JMW A M F

The Power MOSFET is fabricated using the advanced planer VDMOS technology. The resulting device has low conduction resistance, superior switching performance and high avalanche energy.

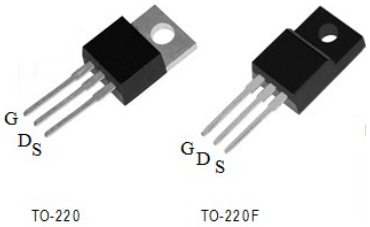
F

- Low $R_{DS(on)}$
- Low gate charge (typ. Q_g = 58.3 nC)
- 100% UIS tested
- RoHS compliant

A

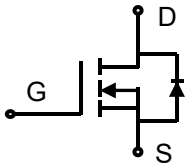
- Power factor correction.
- Switched mode power supplies.
- LED driver.

V_{DSS}	650V
I_D	20A
$R_{DS(on),max}$	0.5Ω
$Q_{g,typ}$	58.3 nC



TO-220 TO-220F

Package No to Scale



N-Channel MOSFET

A M

Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current (T_C = 25°C)	I_D	20	A
(T_C = 100°C)		12.5	A
Pulsed drain current [1]	I_{DM}	80	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [2]	E_{AS}	720	mJ
Peak diode recovery dv/dt [3]	dv/dt	5	V/ns
Power Dissipation TO-220F (T_C = 25°C)	P_D	45	W
Derate above 25°C		0.36	W/°C
Power Dissipation TO-220 (T_C = 25°C)		250	W
Derate above 25°C		2	W/°C
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	20	A
Diode pulse current	$I_{S,pulse}$	80	A

C

		F		
Thermal resistance, Junction-to-case	$R_{\theta JC}$	2.78	0.5	°C/W
Thermal resistance, Junction-to-ambient	$R_{\theta JA}$	62.5	40	°C/W

M

		M		
JMF20N65C	TO-220F	JMF20N65C	50	
JMA20N65C	TO-220	JMA20N65C	50	

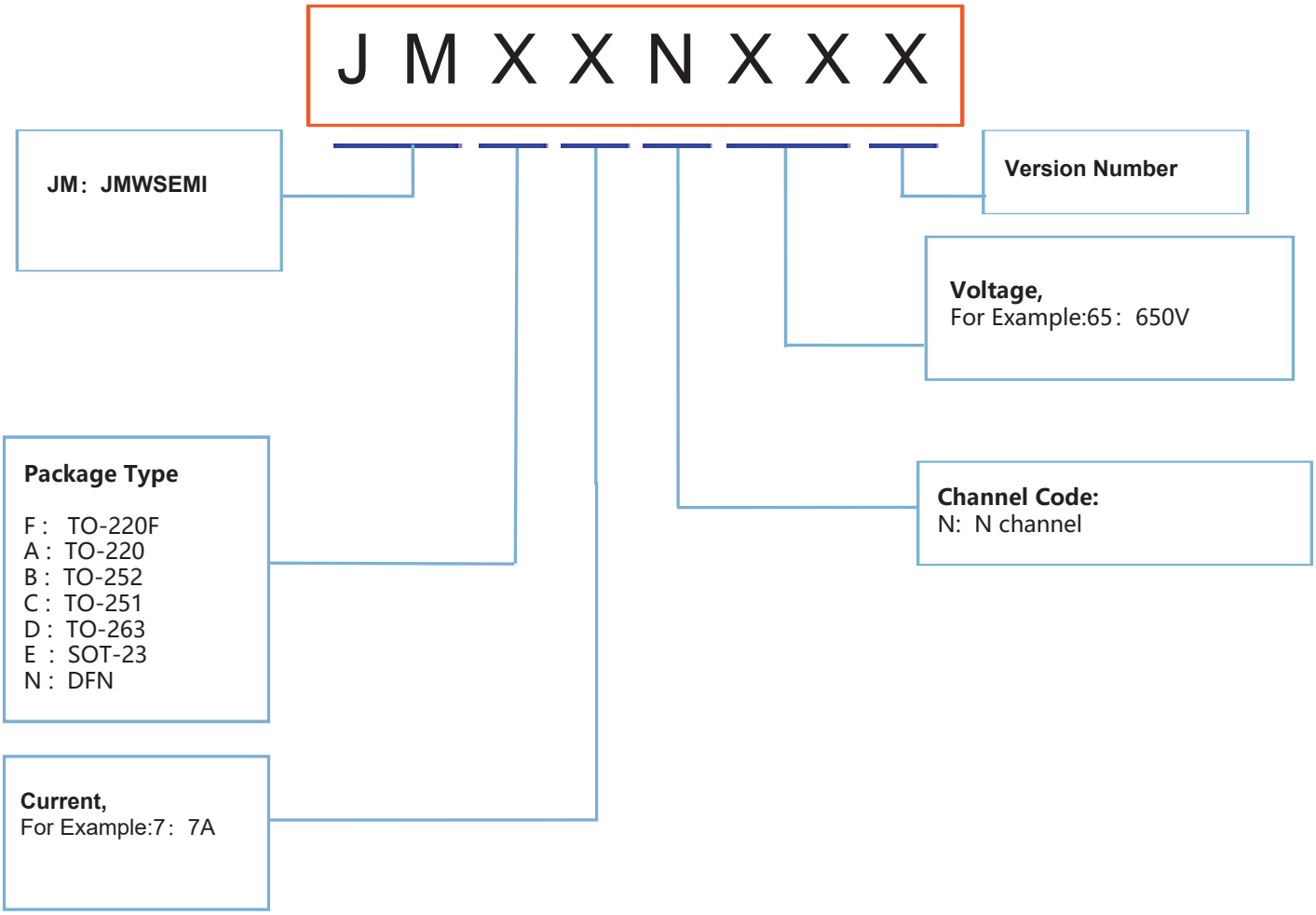
C T_c = 25°C unless otherwise noted

		C	M		M	
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=0.25 mA	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.25 mA	2	-	4	V
Drain cut-off current	I_{DSS}	V_{DS}=650 V, V_{GS}=0 V, T_j = 25°C T_j = 125°C	 - -	 -	 1 100	 μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30 V, V_{DS}=0 V	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30 V, V_{DS}=0 V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=10A	-	0.42	0.5	Ω
Input capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V,	-	2962	-	
Output capacitance	C_{oss}	f = 1 MHz	-	266	-	pF
Reverse transfer capacitance	C_{rss}		-	18	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 325 V, I_D = 20A	-	18.8	-	
Rise time	t_r	R_G = 10 Ω, V_{GS}=15 V	-	43.4	-	ns
Turn-off delay time	$t_{d(off)}$		-	98.2	-	
Fall time	t_f		-	16.9	-	
G						
Gate to source charge	Q_{gs}	V_{DD}=520 V, I_D=20 A,	-	16.7	-	
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	19.3	-	nC
Gate charge total	Q_g		-	58.3	-	
Gate plateau voltage	$V_{plateau}$		-	5	-	V
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=20A	-	-	1.5	V
Reverse recovery time	t_{rr}	V_R=325 V, I_F=20A	-	492.8	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/μs	-	7.46	-	μC
Peak reverse recovery current	I_{rrm}		-	30.3	-	A

Notes:

1. Pulse width limited by maximum junction temperature.
2. L=10mH, I_{AS} = 12A, Starting T_j= 25°C.
3. I_{SD} = 20A, di/dt≤100A/us, V_{DD}≤BV_{DS}, Starting T_j= 25°C.

VD MOS Product Names Rules



C

Figure 1. Typical Output Characteristics

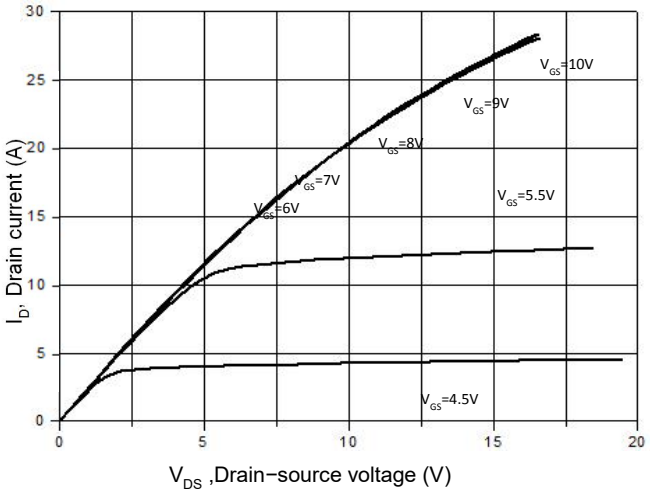


Figure 2. Transfer Characteristics

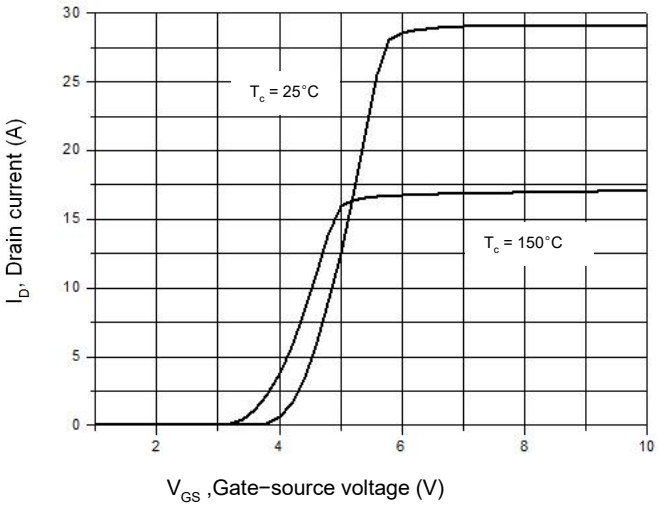


Figure 3. On-Resistance Variation vs. Drain Current

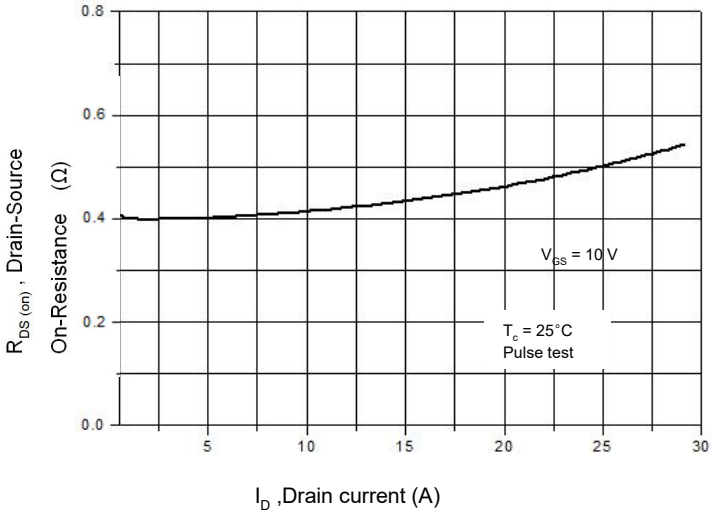


Figure 4. Threshold Voltage vs. Temperature

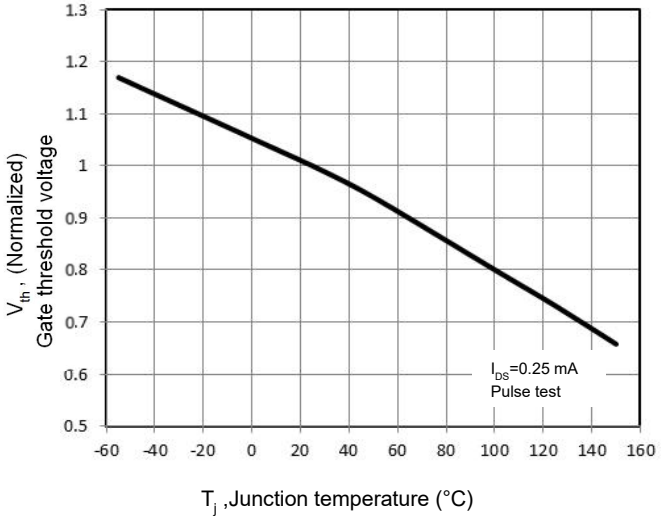


Figure 5. Breakdown Voltage vs. Temperature

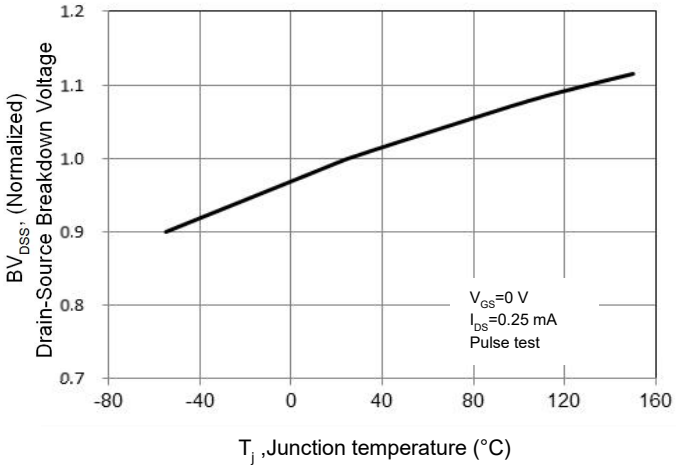


Figure 6. On-Resistance vs. Temperature

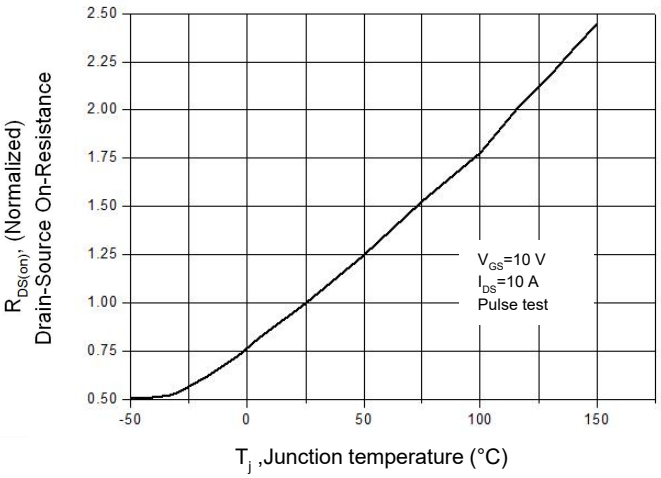


Figure 7. Capacitance Characteristics

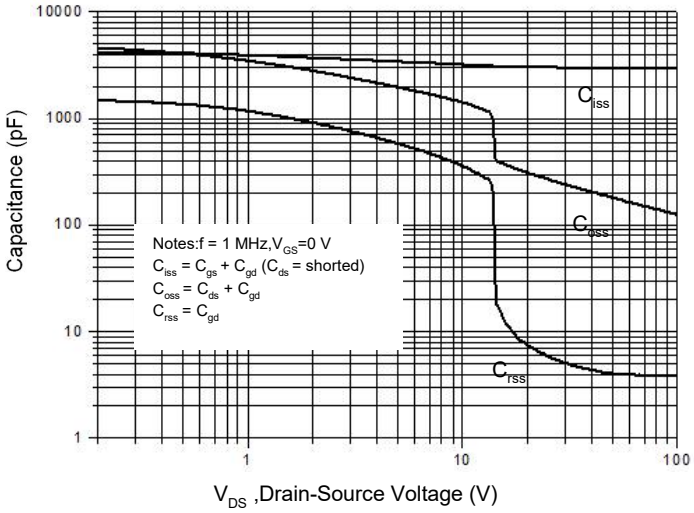


Figure 8. Gate Charge Characteristics

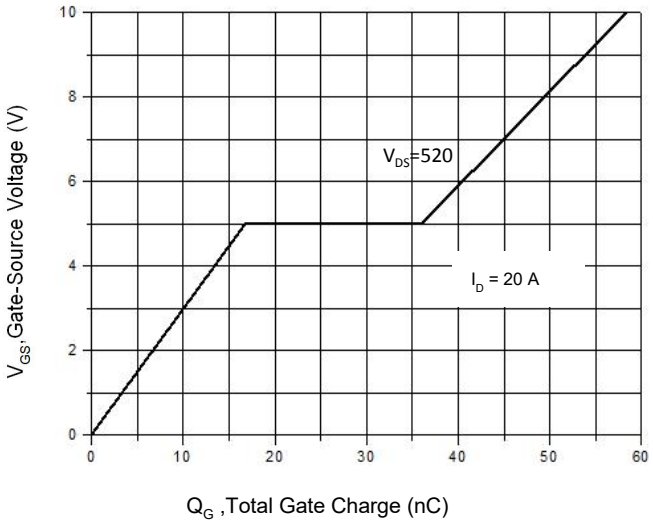


Figure 9. Maximum Safe Operating Area

TO-220F

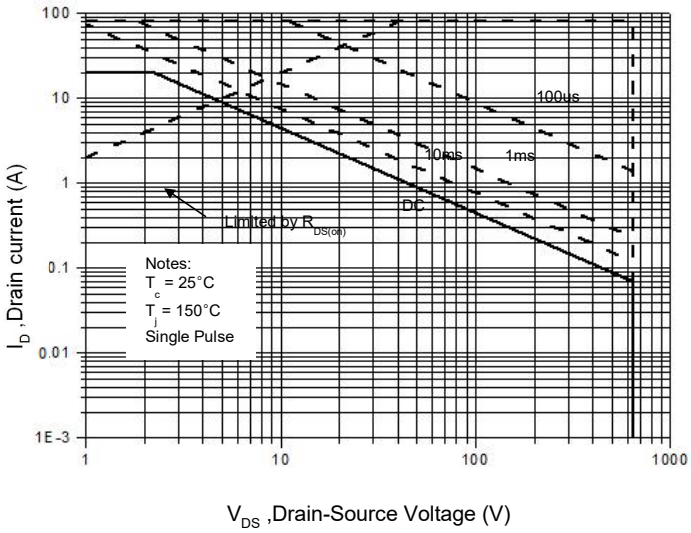


Figure 10. Maximum Safe Operating Area

TO-220

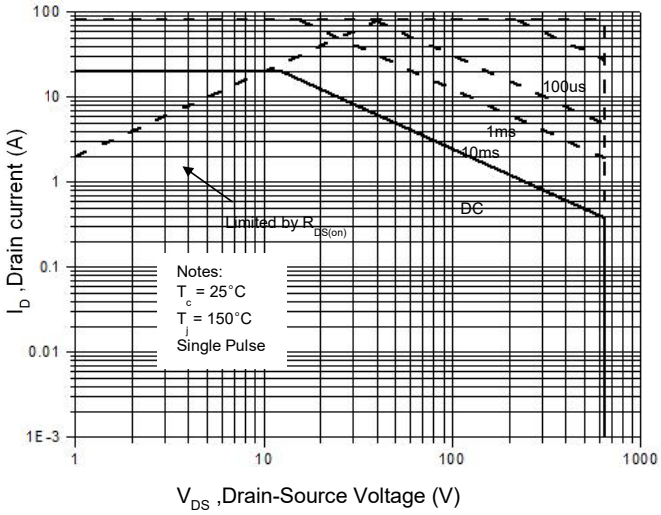


Figure 11. Power Dissipation vs. Temperature

TO-220F

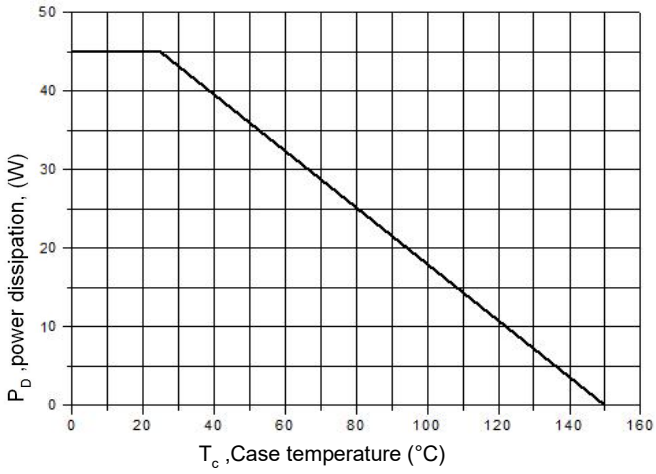


Figure 12. Power Dissipation vs. Temperature

TO-220

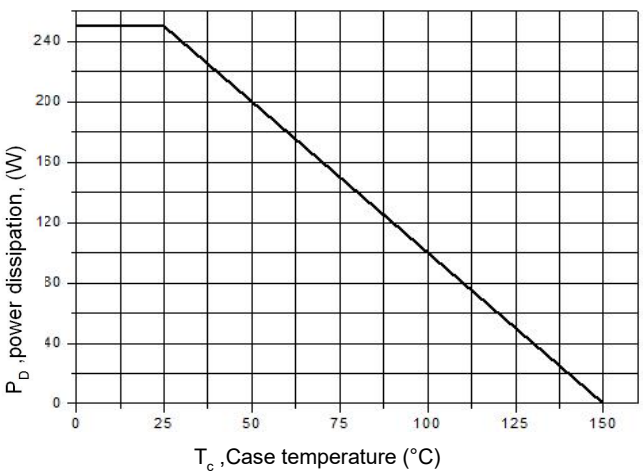


Figure 13. Continuous Drain Current vs. Temperature

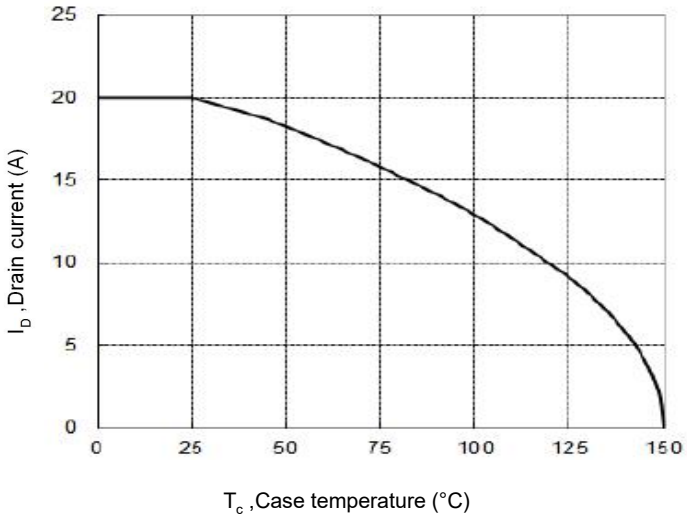


Figure 14. Body Diode Transfer Characteristics

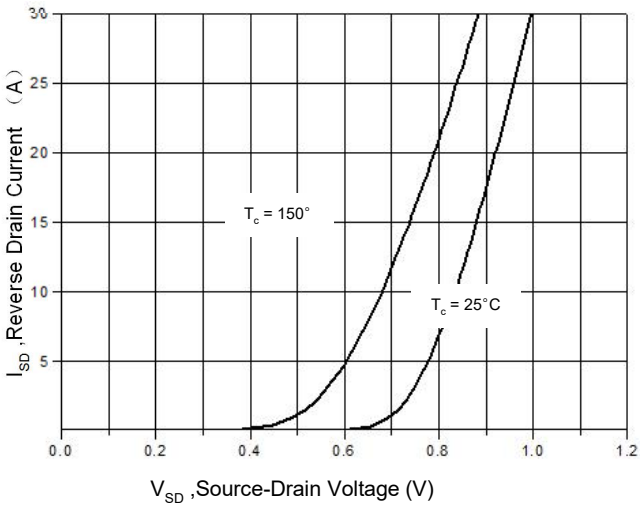


Figure 15 Transient Thermal Impedance , Junction to Case, TO-220F

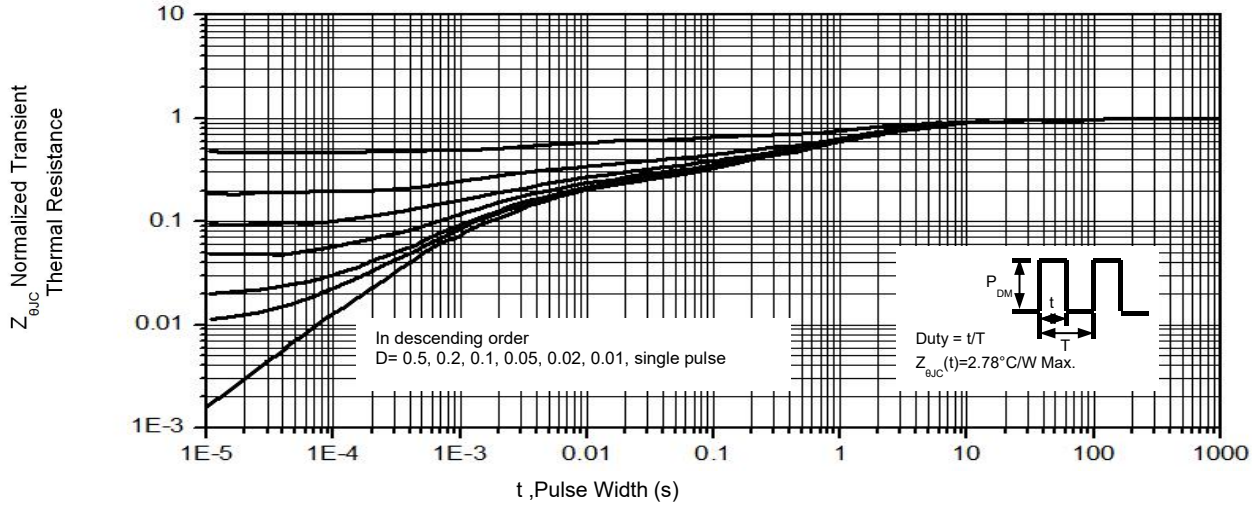
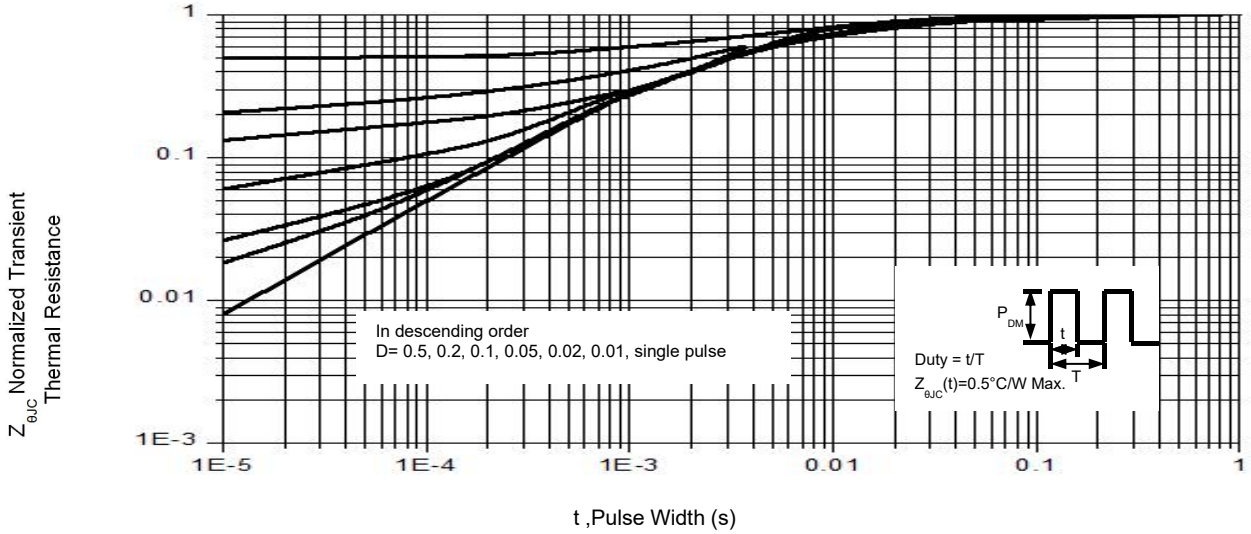
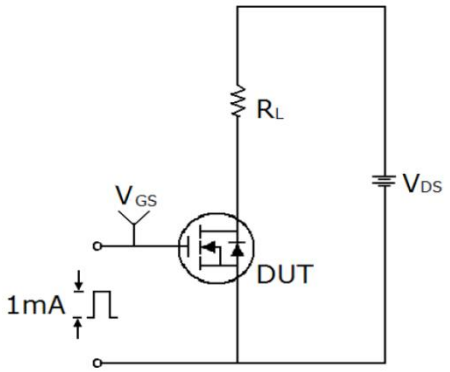
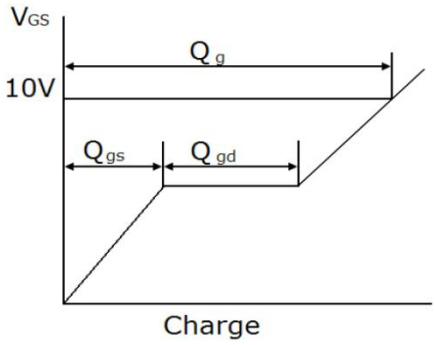


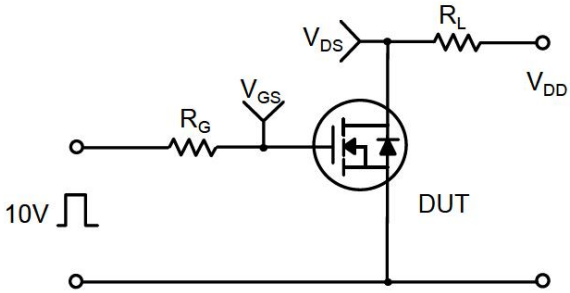
Figure 16. Transient Thermal Impedance, Junction to Case, TO-220

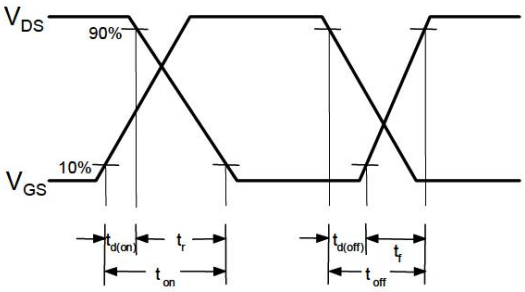


G C C

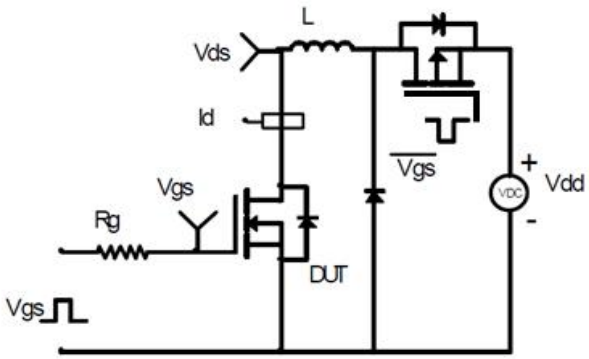

RL
VDS
VGS
DUT
1mA

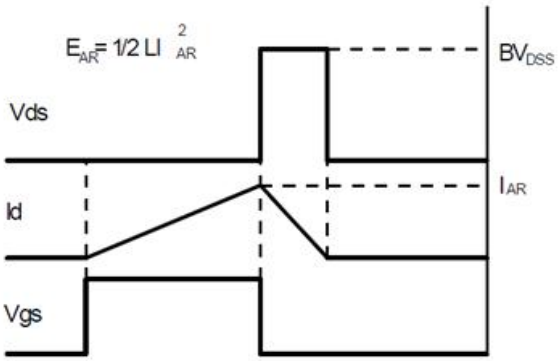

VGS
Q g
10V
Qgs
Q gd
Charge


VDS
RL
VDD
VGS
RG
10V
DUT

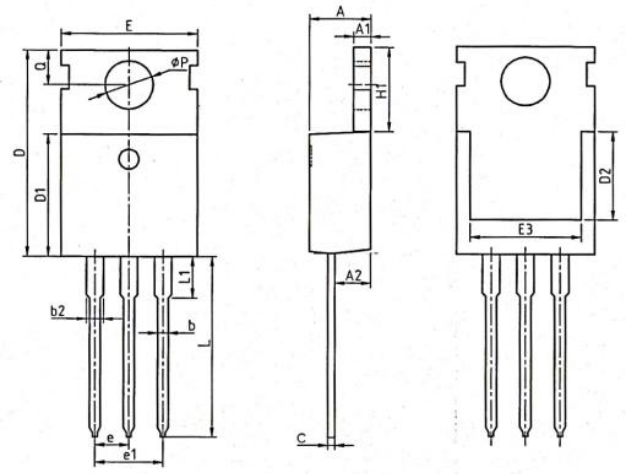

VDS
90%
10%
VGS
td(on)
tr
ton
td(off)
tf
toff

C


L
Vds
Id
Vgs
Rg
DUT
Vgs
Vgs
VDC
Vdd

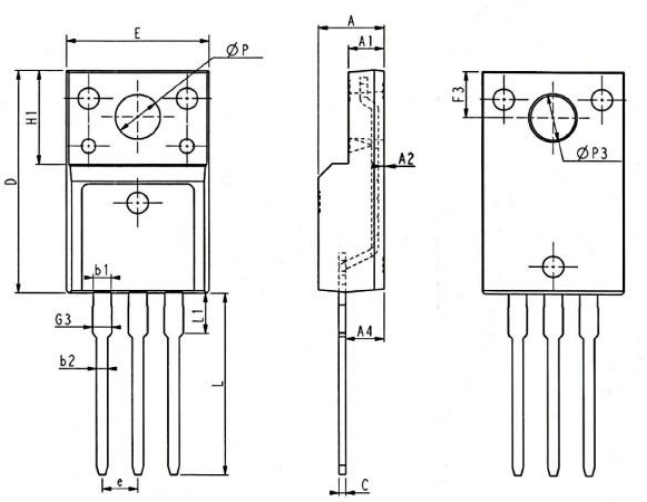

EAR= 1/2 LI 2 AR
BVDSS
Vds
IAR
Id
Vgs

M



COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.37	4.57	4.70	0.172	0.180	0.185
A1	1.25	1.30	1.40	0.049	0.051	0.055
A2	2.20	2.40	2.60	0.087	0.094	0.102
b	0.70	0.80	0.95	0.028	0.031	0.037
b2	1.17	1.27	1.47	0.046	0.050	0.058
c	0.45	0.50	0.60	0.018	0.020	0.024
D	15.10	15.60	16.10	0.594	0.614	0.634
D1	8.80	9.10	9.40	0.346	0.358	0.370
D2	5.50	—	—	0.217	—	—
E	9.70	10.00	10.30	0.382	0.394	0.406
E3	7.00	—	—	0.276	—	—
e	2.54BSC			0.1BSC		
e1	5.08BSC			0.2BSC		
H1	6.25	6.50	6.85	0.246	0.256	0.270
L	12.75	13.50	13.80	0.502	0.531	0.543
L1	—	3.10	3.40	—	0.122	0.134
Øp	3.40	3.60	3.80	0.134	0.142	0.150
Q	2.60	2.80	3.00	0.102	0.110	0.118

M F



COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
E	9.96	10.16	10.36	0.392	0.400	0.408
A	4.50	4.70	4.90	0.177	0.185	0.193
A1	2.34	2.54	2.74	0.092	0.100	0.108
A2	0.30	0.45	0.60	0.012	0.002	0.024
A4	2.65	2.76	2.96	0.104	0.109	0.117
C	0.40	0.50	0.65	0.016	0.020	0.026
D	15.57	15.87	16.17	0.613	0.625	0.637
H1	6.70REF			0.264REF		
e	2.54BSC			0.1BSC		
ØP	3.03	3.18	3.38	0.119	0.125	0.133
L	12.68	12.98	13.28	0.499	0.511	0.523
L1	2.88	3.03	3.18	0.113	0.119	0.125
ØP3	3.15REF			0.124REF		
F3	3.15	3.30	3.45	0.124	0.130	0.136
G3	1.25	1.35	1.55	0.049	0.053	0.061
b1	1.18	1.28	1.43	0.046	0.050	0.056
b2	0.70	0.80	0.95	0.028	0.031	0.037

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