

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
650V	0.34Ω@10V	11A

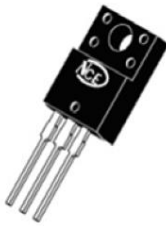
## Feature

- Fast Switching
- Low Gate Charge and Rds(on)
- 100% Single Pulse avalanche energy Test

## Applications

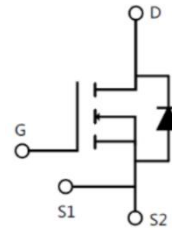
- PD charger
- Large screen display
- Telecom power
- Server power

## Package

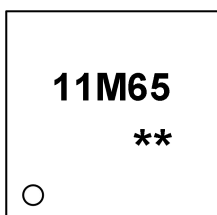


TO-220F

## Circuit diagram



## Marking



11M65 : Product code  
\*\* : Week code

**Absolute maximum ratings (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Rating	Unit
Drain source voltage	$V_{DS}$	650	V
Gate source voltage	$V_{GS}$	$\pm 30$	V
Continuous drain current(Tc=25°C)	$I_D$	11	A
Continuous drain current(Tc=100°C)	$I_D$	7	A
Pulsed drain current	$I_{DM}$	33	A
Power dissipation(Tc=25°C)	$P_D$	31	W
Single pulsed avalanche energy <sup>1)</sup>	$E_{AS}$	220	mJ
Thermal resistance, junction-case	$R_{\theta JC}$	4.03	°C/W
Operation and storage temperature	$T_{stg}, T_j$	-55 to 150	°C

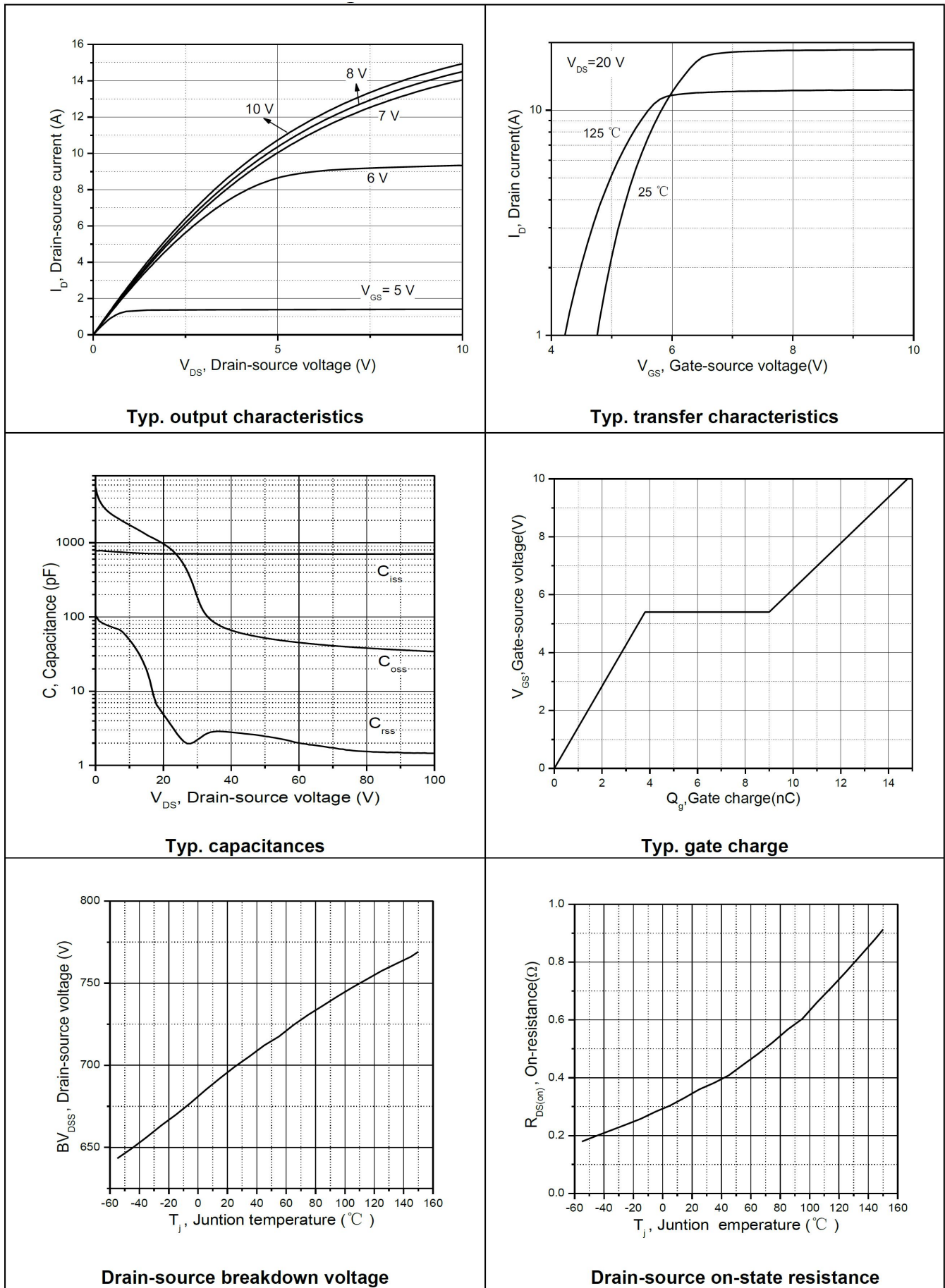
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

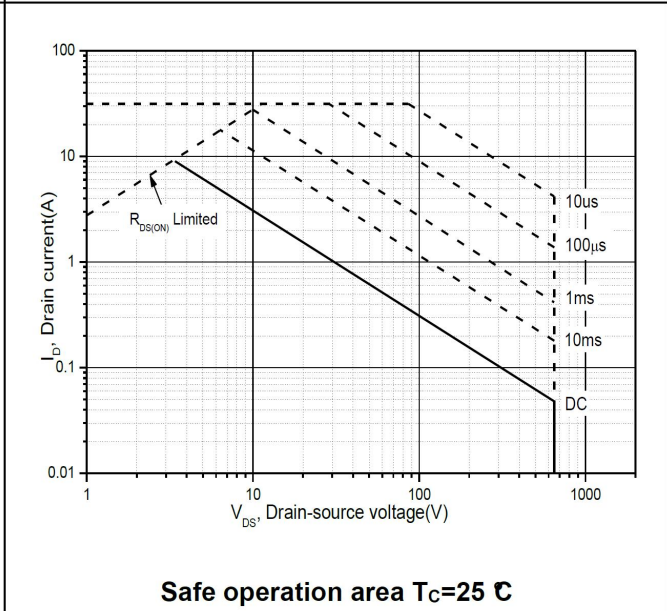
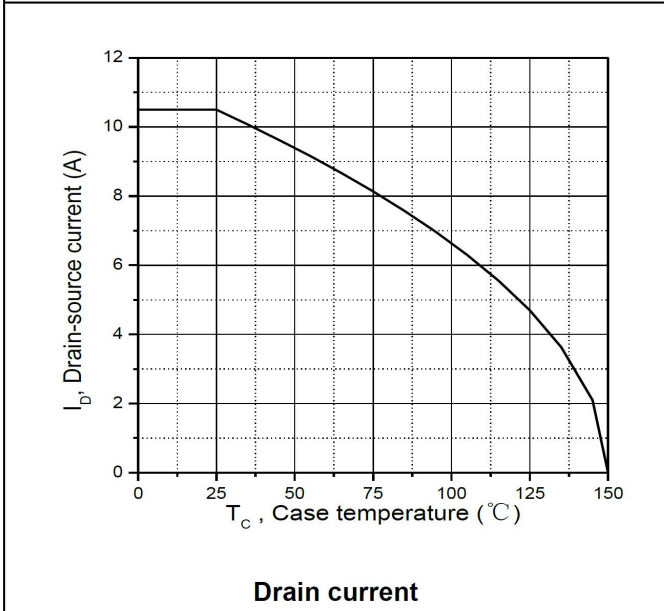
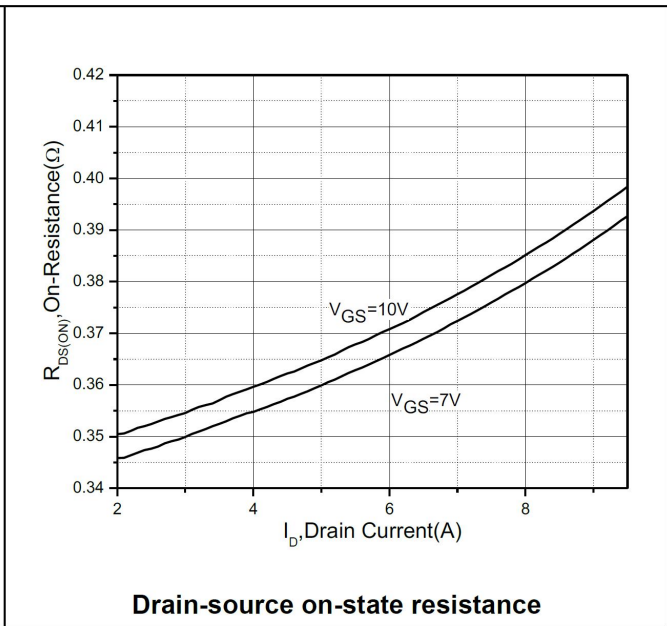
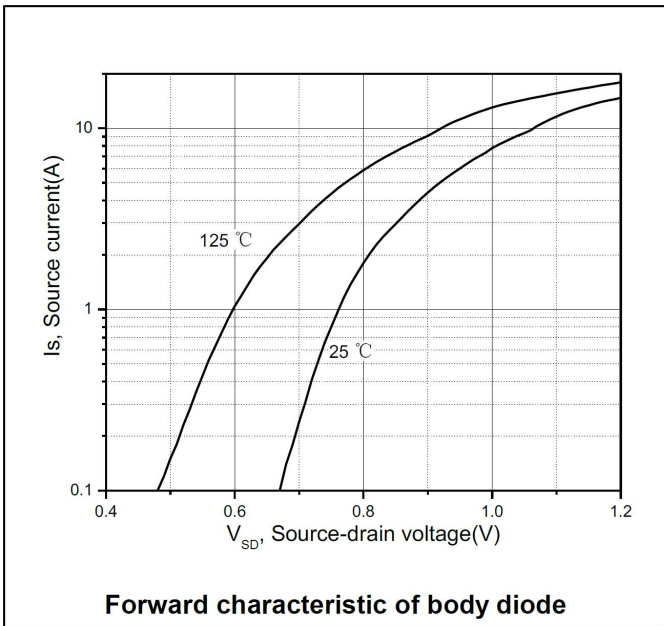
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = 250\mu A, V_{GS} = 0V$	650	-	-	V
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = 520V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	$\pm 0.1$	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 5.5A$	-	0.34	0.42	$\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 50V, V_{GS} = 0V, f = 1.0MHz$	-	702	-	$pF$
Output Capacitance	$C_{oss}$		-	53	-	
Reverse Transfer Capacitance	$C_{riss}$		-	3	-	
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 520V, V_{GS} = 10V, I_D = 10.5A$	-	15	-	$nC$
Gate-Source Charge	$Q_{gs}$		-	4	-	
Gate-Drain Charge	$Q_{gd}$		-	5	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 520V, I_D = 10.5A, R_G = 25\Omega$	-	24	-	$ns$
Rise Time	$t_r$		-	24	-	
Turn-Off Delay Time	$t_{d(off)}$		-	34	-	
Fall Time	$t_f$		-	37	-	
<b>Drain-Source Body Diode Characteristics</b>						
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$	-	-	1.2	V

Note:

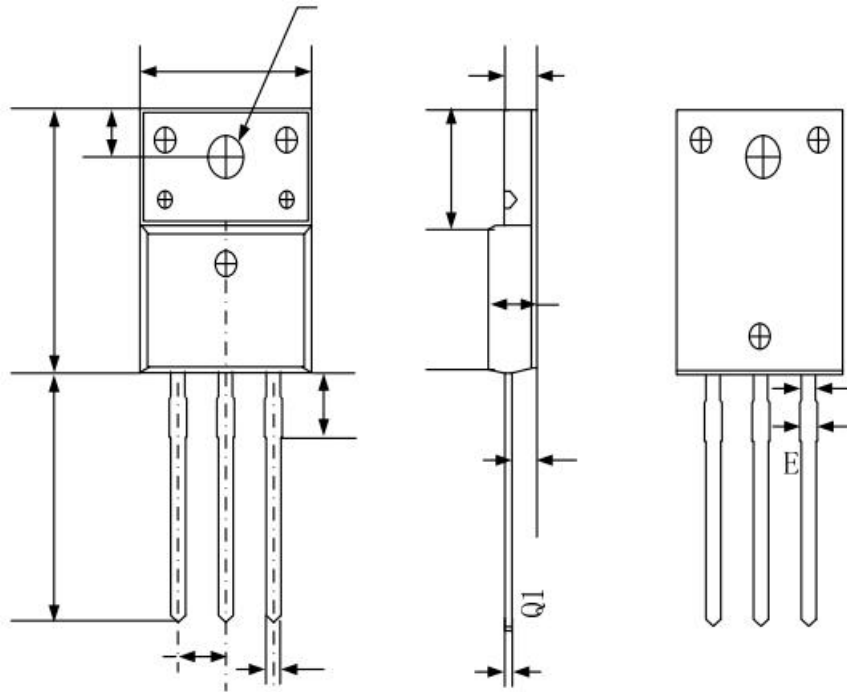
- $E_{AS}$  is tested at starting  $T_j = 25^\circ C, V_{DD} = 75V, V_{GS} = 10V, L = 10mH, R_g = 25\Omega$ ;

**Typical Characteristics**





**TO-220F Package Outline Dimensions**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.50	4.83	0.18	0.19
b	0.70	0.91	0.03	0.04
b1	1.20	1.47	0.05	0.06
b2	1.10	1.38	0.04	0.05
c	0.45	0.63	0.02	0.02
D	15.67	16.07	0.62	0.63
e	2.54 BSC		0.10 BSC	
E	9.96	10.36	0.39	0.41
F	2.34	2.74	0.09	0.11
G	6.48	6.90	0.26	0.27
L	12.68	13.30	0.50	0.52
L1	3.13	3.50	0.12	0.14
Q	2.56	2.93	0.10	0.12
Q1	3.20	3.40	0.13	0.13
$\Phi R$	3.08	3.28	0.12	0.13

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