UNIKC Semiconductor

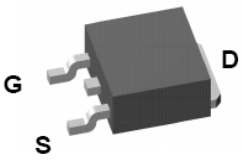
RoHS Compliant

P2503BDG

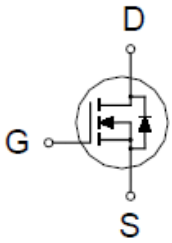
N-Channel Enhancement Mode MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
30V	25mΩ @V_{GS} = 10V	12A



TO-252



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	
Continuous Drain Current	T_C = 25 °C	I_D	12	A
	T_C = 100 °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 = 100 °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	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤1%

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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≅ 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 = 5A, dI_F/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.

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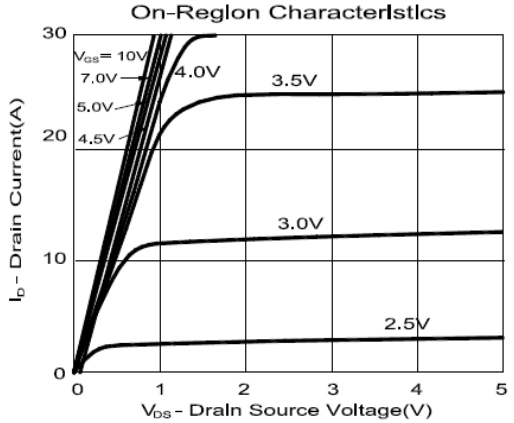
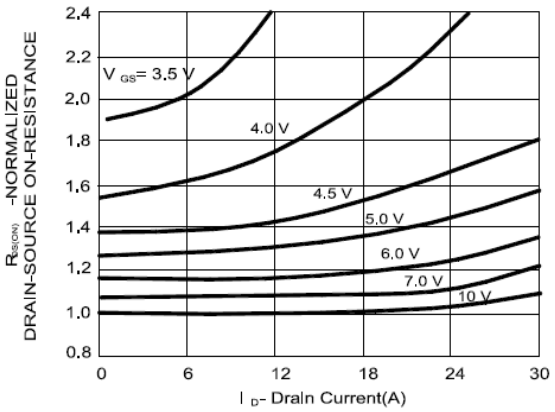
TYPICAL PERFORMANCE CHARACTERISTICS

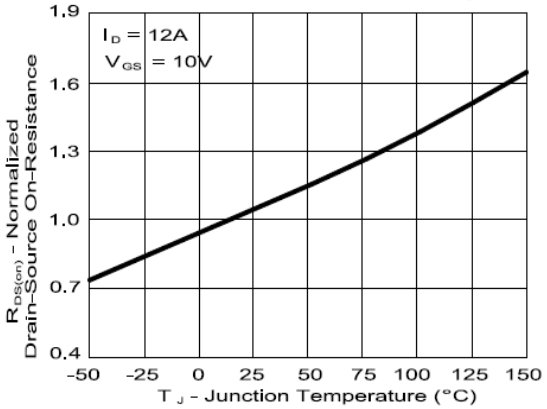
On-Reglon Characterlstlcs



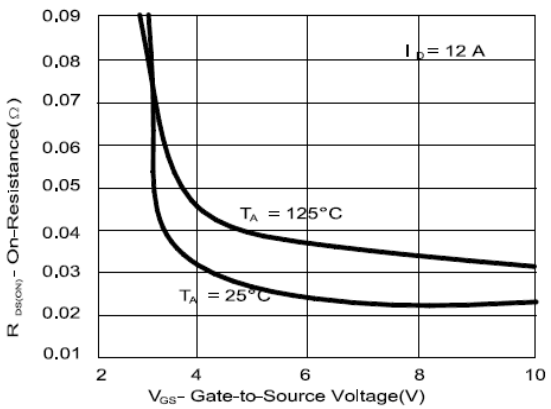
On-Resistance Variation with Drain Current and Gate Voltage



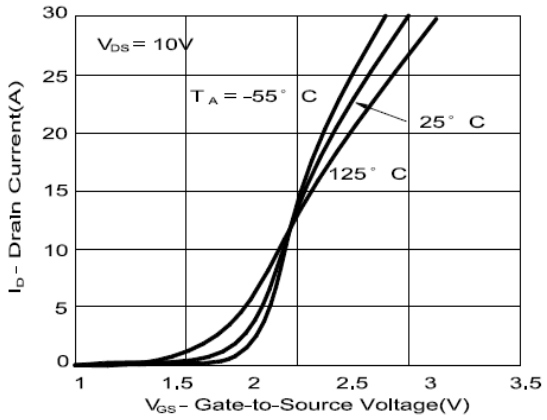
On-Resistance Variation with Temperature



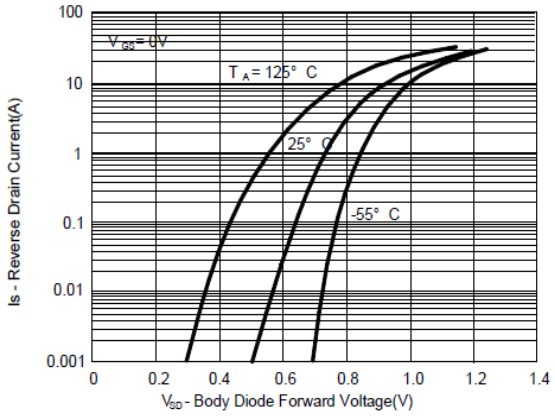
On-Resistance Variation with Gate-to-Source Voltage



Transfer Characteristics



Body Diode Forward Voltage Variation with Source Current and Temperature



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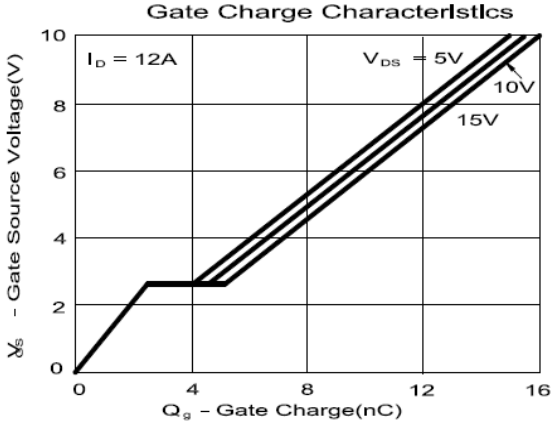
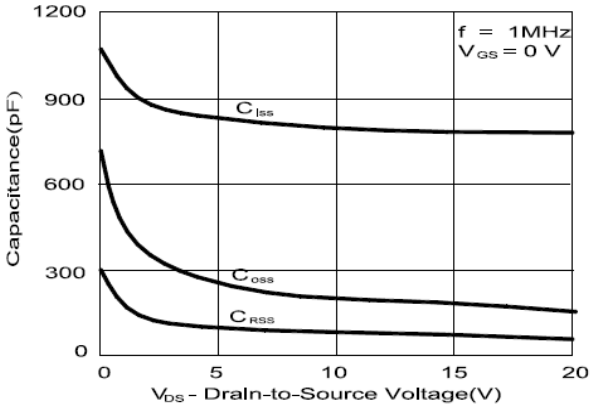
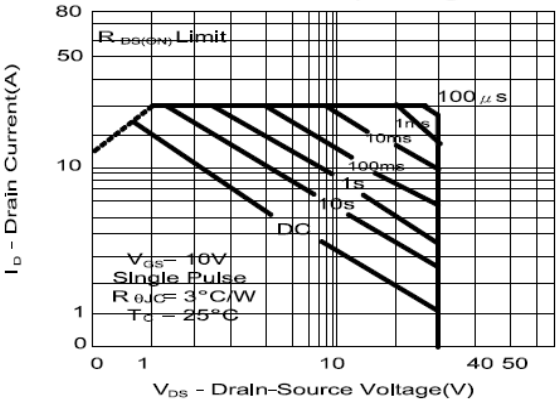
Gate Charge Characteristics



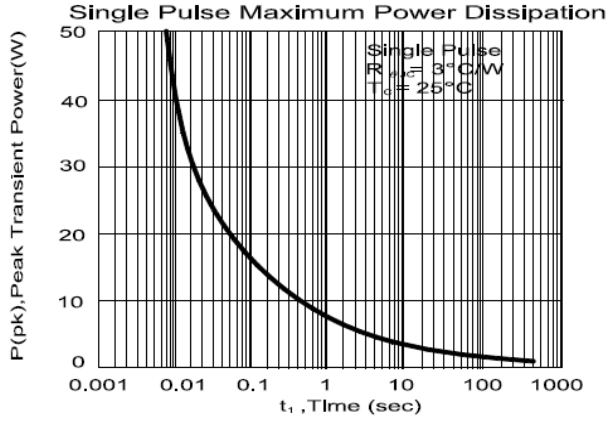
Capacitance Characteristics



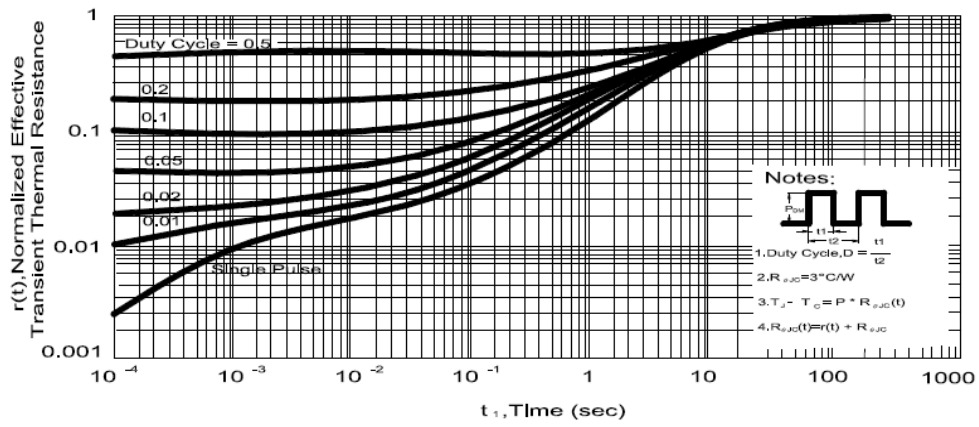
Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



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Package Dimension

TO-252 (DPAK) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	8.9	10	10.41	J	4.8		5.64
B	2.1	2.2	2.5	K	0.15		1.49
C	0.4	0.5	0.61	L	0.4	0.76	0.91
D	0.82	1.2	1.5	M	4.2	4.58	5
E	0.35	0.5	0.65	S	4.57	5.1	5.52
F	0		0.2	T	3.81	4.75	5.24
G	5.3	6.1	6.3	U	1.4		1.78
H	0.5		1.7	V	0.55	1.25	1.7
I	6.3	6.5	6.8