NIKO-SEM

P-Channel Enhancement Mode Field Effect Transistor

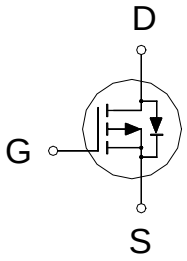
P1504EDG

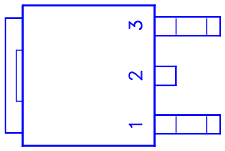
TO-252

Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
-40V	15mΩ	-45A





1. GATE
2. DRAIN
3. SOURCE

100% Rg tested
100% UIS tested

ABSOLUTE MAXIMUM RATINGS (T_C = 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	-45	A
	T_C = 70 °C		-36	
Pulsed Drain Current[1]		I_{DM}	-150	
Avalanche Current		I_{AS}	-45	
Avalanche Energy [2]	L = 0.1mH	E_{AS}	102	mJ
Power Dissipation	T_c = 25 °C	P_D	50	W
	T_c = 70 °C		32	
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-Ambient	$R_{\theta JA}$		75	°C / W
Junction-to-Case	$R_{\theta JC}$		2.5	

[1]Pulse width limited by maximum junction temperature.
[2]V_{DD} = -20V . Starting T_J = 25°C.

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

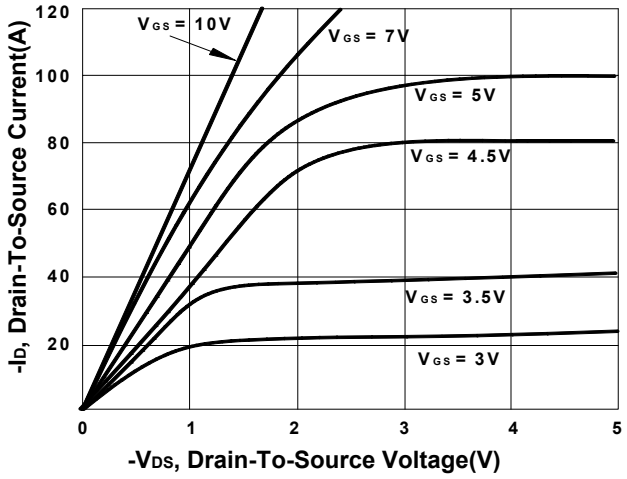
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250µA	-40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	-1.7	-2.2	-3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -32V, V_{GS} = 0V			1	µA
		V_{DS} = -30V, V_{GS} = 0V, T_J = 55 °C			10	

Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -4.5V, I_D = -15A		19	29	mΩ
		V_{GS} = -10V, I_D = -25A		13	15	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -25A		24		S
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -10V,	-150			A
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -15V, f = 1MHz		2700	2950	pF
Output Capacitance	C_{oss}			400	430	
Reverse Transfer Capacitance	C_{rss}			230	250	
Gate Resistance	R_g	V_{GS} = -15mV, V_{DS} = 0V, f = 1MHz		3.5	4.5	Ω
Total Gate Charge[2]	Q_g	V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = -10V, I_D =-25A		40	45	nC
Gate-Source Charge[2]	Q_{gs}			10	13	
Gate-Drain Charge[2]	Q_{gd}			5	8	
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = -20V , R_L = 0.75Ω I_D ≅ 1A, V_{GS} = -10V, R_{GEN} =6Ω		11		nS
Rise Time[2]	t_r			75		
Turn-Off Delay Time[2]	$t_{d(off)}$			89		
Fall Time[2]	t_f			35		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				-25	A
Forward Voltage[1]	V_{SD}	I_F = I_S, V_{GS} = 0V		-0.7	-1.3	V
Reverse Recovery Time	t_{rr}	I_F = -25A, dI_F/dt = 100A / μS		28		nS
Reverse Recovery Charge	Qrr			26		nC

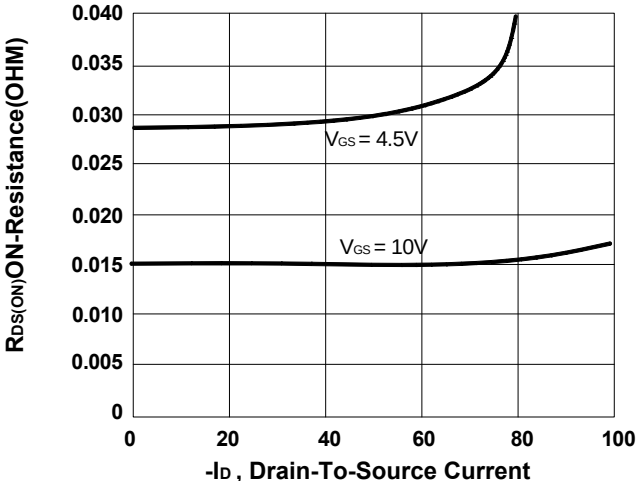
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.

REMARK: THE PRODUCT MARKED WITH "P1504EDG", DATE CODE or LOT #

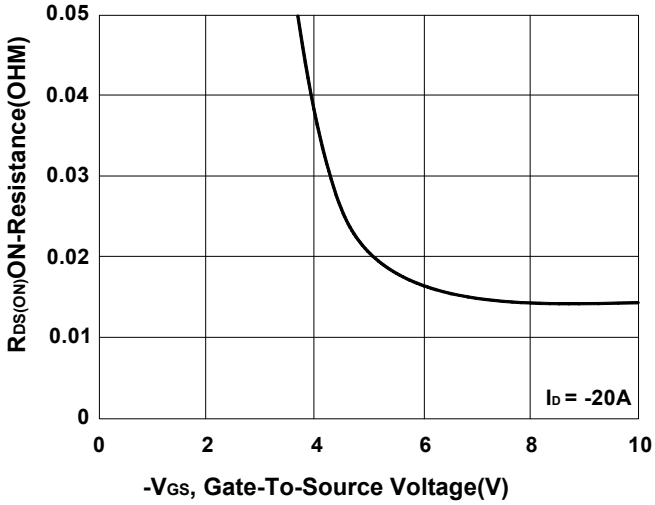
Output Characteristics



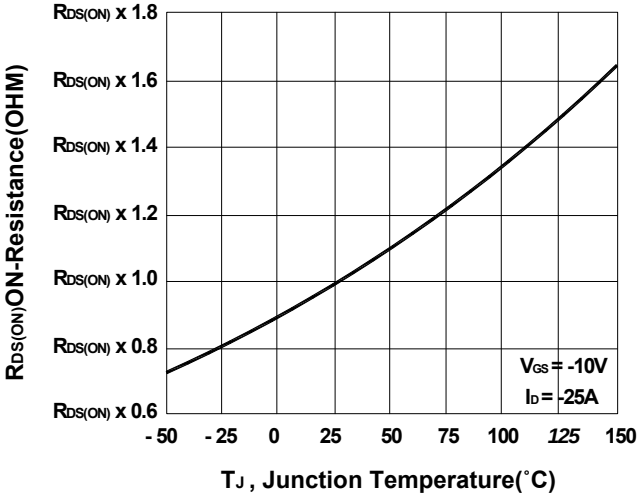
On-Resistance VS Drain Current



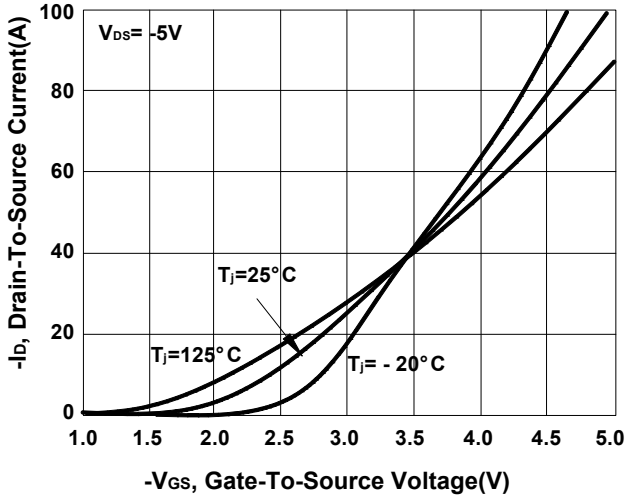
On-Resistance VS Gate-To-Source



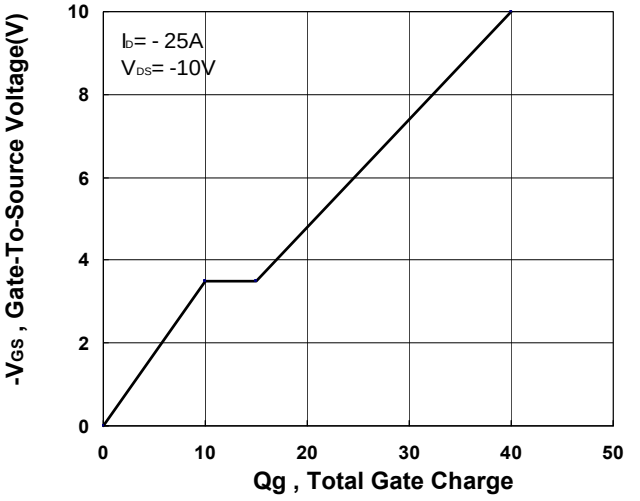
On-Resistance VS Temperature



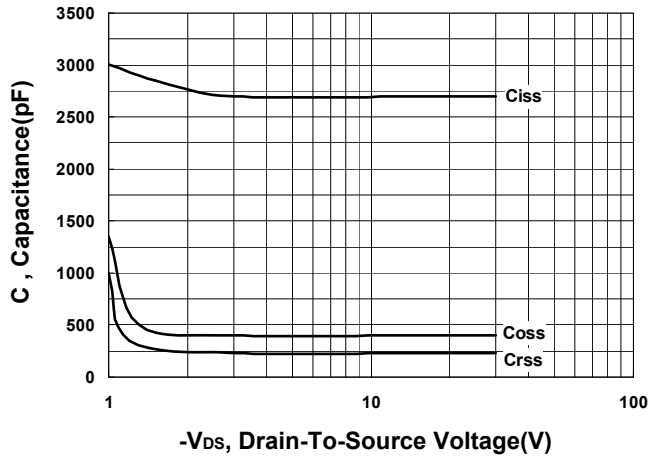
Transfer Characteristics



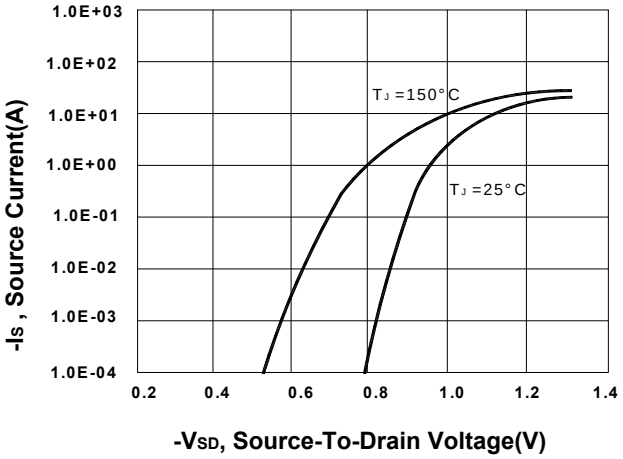
Gate charge Characteristics



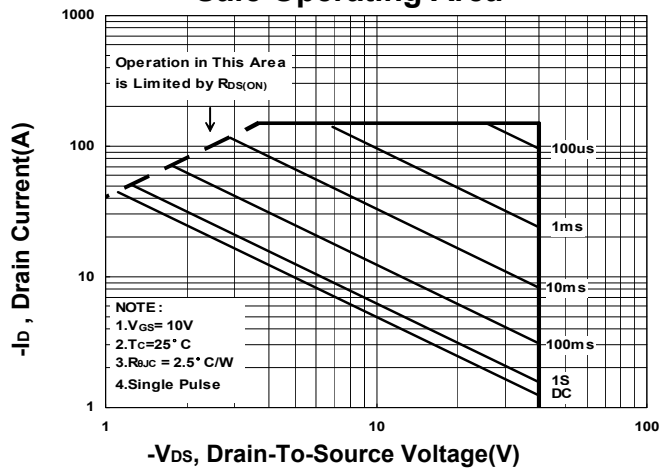
Capacitance Characteristic



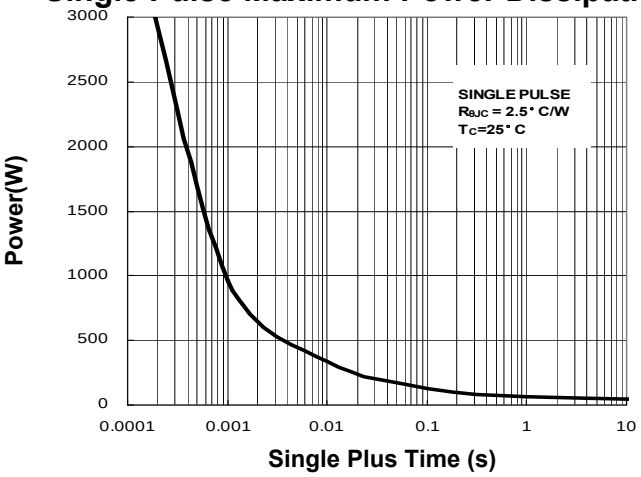
Body Diode Forward Voltage VS Source current



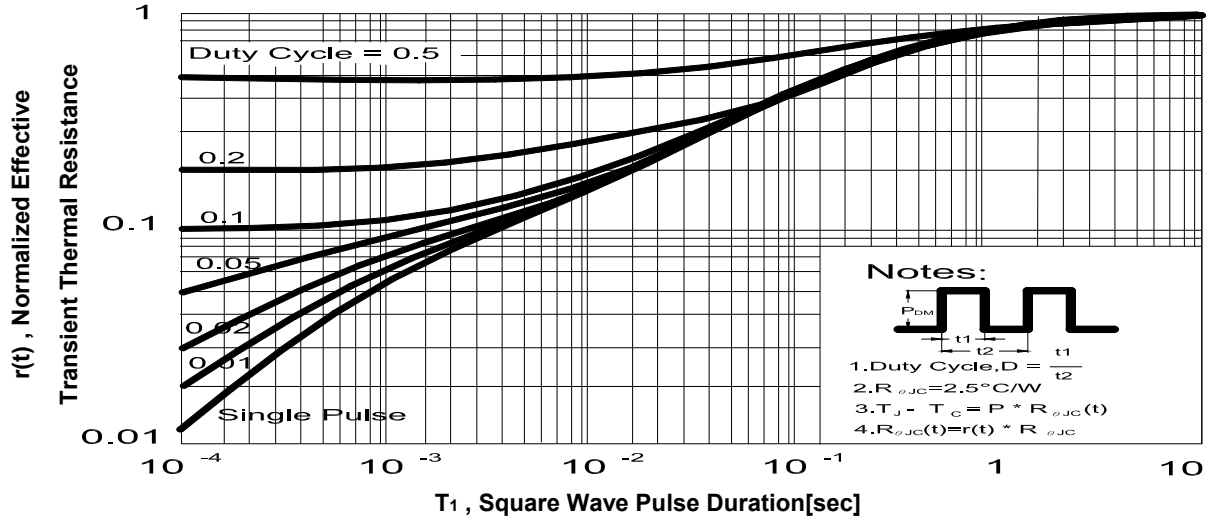
Safe Operating Area



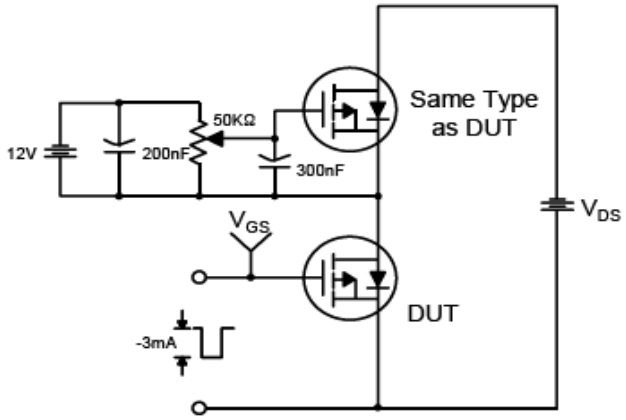
Single Pulse Maximum Power Dissipation

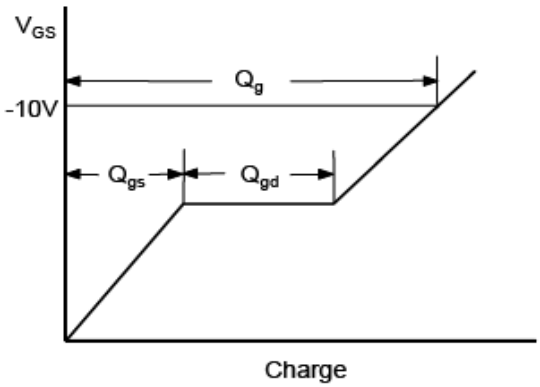


Transient Thermal Response Curve

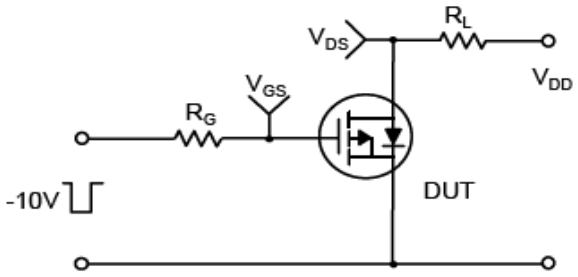


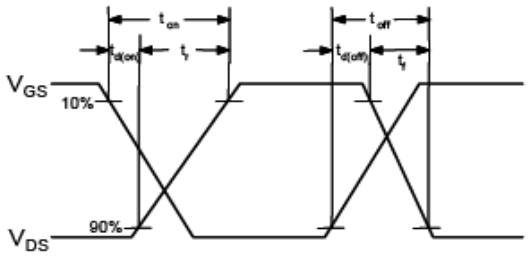
Gate Charge Test Circuit & Waveform



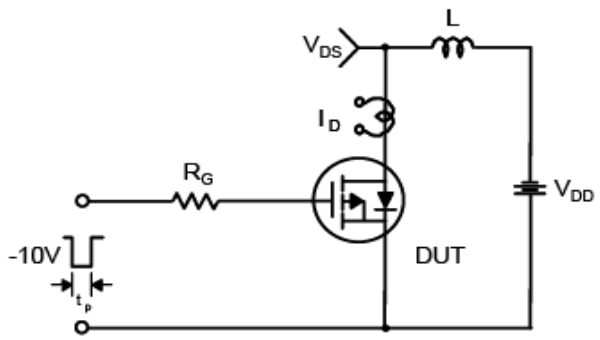


Resistive Switching Test Circuit & Waveforms

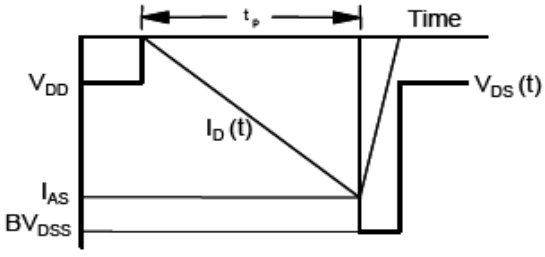




Unclamped Inductive Switching Test Circuit & Waveforms



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



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	N