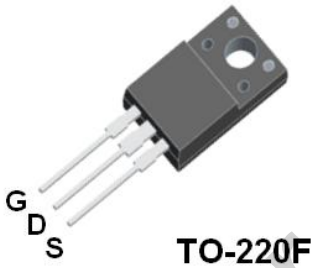
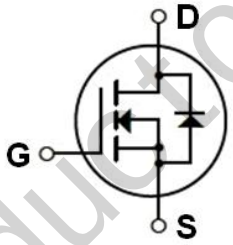
Description：

This P-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.



TO-220F



Features：

1) V_{DS}=-60V,I_D=-40A,$R_{DS(ON)}$<35m Ω @V_{GS}=-10V
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity trench technology for ultra $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.

Absolute Maximum Ratings：(T_C=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current-	-40	A
	Continuous Drain Current-TC=100℃	-24	
	Pulsed Drain Current[1]	-120	
E_{AR}	Single Pulse Avalanche Energy[3]	77	mJ
P_D	Power Dissipation	75	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristics：

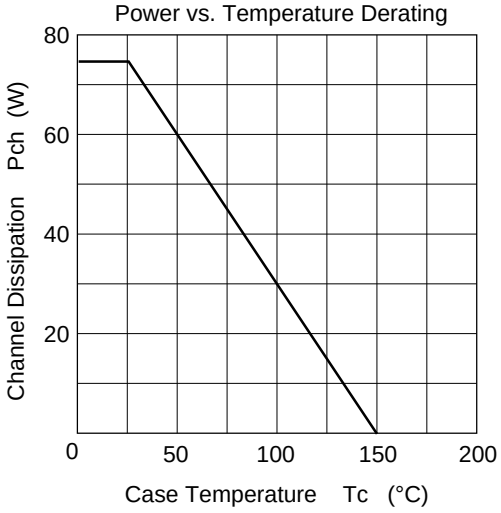
Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	1.67	℃/W

Electrical Characteristics: (T_C=25℃ unless otherwise noted)

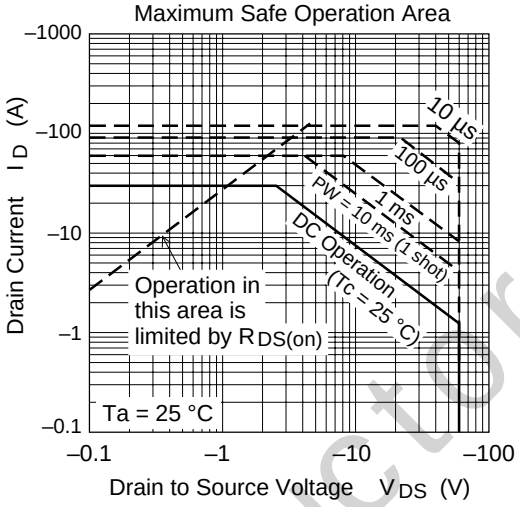
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	-60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-60V	---	---	-10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±10	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	-1		-2	V
$R_{DS(ON)}$	Drain-Source On Resistance[4]	V_{GS}=-10V,I_D=-15A	---	28	35	mΩ
		V_{GS}=-4V,I_D=-15A	---	38	55	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-10V, V_{GS}=0V, f=1MHz	---	2500	---	pF
C_{oss}	Output Capacitance		---	1300	---	
C_{rss}	Reverse Transfer Capacitance		---	300	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=-0V, I_D=-15A, R_L=2Ω .V_{GS}=-10V	---	25	---	ns
t_r	Rise Time		---	150	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	350	---	ns
t_f	Fall Time		---	220	---	ns
Q_g	Total Gate Charge	V_{GS}=-10V, V_{DS}=-50V, I_D=-10A	---	25	---	nC
Q_{gs}	Gate-Source Charge		---	5	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	7	---	nC
Drain-Source Diode Characteristics						
Trr	Reverse Recovery Time		---	35	---	nS

Typical Characteristics: (T_C=25℃ unless otherwise noted)

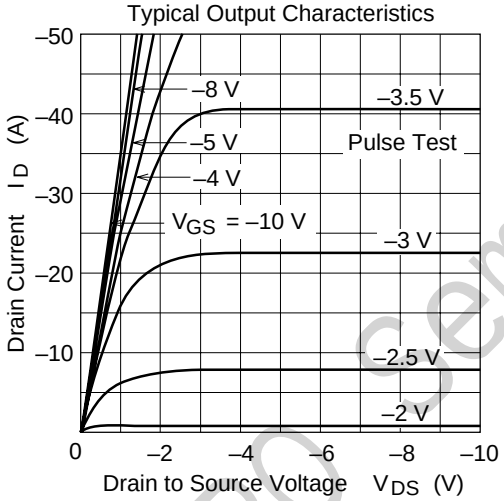
Power vs. Temperature Derating



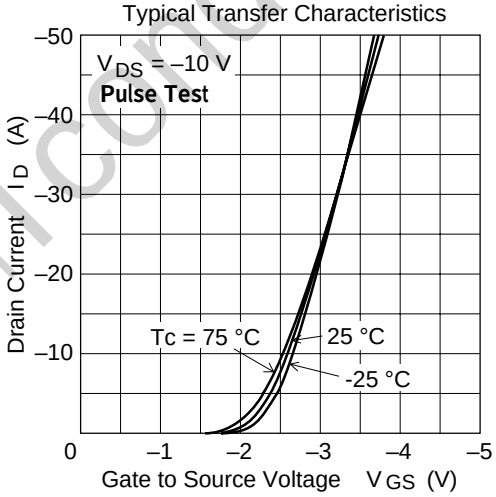
Maximum Safe Operation Area



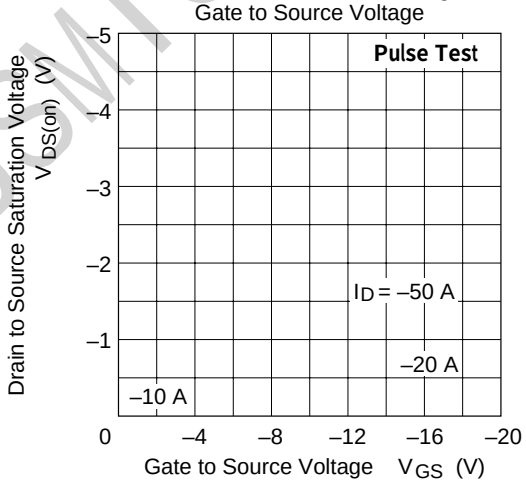
Typical Output Characteristics



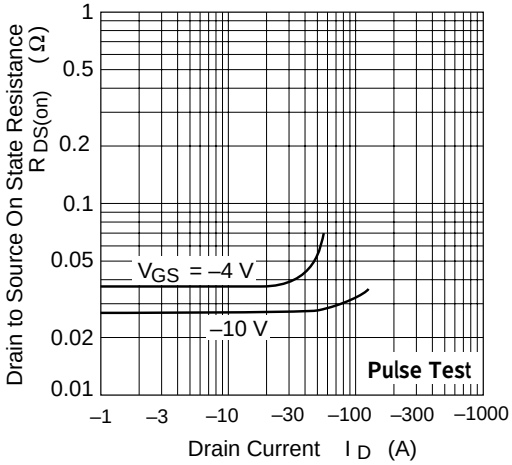
Typical Transfer Characteristics



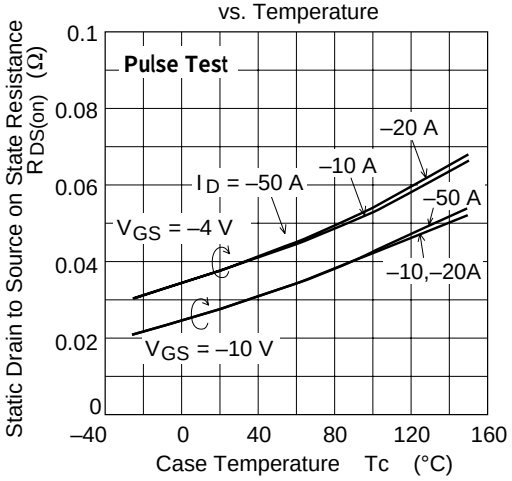
Drain to Source Saturation Voltage vs. Gate to Source Voltage



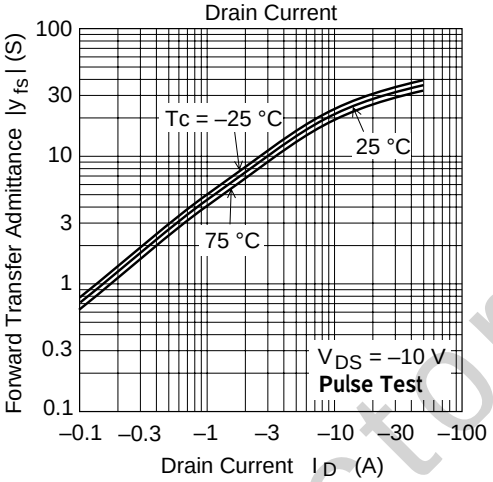
Static Drain to Source on State Resistance vs. Drain Current



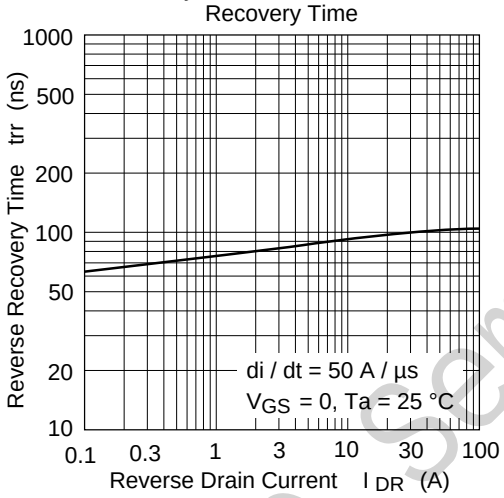
Static Drain to Source on State Resistance vs. Temperature



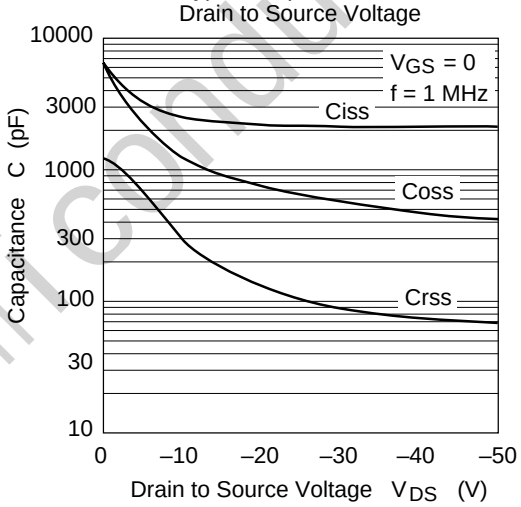
Forward Transfer Admittance vs. Drain Current



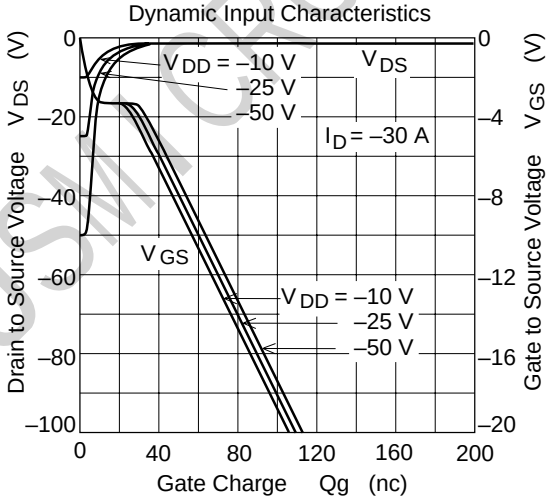
Body–Drain Diode Reverse Recovery Time



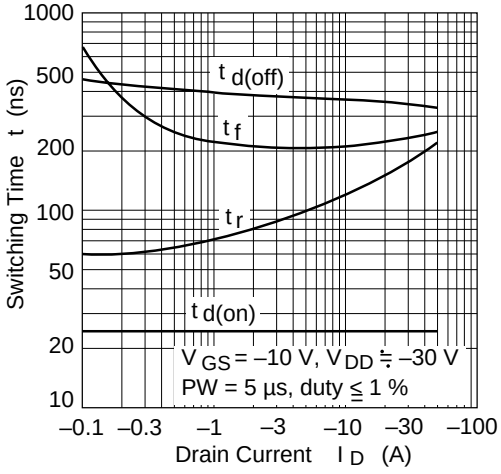
Typical Capacitance vs. Drain to Source Voltage



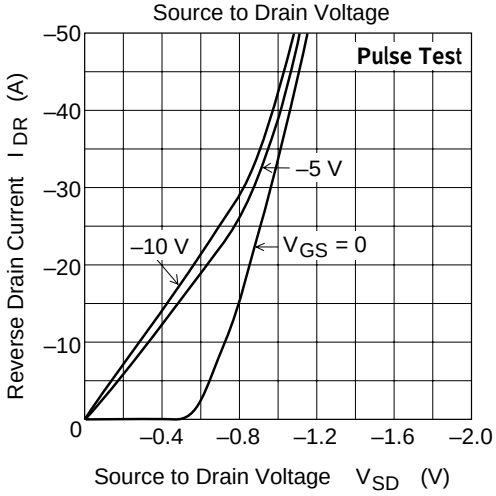
Dynamic Input Characteristics



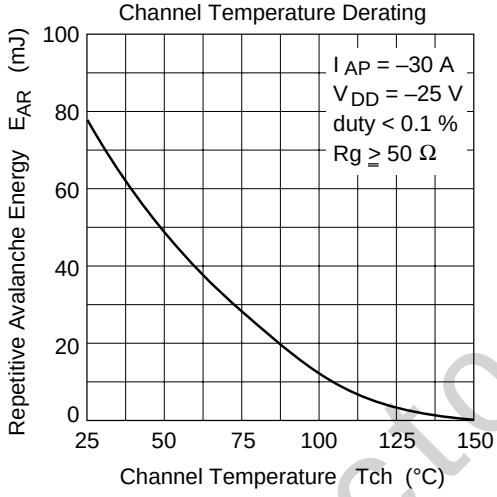
Switching Characteristics



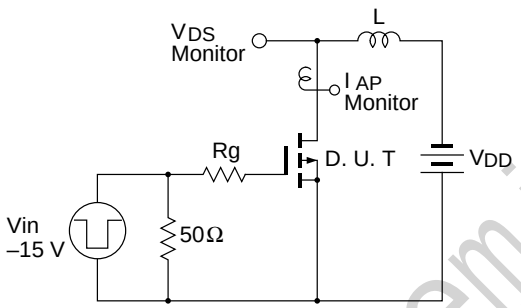
Reverse Drain Current vs. Source to Drain Voltage



Maximum Avalanche Energy vs. Channel Temperature Derating

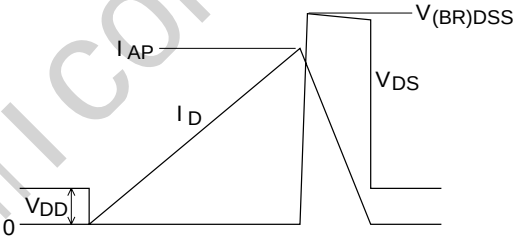


Avalanche Test Circuit

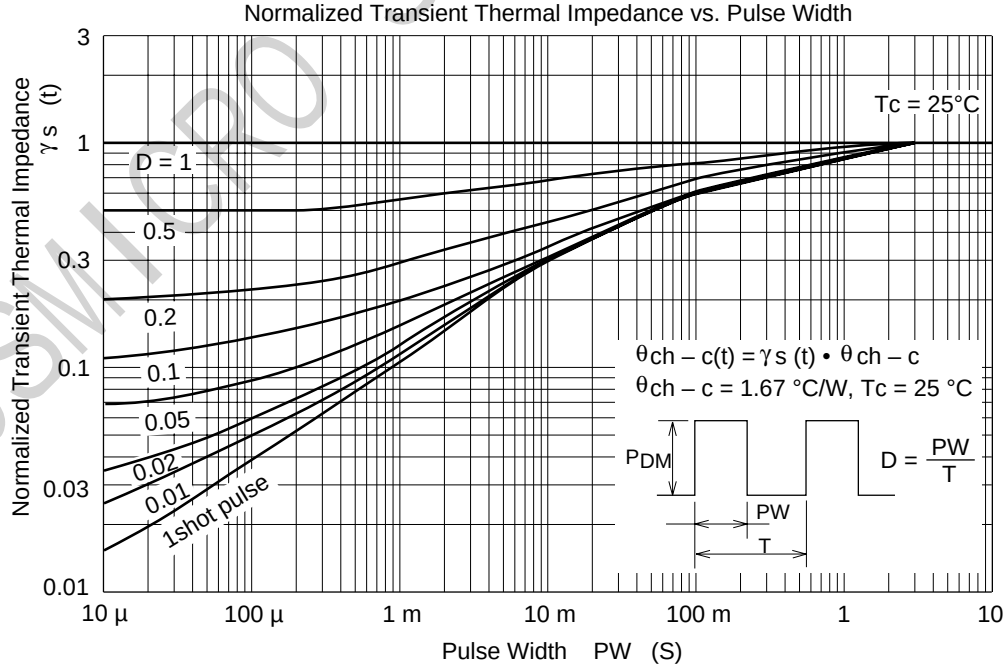


Avalanche Waveform

$$E_{AR} = \frac{1}{2} \bullet L \bullet I_{AP}^2 \bullet \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Normalized Transient Thermal Impedance vs. Pulse Width



TO-220F Package Dimensions

UNIT：mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	9.80		10.60	D		2.54	
A1		7.00		D1	1.15		1.55
A2	2.90		3.40	D2	0.60		1.00
A3	9.10		9.90	D3	0.20		0.50
B1	15.40		16.40	E	2.24		2.84
B2	4.35		4.95	E1		0.70	
B3	6.00		7.40	E2		1.0×45°	
C	3.00		3.70	E3	0.35		0.65
C1	15.00		17.00	E4	2.30		3.30
C2	8.80		10.80	α（度）		30°