NIKO-SEM

N-Channel Logic Level Enhancement Mode Field Effect Transistor

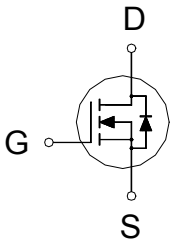
P2504BDG

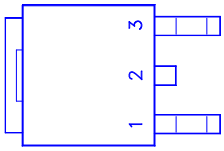
TO-252 (DPAK)

Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
40V	25mΩ	32A





1. GATE
2. DRAIN
3. SOURCE

100% Rg tested
100% UIS tested

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25 °C	I_D	32	A
	T_C = 100 °C		20	
Pulsed Drain Current[1]		I_{DM}	70	
Avalanche Current		I_{AS}	17	
Avalanche Energy	L = 0.3mH	E_{AS}	44	mJ
Power Dissipation	T_C = 25 °C	P_D	41.6	W
	T_C = 100 °C		16.6	
Operating 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	°C / W
Junction-to-Ambient	$R_{\theta JA}$		75	°C / W

[1]Pulse width limited by maximum junction temperature.

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

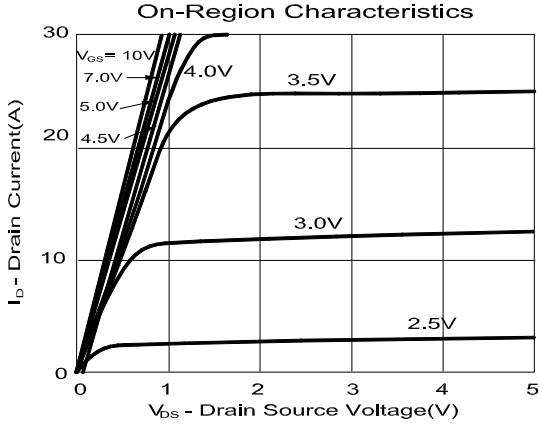
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.7	1.9	2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 32V, V_{GS} = 0V			1	μA
		V_{DS} = 30V, V_{GS} = 0V, T_C = 125 °C			10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 10V, V_{GS} = 10V	70			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 5V, I_D = 10A		27	45	mΩ
		V_{GS} = 10V, I_D = 12A		21	25	

Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 12A		18		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz		760		pF
Output Capacitance	C_{oss}			165		
Reverse Transfer Capacitance	C_{rss}			110		
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		
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		1.5	3	Ω
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = 20V, R_L = 1Ω, $I_D \cong$ 1A, V_{GS} = 10V, R_{GEN} = 6Ω		2.1	4.2	nS
Rise Time[2]	t_r			7.2	14	
Turn-Off Delay Time[2]	$t_{d(off)}$			11.6	21.0	
Fall Time[2]	t_f			3.5	7.2	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current	I_S				32	A
Forward Voltage[1]	V_{SD}	I_F = 12A, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}	I_F = 5 A, dI_F/dt = 100A / μS		14.5		nS
Reverse Recovery Charge	Q_{rr}			7.2		nC

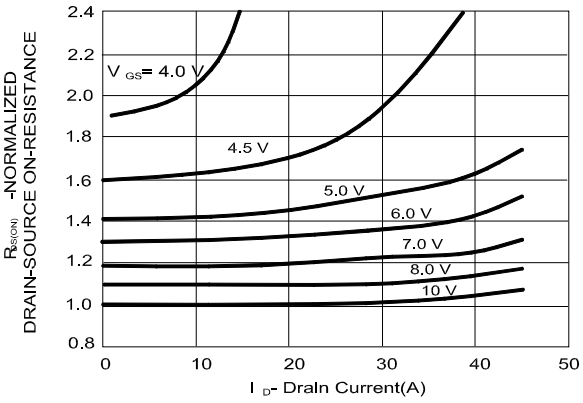
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.

REMARK: THE PRODUCT MARKED WITH "P2504BDG", DATE CODE or LOT #

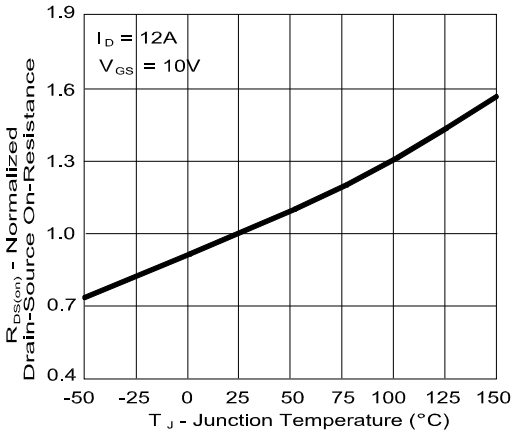
On-Region Characteristics



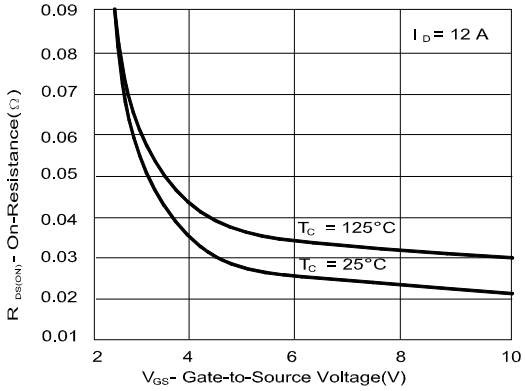
On-Resistance Variation with Drain Current and Gate Voltage



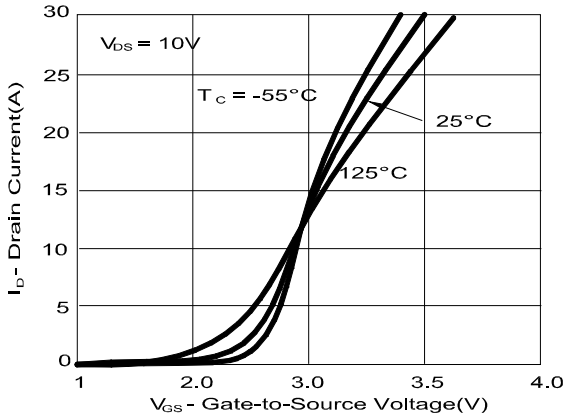
On-Resistance Variation with Temperature



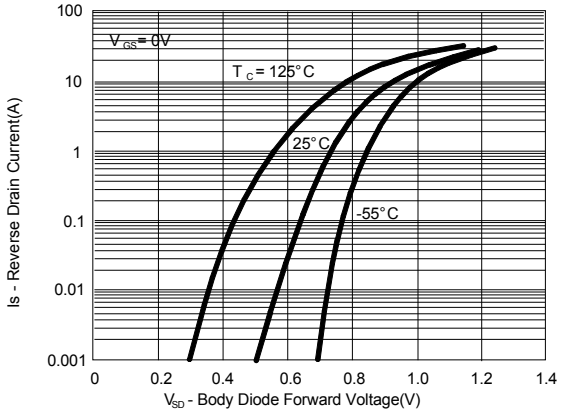
On-Resistance Variation with Gate-to-Source Voltage



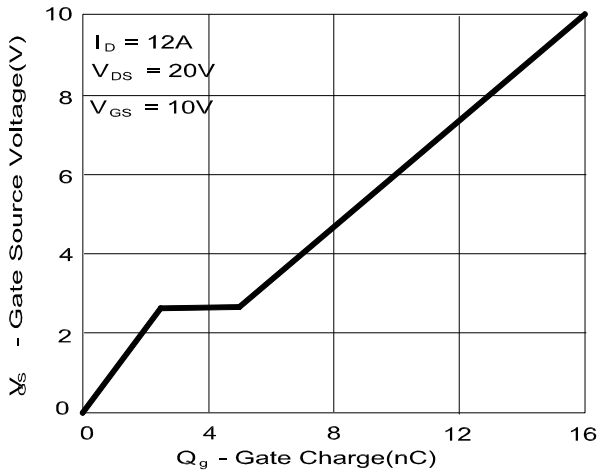
Transfer Characteristics



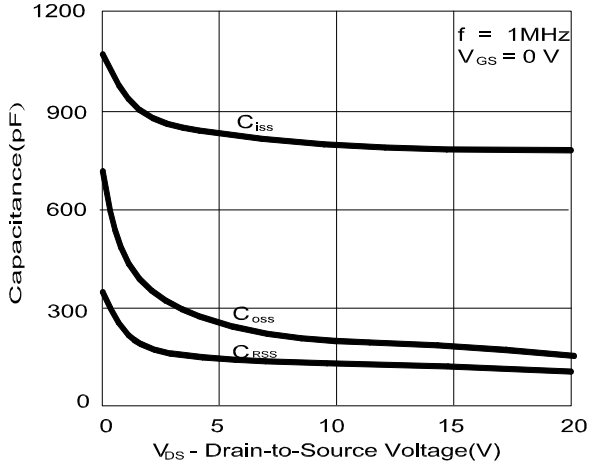
Body Diode Forward Voltage Variation with Source Current and Temperature



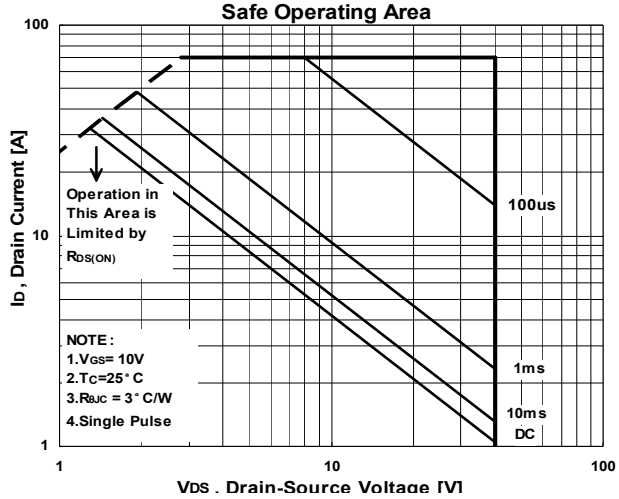
Gate Charge Characteristics



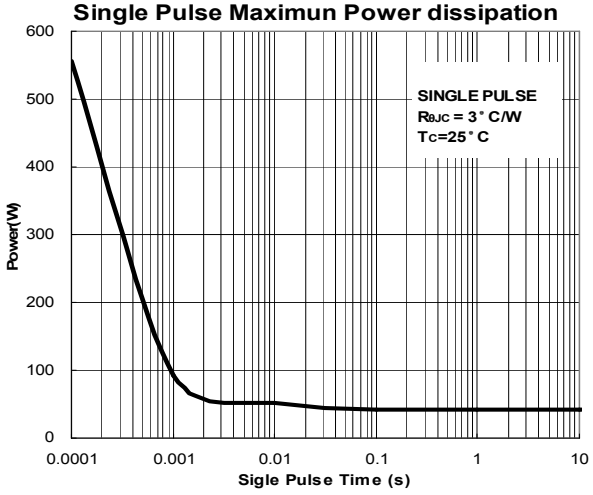
Capacitance Characteristics



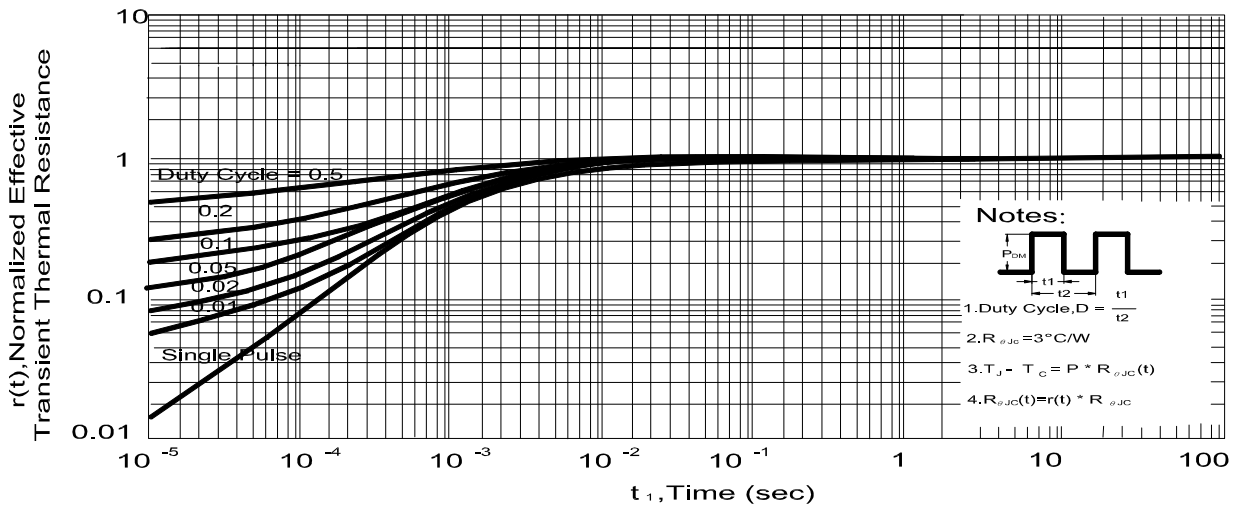
Safe Operating Area



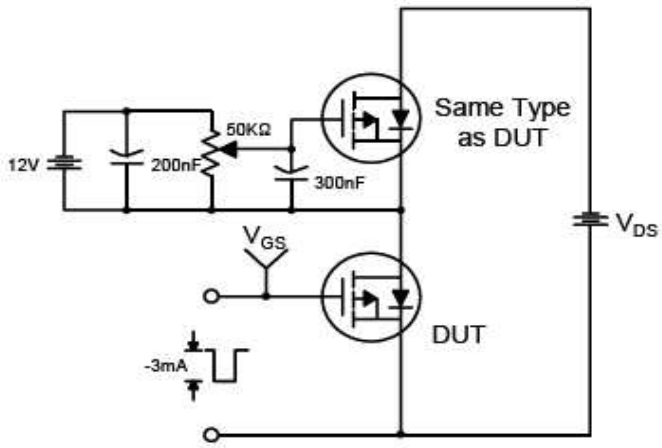
Single Pulse Maximun Power dissipation

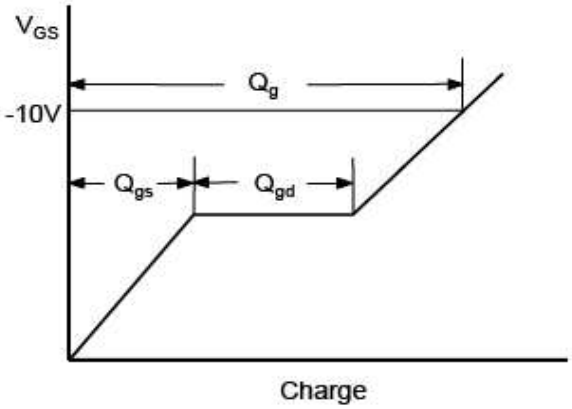


Transient Thermal Response Curve

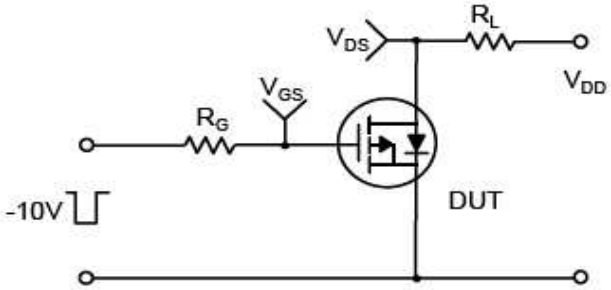


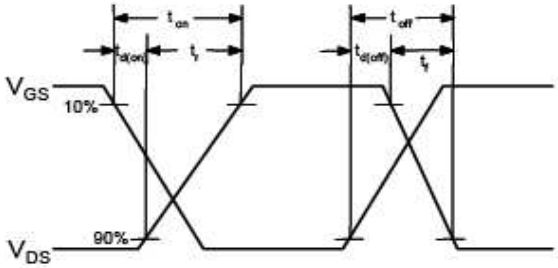
Gate Charge Test Circuit & Waveform



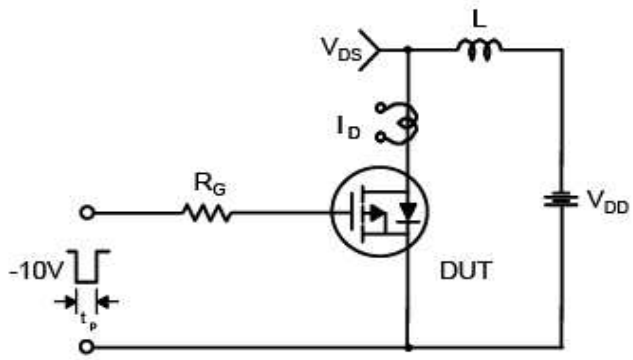


Resistive Switching Test Circuit & Waveforms

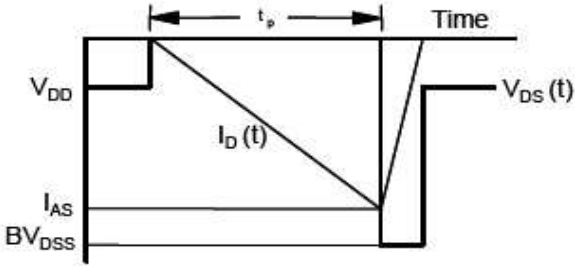




Unclamped Inductive Switching Test Circuit & Waveforms

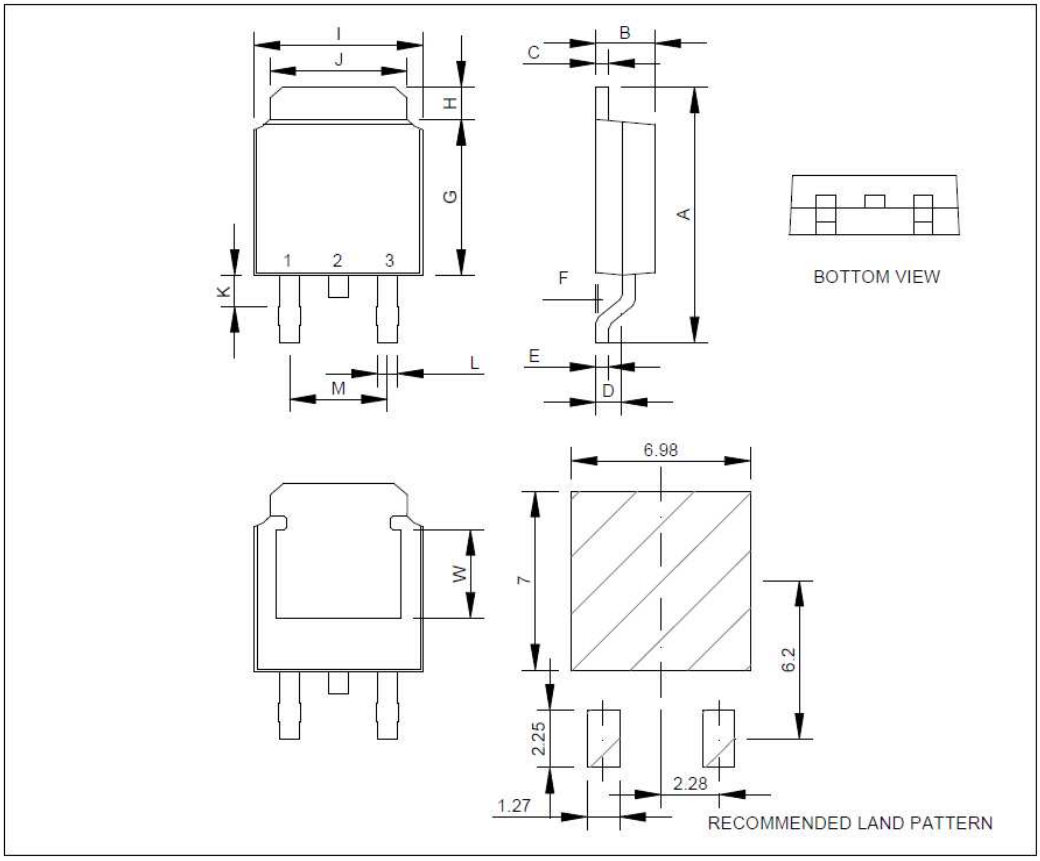


$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



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



TO-252 (DPAK) MECHANICAL DATA 散熱片

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
S	4.57	5.249	5.6	U	1.4		3
T	3.81	4.064	5	V	0.95		1.1