UNIKC
Semiconductor

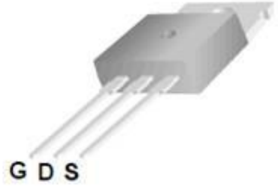
RoHS
Compliant

P3506DT

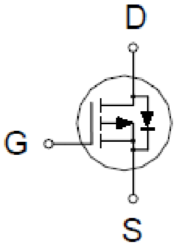
P-Channel Enhancement Mode MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
-60V	35mΩ @V_{GS} = 10V	-40A



TO-220



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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current	T_C = 25 °C	I_D	-40	A
	T_C = 100 °C		-25	
Pulsed Drain Current[1]		I_{DM}	-150	
Avalanche Current		I_{AS}	-40	
Avalanche Energy[2]	L = 0.1mH	E_{AS}	80	mJ
Power Dissipation	T_C = 25 °C	P_D	104	W
	T_C = 100 °C		41	
Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		1.2	°C / W
Junction-to-Ambient	$R_{\theta JA}$		40	

[1] Pulse width limited by maximum junction temperature.

[2] V_{DD}=-30V .Starting T_J = 25°C

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ELECTRICAL CHARACTERISTICS (T_J = 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	-60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	-2	-2.7	-4	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -48V, V_{GS} = 0V			1	µA
		V_{DS} = -40V, V_{GS} = 0V , T_J = 55 °C			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -7V, I_D = -20A		34	55	mΩ
		V_{GS} = -10V, I_D = -25A		29	35	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -25A		30		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} = -30V, f = 1MHz		2590		pF
Output Capacitance	C_{oss}			260		
Reverse Transfer Capacitance	C_{rss}			150		
Gate Resistance	R_g	V_{GS}=0V,V_{DS}=0V,f=1MHz		4.8		Ω
Total Gate Charge[2]	Q_g	V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = -10V I_D = -25A		38.6		nC
Gate-Source Charge[2]	Q_{gs}			13.6		
Gate-Drain Charge[2]	Q_{gd}			8.8		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = -30V, R_L = 1Ω, I_D ≅ -20A V_{GS}=-10V,R_{GEN}=6Ω		30		nS
Rise Time[2]	t_r			90		
Turn-Off Delay Time[2]	$t_{d(off)}$			70		
Fall Time[2]	t_f			15		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current	I_S				-40	A
Forward Voltage[1]	V_{SD}	I_F = -25A, V_{GS} = 0V			-1.3	V
Reverse Recovery Time	t_{rr}	I_F = -25A , dI_F/dt = 100A / µS		38		nS
Reverse Recovery Charge	Q_{rr}			48		nC

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

[2] Independent of operating temperature.

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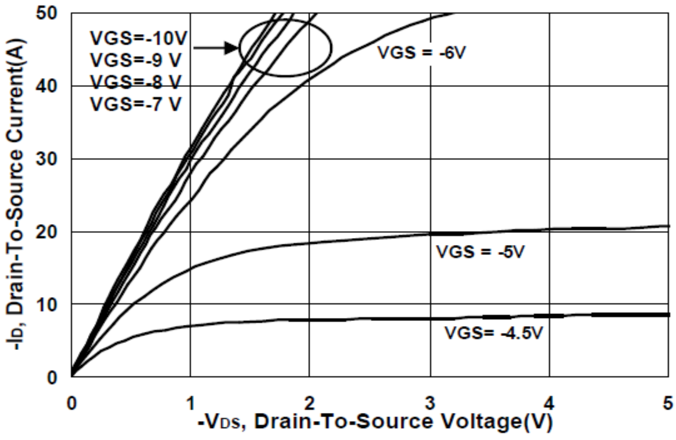
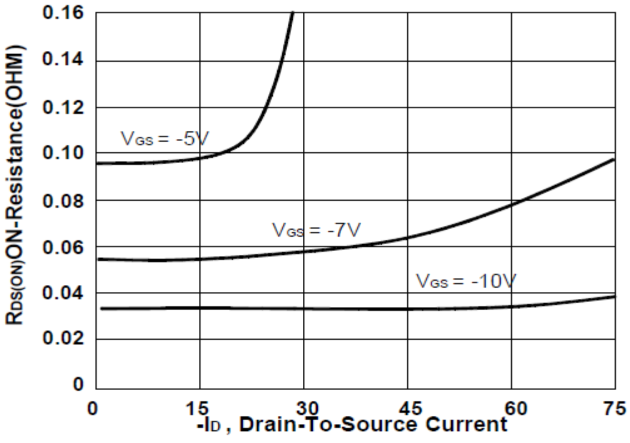
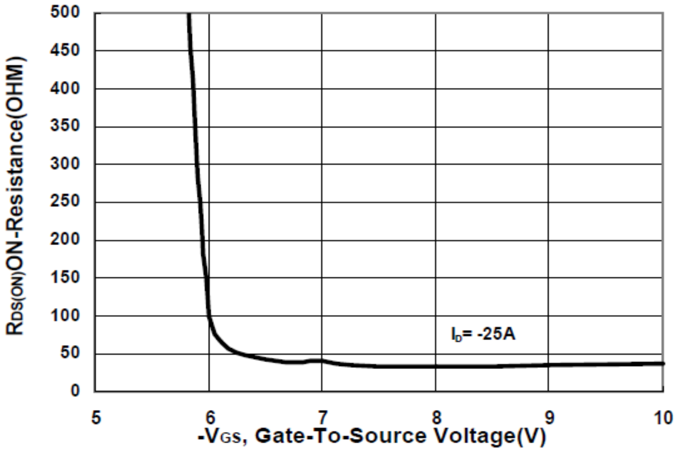
Output Characteristics



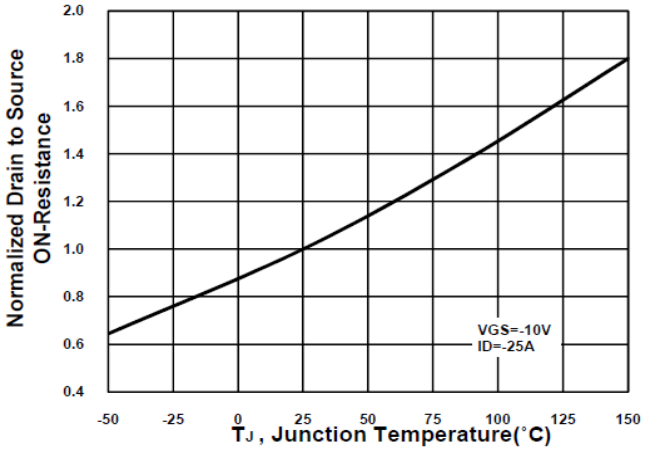
On-Resistance VS Drain Current



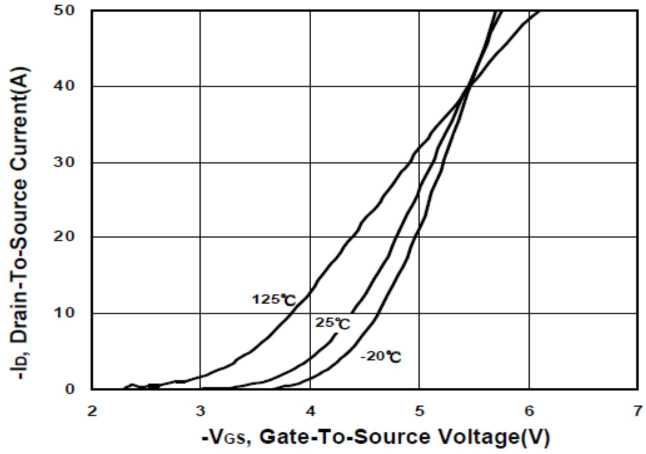
On-Resistance VS Gate-To-Source



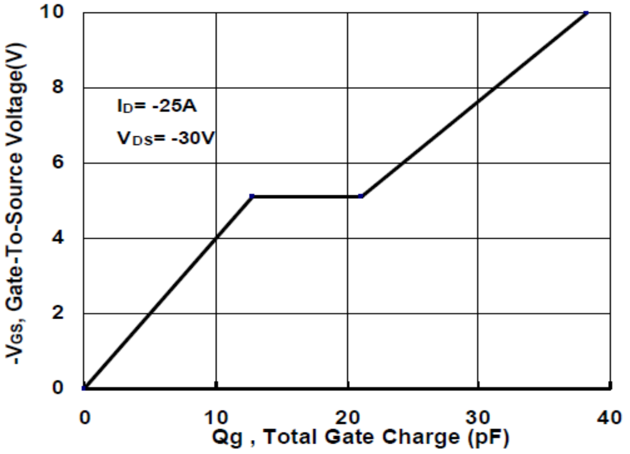
On-Resistance VS Temperature



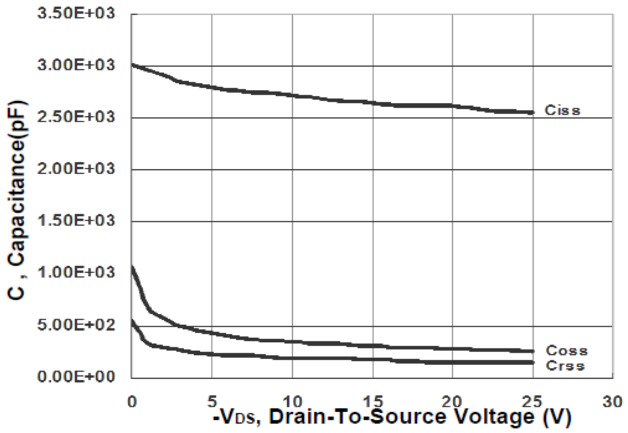
Transfer Characteristics



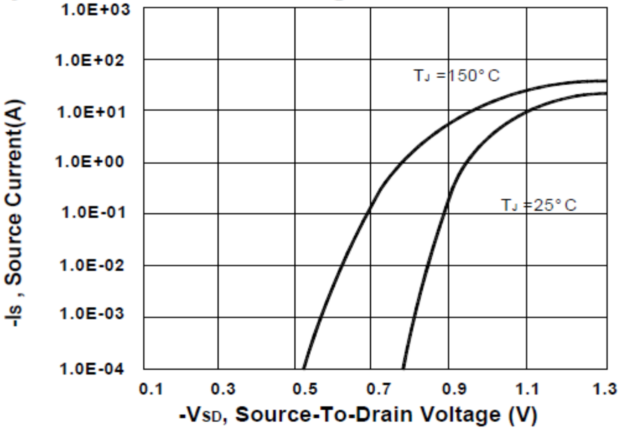
Gate charge Characteristics



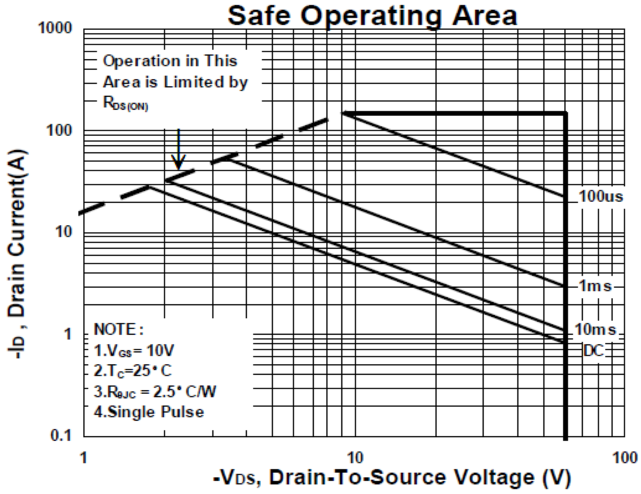
Capacitance Characteristic



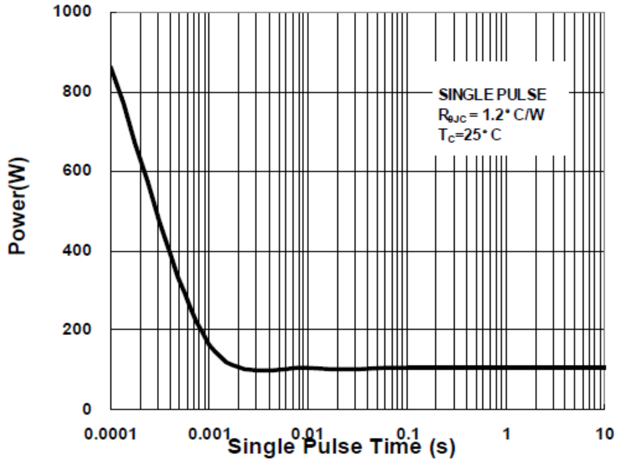
Body Diode Forward Voltage VS Source current



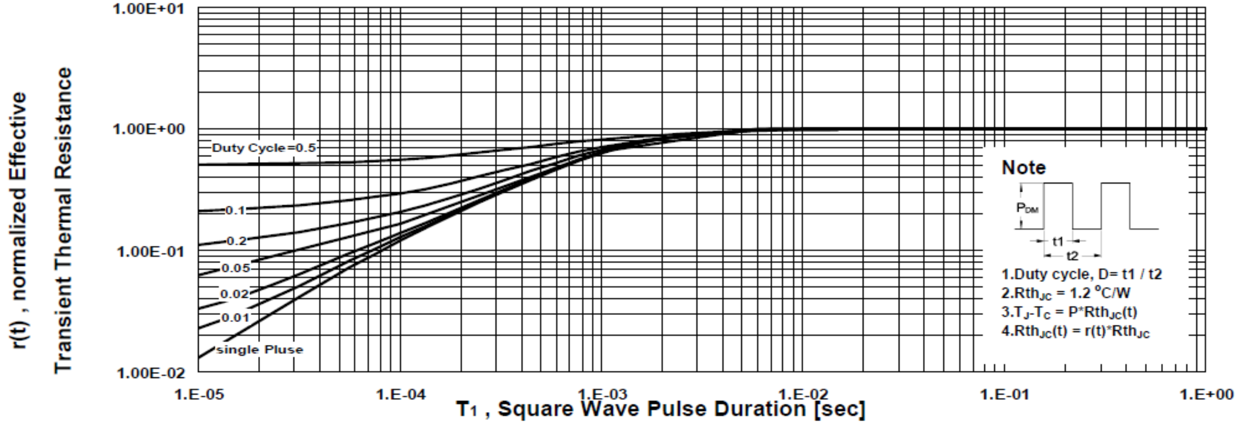
Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



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Package Dimension

TO-220 (3-Lead) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.652	10.16	11.5	H	2.04	2.54	3.04
B	2.54	2.79	3.048	I	1.15	1.52	1.778
C	17.3		22.86	J	3.556	4.57	4.826
D	26.924	29.03	31.242	K	0.508	1.3	1.45
E	14.224	15.45	16.510	L	1.89	2.69	3.09
F	8.382	9.20	9.40	M	0.34	0.5	0.6
G	0.381	0.81	1.016	N