UNIKC
Semiconductor

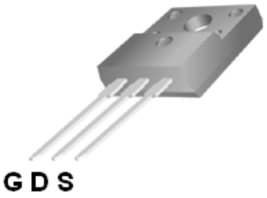
RoHS Compliant

P1604ETF

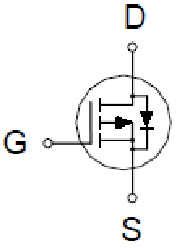
P-Channel Enhancement Mode MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
-40V	16mΩ @V_{GS} = -10V	-40A



TO-220F



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	
Continuous Drain Current	T_C = 25 °C	I_D	-40	A
	T_C = 100 °C		-25	
Pulsed Drain Current[1]		I_{DM}	-120	
Avalanche Current		I_{AS}	-40	
Avalanche Energy	L = 0.1mH	E_{AS}	78	mJ
Power Dissipation	T_C = 25 °C	P_D	42	W
	T_C = 100 °C		17	
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	$R_{\theta JA}$		60	

[1] Pulse width limited by maximum junction temperature.

P1604ETF

P-Channel Enhancement Mode MOSFET

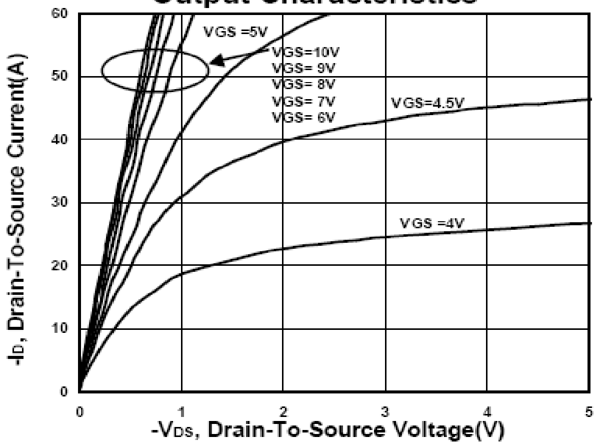
ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.5	-2.2	-3.0	
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 = 125 °C			-10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -10V	-120			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -7V, I_D = -15A		16	20	mΩ
		V_{GS} = -10V, I_D = -25A		13	16	
Forward Transconductance[1]	g_{fs}	V_{DS} = -10V, I_D = -25A		38		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -20V, f = 1MHz		2310		pF
Output Capacitance	C_{oss}			438		
Reverse Transfer Capacitance	C_{rss}			320		
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		4.3		Ω
Total Gate Charge[2]	Q_g	V_{DS} = 0.5$V_{(BR)DSS}$, I_D = -25A, V_{GS} = -10V		45		nC
Gate-Source Charge[2]	Q_{gs}			12		
Gate-Drain Charge[2]	Q_{gd}			11		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = -20V, I_D ≅ -25A, V_{GS} = -10V, R_{GS} = 6Ω		15		nS
Rise Time[2]	t_r			43		
Turn-Off Delay Time[2]	$t_{d(off)}$			62		
Fall Time[2]	t_f			50		
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		43		nS
Reverse Recovery Charge	Q_{rr}			31		nC

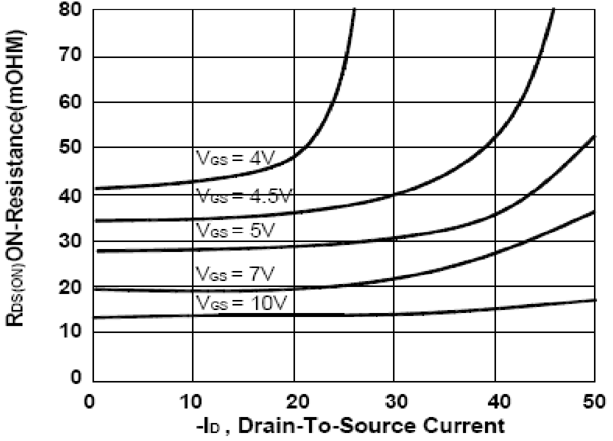
[1] Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2] Independent of operating temperature.

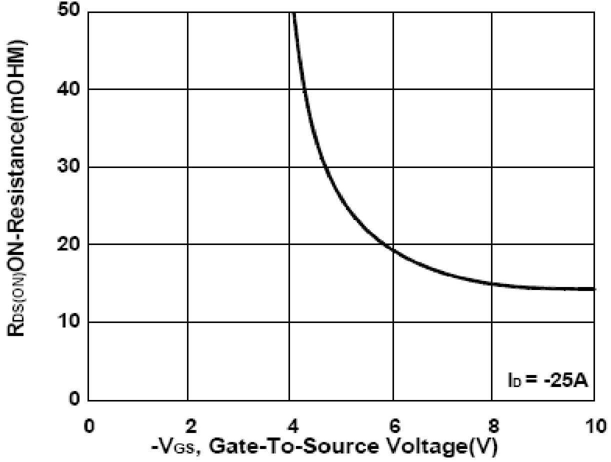
Output Characteristics



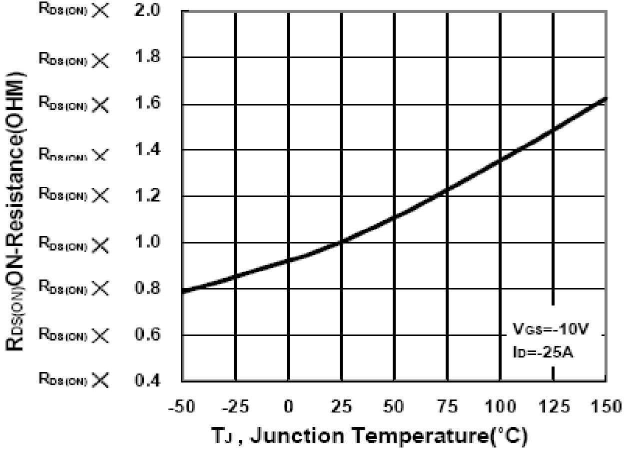
On-Resistance VS Drain Current



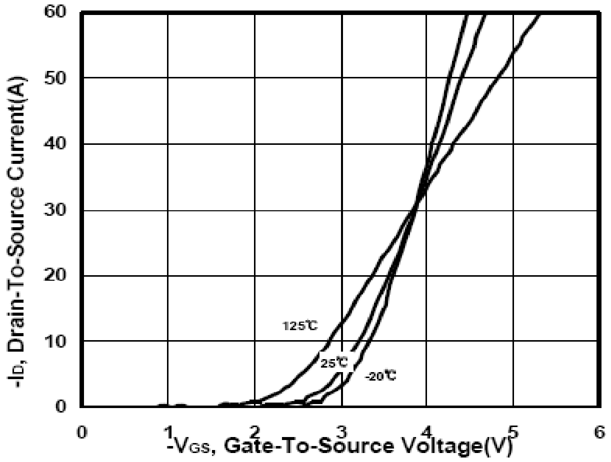
On-Resistance VS Gate-To-Source



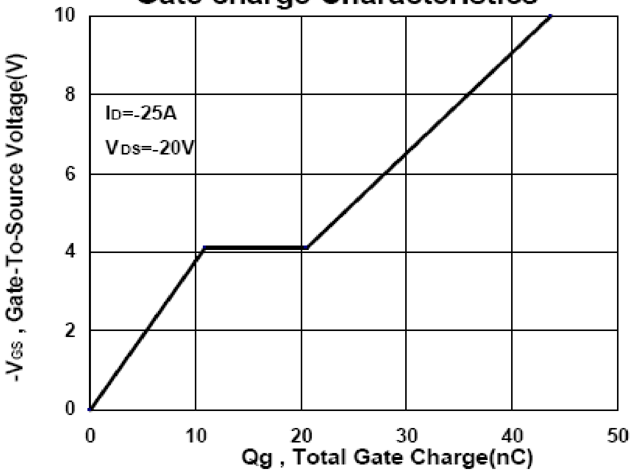
On-Resistance VS Temperature



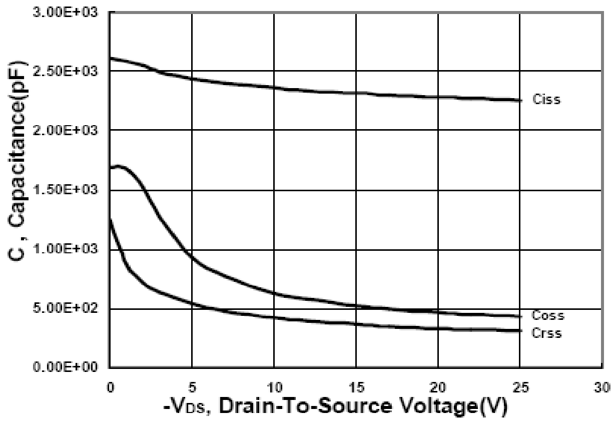
Transfer Characteristics



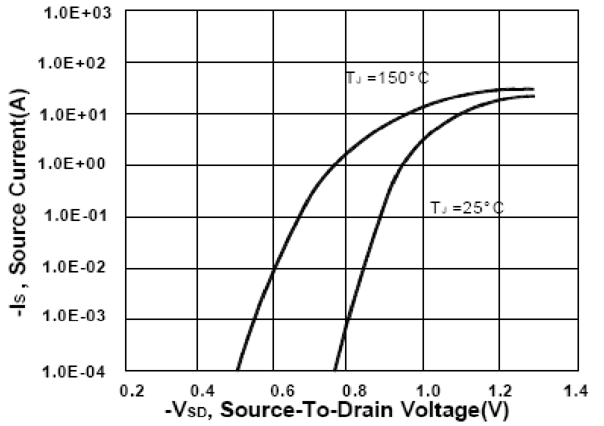
Gate charge Characteristics



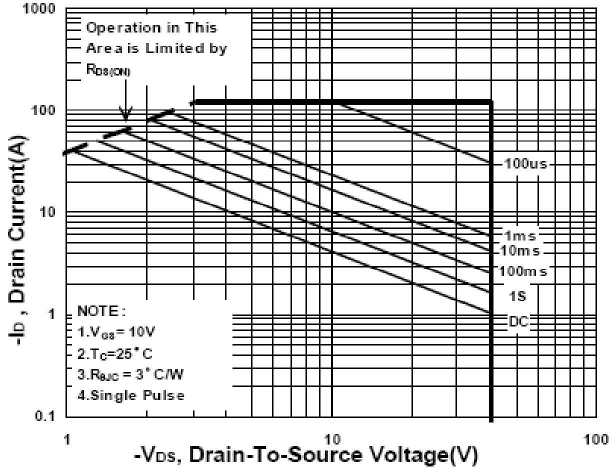
Capacitance Characteristic



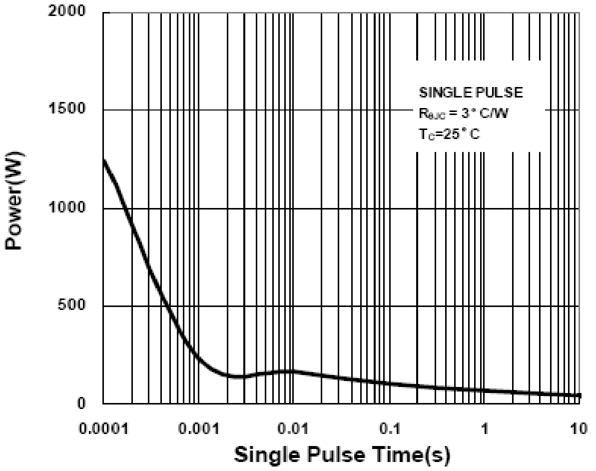
Body Diode Forward Voltage VS Source current



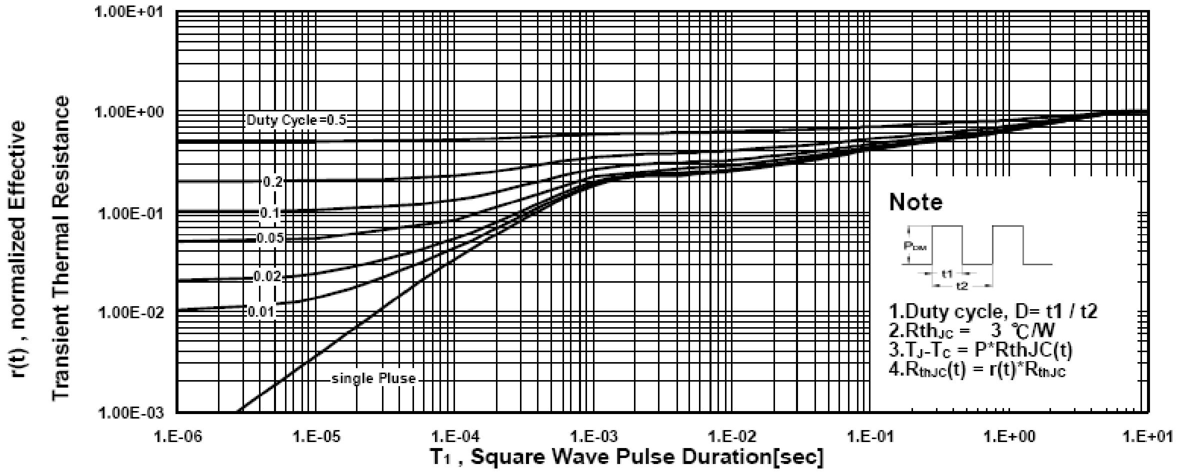
Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



Note

1.Duty cycle, D= t1 / t2

2.Rth_{JC} = 3 ℃/W

3.T_J-T_C = P*RthJC(t)

4.$R_{thJC}(t) = r(t)*R_{thJC}$

Package Dimension

TO-220F (3-Lead) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	4.2		4.93	e	2.05	2.55	3.05
A1	2.34		3.1	F	27.45		30.6
B	17.77		20.3	G	7.72		9.3
b	0.6		1.05	H	6.1		7.1
b1	0.9	1.23	1.62	L	12.5		14.5
b2	0.6		1.9	L1	1.97		3.8
c	0.4		1.0	P	2.98		3.4
D	14.7		16.4	Q	2.1		2.96
D1	6.4		7.5	q	3.0		3.8
E	9.7		10.4