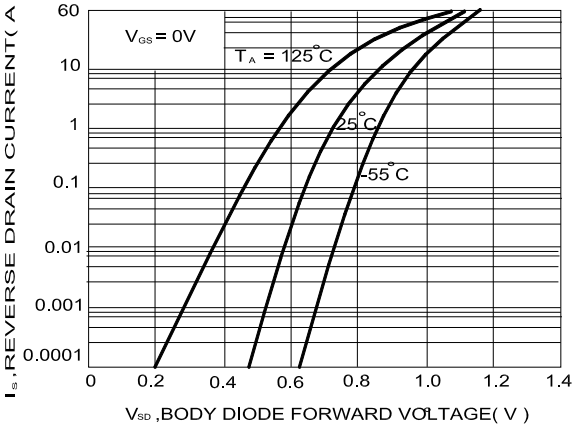
ON-RESISTANCE VARIATION WITH GATE-TO-SOURCE VOLTAGE

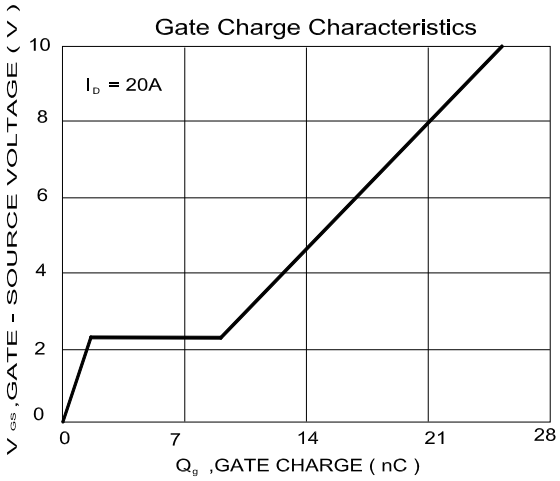


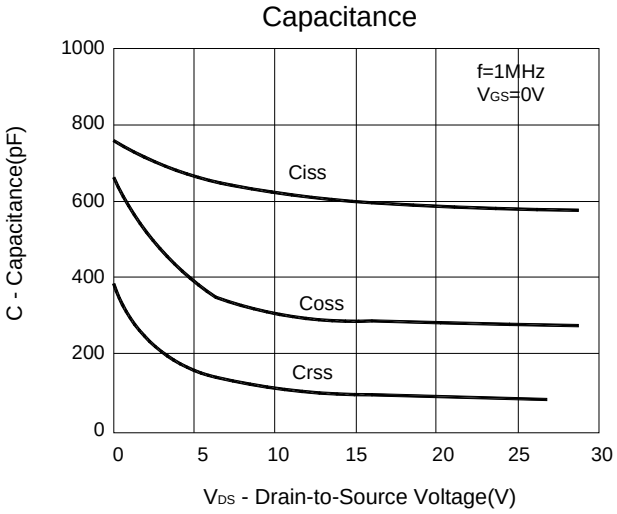
Transfer Characteristics

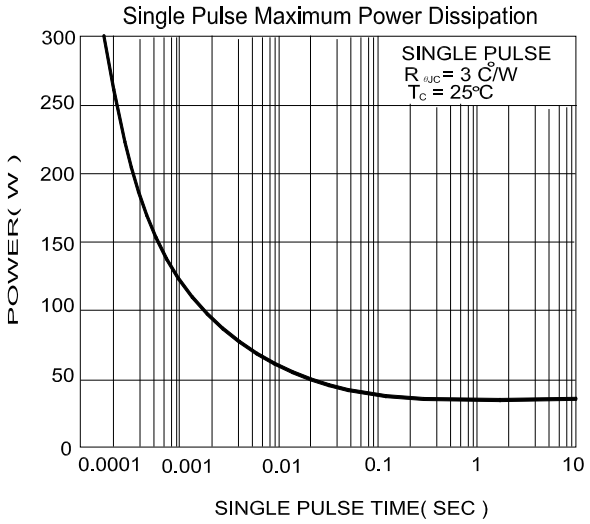


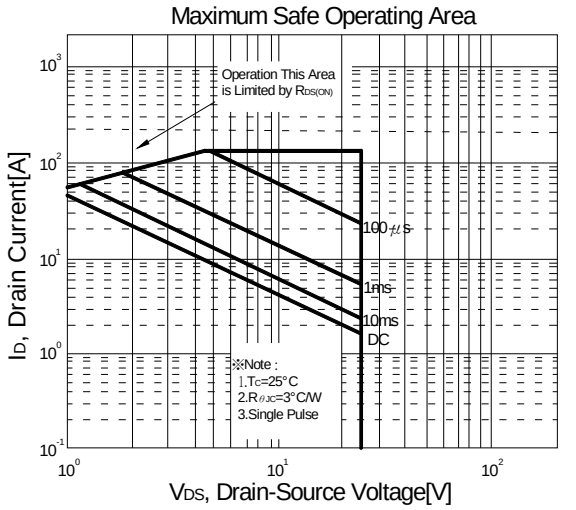
BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

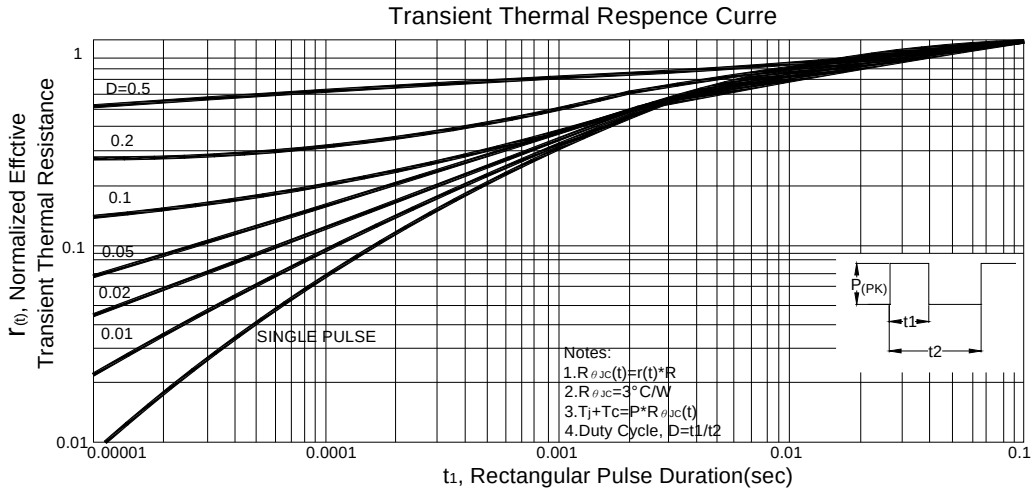



Gate Charge Characteristics
I_D = 20A
V_{GS}, GATE - SOURCE VOLTAGE (V)
Q_g ,GATE CHARGE (nC)


Capacitance
f=1MHz
V_{GS}=0V
Ciss
Coss
Crss
C - Capacitance(pF)
V_{DS} - Drain-to-Source Voltage(V)


Single Pulse Maximum Power Dissipation
SINGLE PULSE
$R_{\theta JC}$= 3 °C/W
T_C = 25°C
POWER(W)
SINGLE PULSE TIME(SEC)


Maximum Safe Operating Area
Operation This Area is Limited by $R_{DS(ON)}$
100μs
1ms
10ms
DC
※Note :
1.T_C=25°C
2.$R_{\theta JC}$=3°C/W
3.Single Pulse
I_D, Drain Current[A]
V_{DS}, Drain-Source Voltage[V]


Transient Thermal Respence Curre
D=0.5
0.2
0.1
0.05
0.02
0.01
SINGLE PULSE
Notes:
1.$R_{\theta JC}$(t)=r(t)*R
2.$R_{\theta JC}$=3°C/W
3.T_J+Tc=P*$R_{\theta JC}$(t)
4.Duty Cycle, D=t1/t2
P(PK)
t1
t2
$r_{(t)}$, Normalized Effctive Transient Thermal Resistance
t_1, Rectangular Pulse Duration(sec)

TO-252 (DPAK) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.35		10.1	H		0.8	
B	2.2		2.4	I	6.4		6.6
C	0.48		0.6	J	5.2		5.4
D	0.89		1.5	K	0.6		1
E	0.45		0.6	L	0.64		0.9
F	0.03		0.23	M	4.4		4.6
G	6		6.2	N