NIKO-SEM

N-Channel Logic Level Enhancement Mode Field Effect Transistor

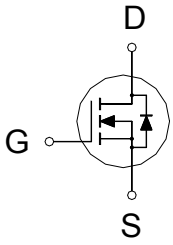
P2503BDG

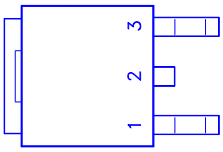
TO-252

Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
30	25mΩ	12A





1.GATE
2.DRAIN
3.SOURCE

ABSOLUTE MAXIMUM RATINGS (T_C = 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	T_C = 25 °C	I_D	12	A
	T_C = 70 °C		10	
Pulsed Drain Current[1]		I_{DM}	30	
Avalanche Current		I_{AR}	10	
Avalanche Energy	L = 0.1mH	E_{AS}	5	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	0.625	
Power Dissipation	T_C = 25 °C	P_D	32	W
	T_C = 70 °C		22	
Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		3.9	°C / W
Junction-to-Ambient	$R_{\theta JA}$		75	°C / W

[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			UNIT
			MIN	TYP	MAX	
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	1.5	2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±250	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 °C			10	

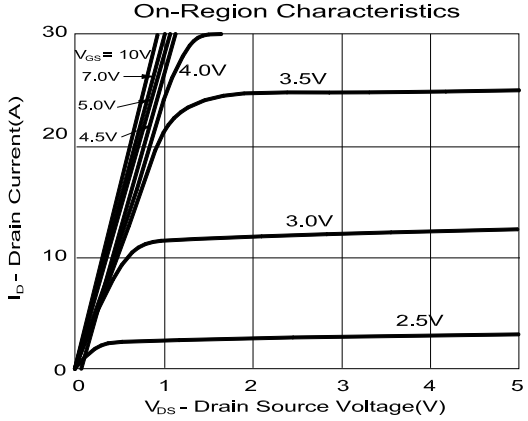
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 10V	30			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 6A		25	37	mΩ
		V_{GS} = 10V, I_D = 12A		18	25	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 12A		19		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 10V, f = 1MHz		790		pF
Output Capacitance	C_{oss}			175		
Reverse Transfer Capacitance	C_{rss}			65		
Total Gate Charge[2]	Q_g	V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = 10V, I_D = 12A		16		nC
Gate-Source Charge[2]	Q_{gs}			2.5		
Gate-Drain Charge[2]	Q_{gd}			2.1		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DD} = 10V, $I_D \cong$ 1A, V_{GS} = 10V, R_{GEN} = 6Ω		2.2	4.4	nS
Rise Time[2]	t_r			7.5	15	
Turn-Off Delay Time[2]	$t_{d(off)}$			11.8	21.3	
Fall Time[2]	t_f			3.7	7.4	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				1.3	A
Pulsed Current[3]	I_{SM}				2.6	
Forward Voltage[1]	V_{SD}	I_F = 1A, V_{GS} = 0V			1	V
Reverse Recovery Time	t_{rr}	I_F = 5 A, dIF/dt = 100A / μS		18.8		nS
Reverse Recovery Charge	Q_{rr}			17.6		nC

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

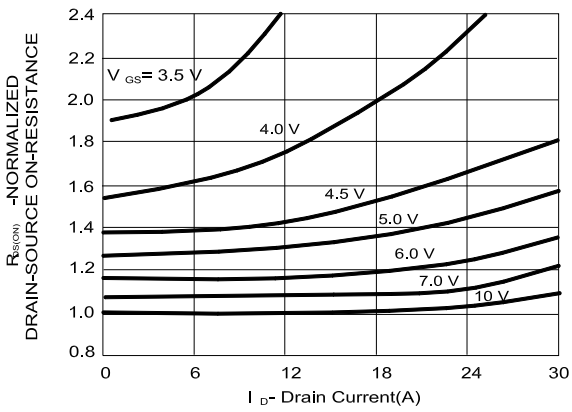
REMARK: THE PRODUCT MARKED WITH "P2503BDG", DATE CODE or LOT #

TYPICAL PERFORMANCE CHARACTERISTICS

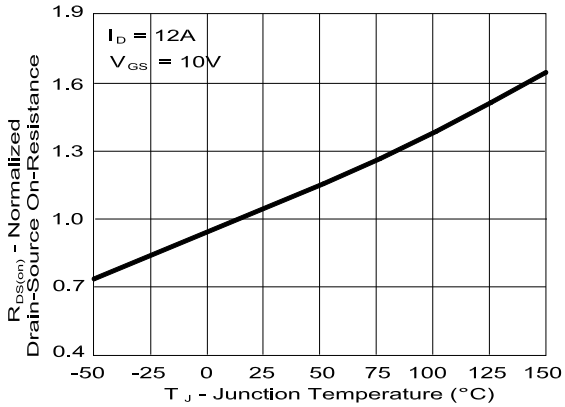
On-Region Characteristics



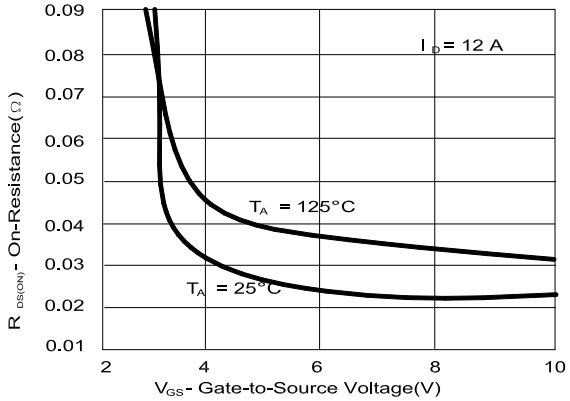
On-Resistance Variation with Drain Current and Gate Voltage



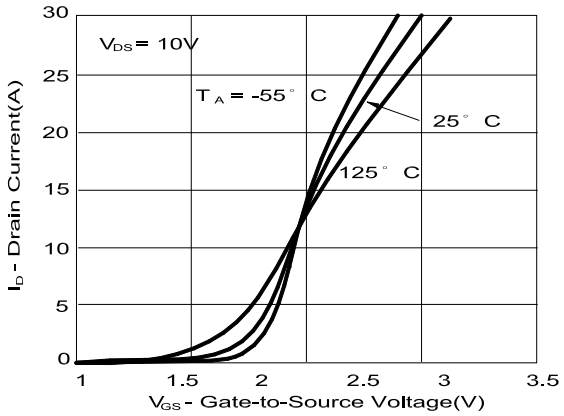
On-Resistance Variation with Temperature



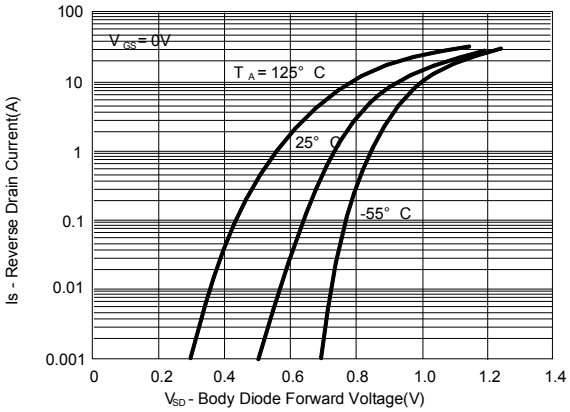
On-Resistance Variation with Gate-to-Source Voltage



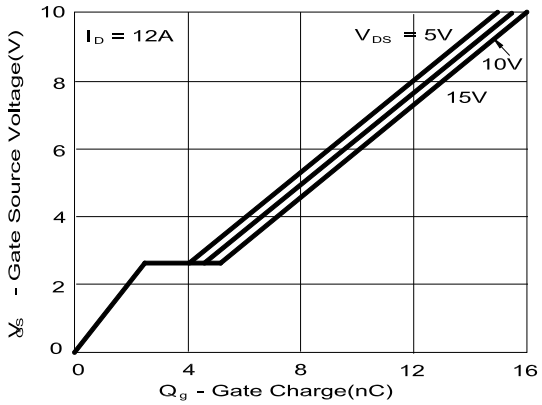
Transfer Characteristics



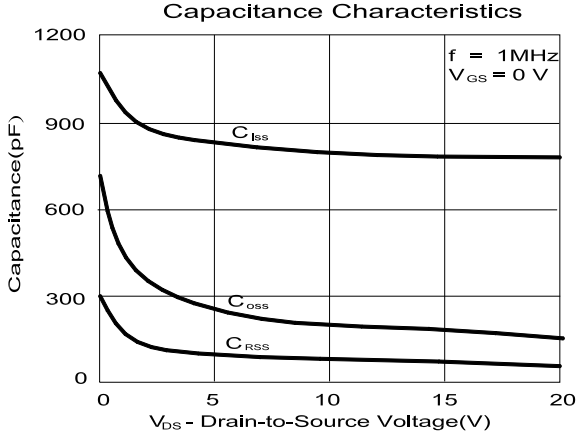
Body Diode Forward Voltage Variation with Source Current and Temperature



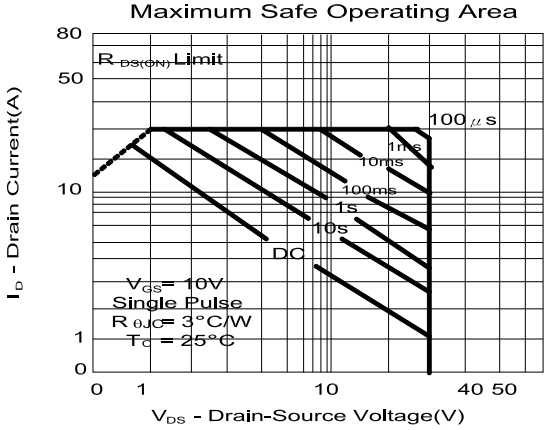
Gate Charge Characteristics



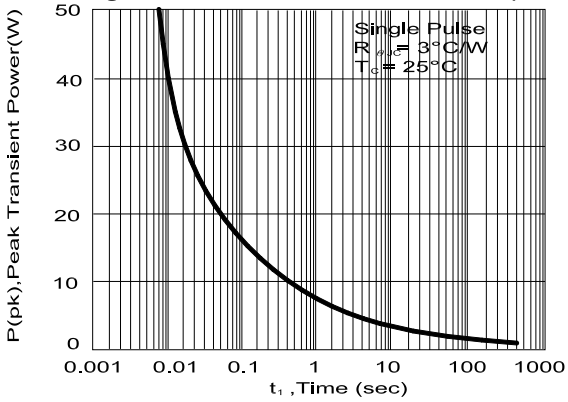
Capacitance Characteristics



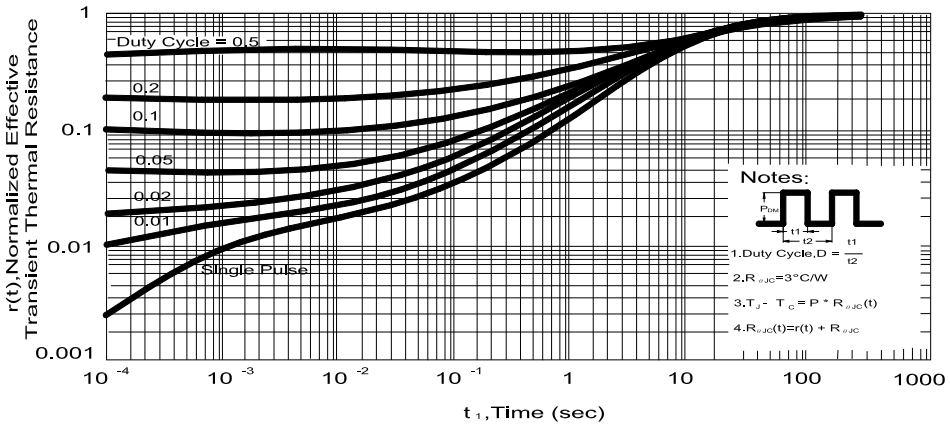
Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



TO-252 (DPAK) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	8.9	9.5	10.4	H	0.8	1.27	2.03
B	2.19	2.3	2.435	I	6.35	6.6	6.8
C	0.35	0.5	0.65	J	4.8	5.34	5.5
D	0.89		1.5	K	0.5		1.5
E	0.35		0.65	L	0.4	0.76	0.89
F	0.0		0.23	M	3.96		5.18
G	5.4		6.2	W	3.38	3.58	3.78