

Features

- 60V/28A,
 $R_{DS(ON)} = 12m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)} = 16m\Omega(Typ.)@V_{GS}=4.5V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Fast Switching Speed
- 100% Avalanche Tested

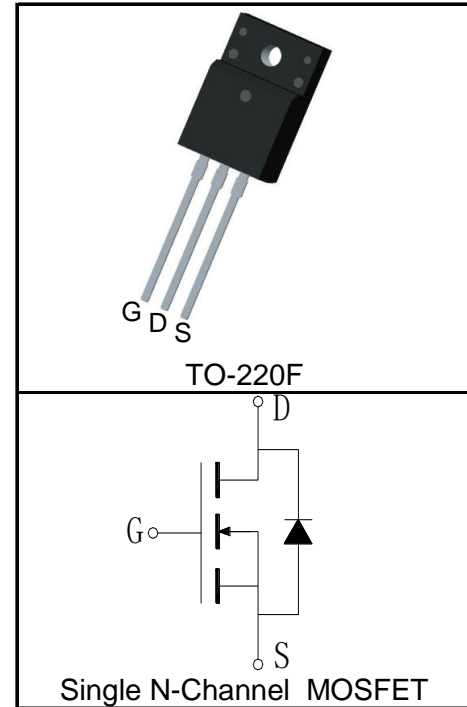
Applications

- DC Motor Control



Halogen-Free

Pin Description



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	
T_J	Maximum Junction Temperature	175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 28	A
Mounted on Large Heat Sink			
$I_{DP}^{(1)}$	300 μs Pulse Drain Current Tested	$T_C=25^\circ\text{C}$ 112	A
$I_D^{(2)}$	Continuous Drain Current($V_{GS}=10V$)	$T_C=25^\circ\text{C}$ 28	A
		$T_C=100^\circ\text{C}$ 20	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 25	W
		$T_C=100^\circ\text{C}$ 13	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	6	$^\circ\text{C/W}$
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	62.5	$^\circ\text{C/W}$
Drain-Source Avalanche Ratings			
$E_{AS}^{(4)}$	Avalanche Energy, Single Pulsed	64	mJ

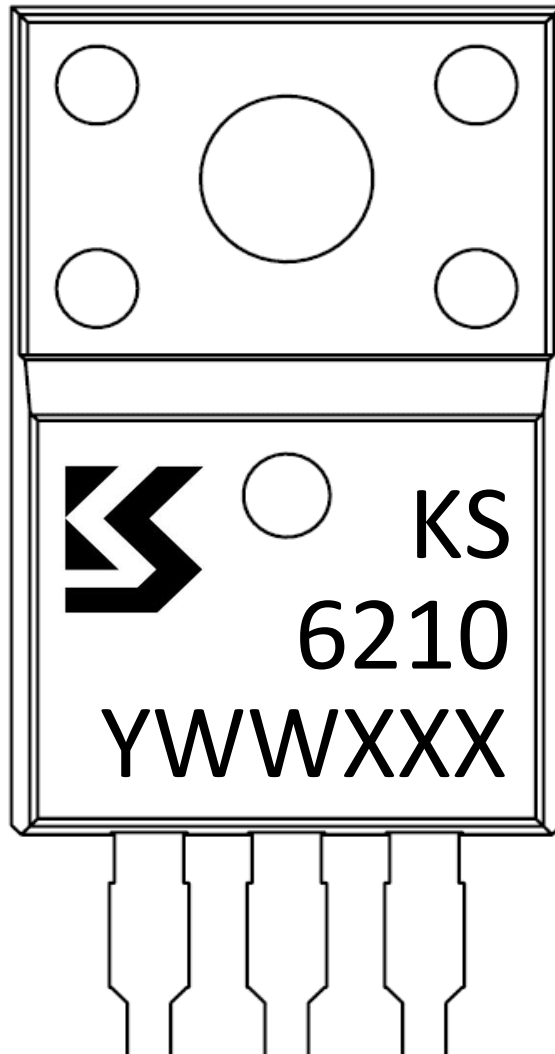
Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS6210FB2			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	60			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V$			1	μA
		$T_J=125^\circ C$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.2	1.8	2.3	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=20A$		12	17	$m\Omega$
		$V_{GS}=4.5V, I_{DS}=16A$		16	25	$m\Omega$
Diode Characteristics						
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=20A, V_{GS}=0V$		0.85	1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD}=20A, di_{SD}/dt=100A/\mu s$		25		ns
Q_{rr}	Reverse Recovery Charge			39		nC
Dynamic Characteristics⁽⁶⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		1.6		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=30V,$ Frequency=1.0MHz		2000		pF
C_{oss}	Output Capacitance			180		
C_{rss}	Reverse Transfer Capacitance			115		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=30V, I_{DS}=20A,$ $V_{GEN}=10V, R_G=3\Omega$		8		ns
t_r	Turn-on Rise Time			15		
$t_{d(OFF)}$	Turn-off Delay Time			28		
t_f	Turn-off Fall Time			9		
Gate Charge Characteristics⁽⁶⁾						
Q_g	Total Gate Charge	$V_{DS}=30V, V_{GS}=10V,$ $I_{DS}=20A$		48		nC
Q_{gs}	Gate-Source Charge			7		
Q_{gd}	Gate-Drain Charge			14		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature.
 - ③ When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
 - ④ Limited by $T_{Jmax}, I_{AS} = 16A, L=0.5mH, V_{DD} = 30V, R_G = 25\Omega$, Starting $T_J = 25^\circ C$.
 - ⑤ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

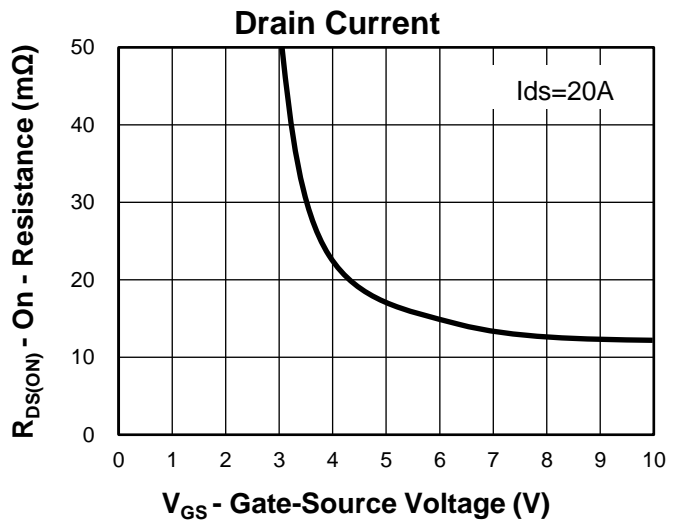
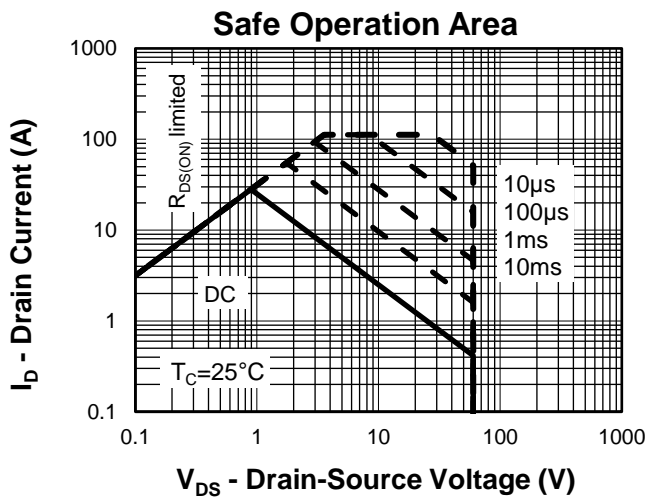
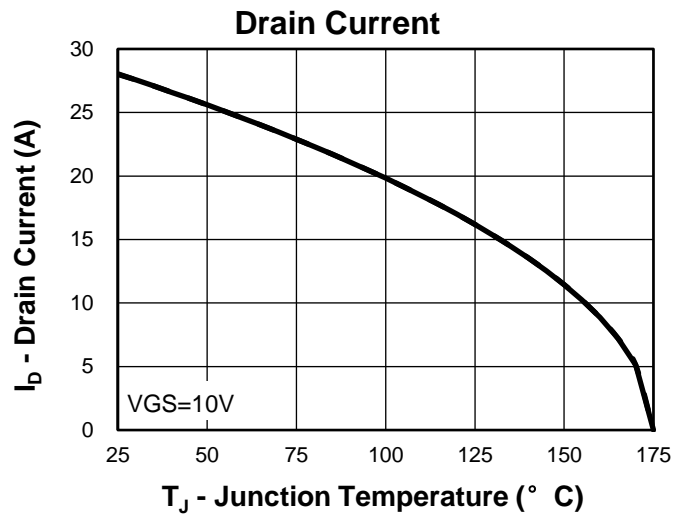
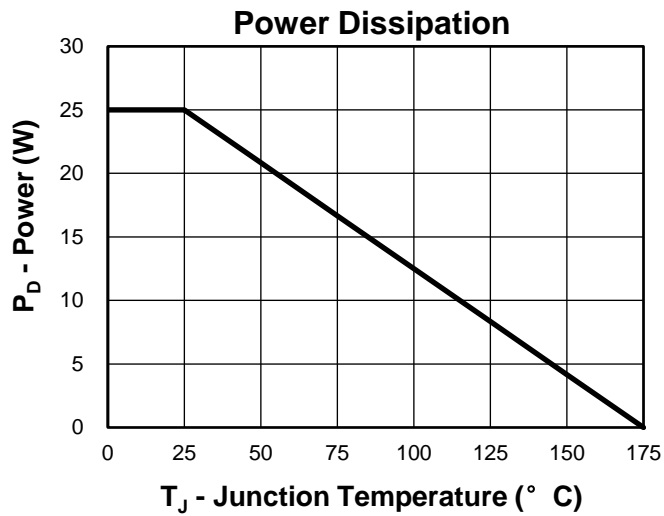
Ordering and Marking Information

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS6210FB2	TO-220F	Tube	50	-	-

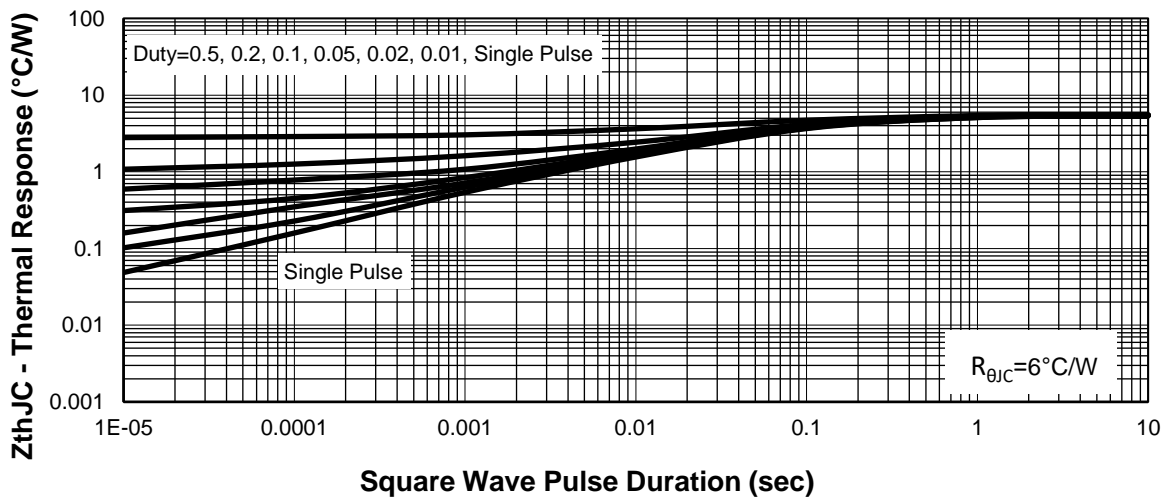


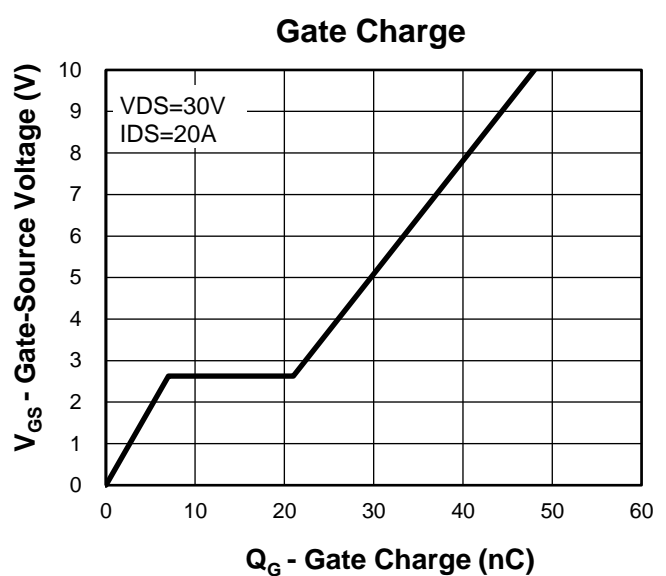
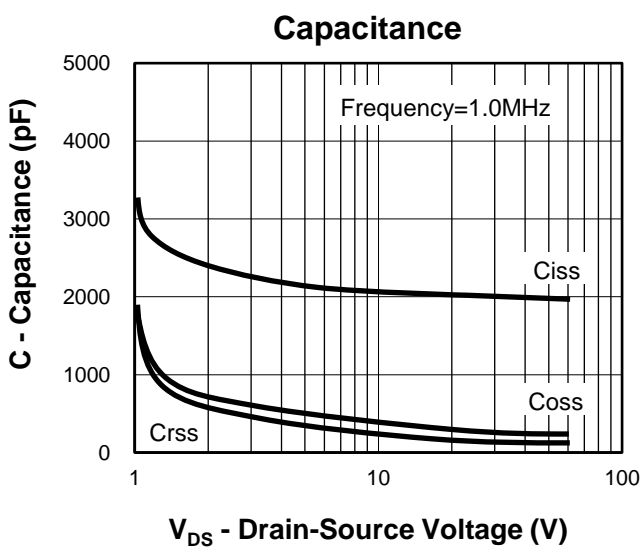
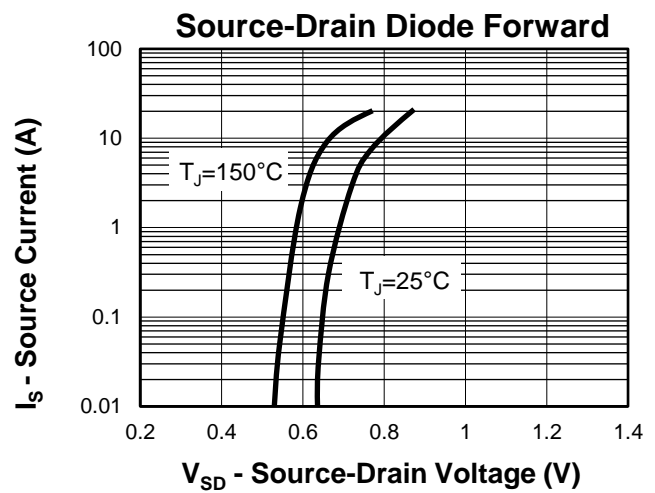
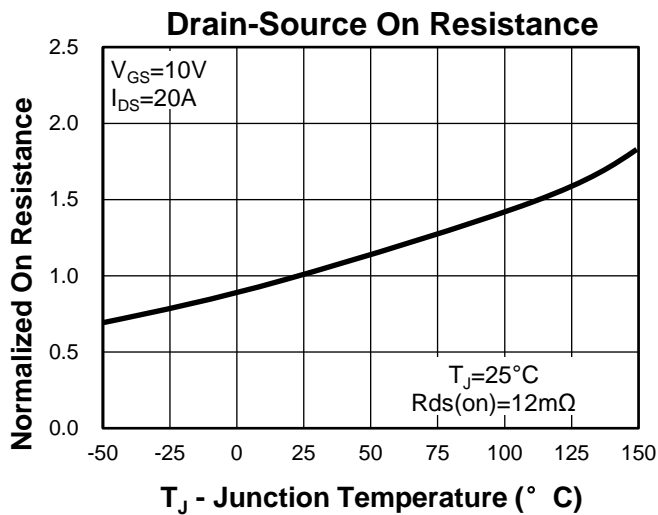
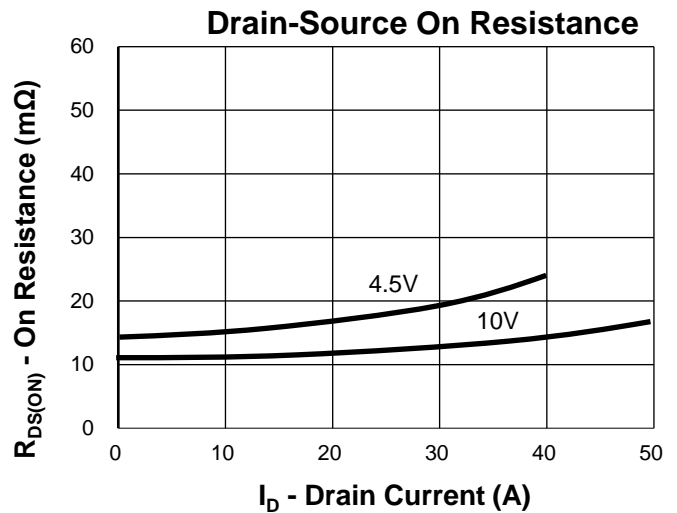
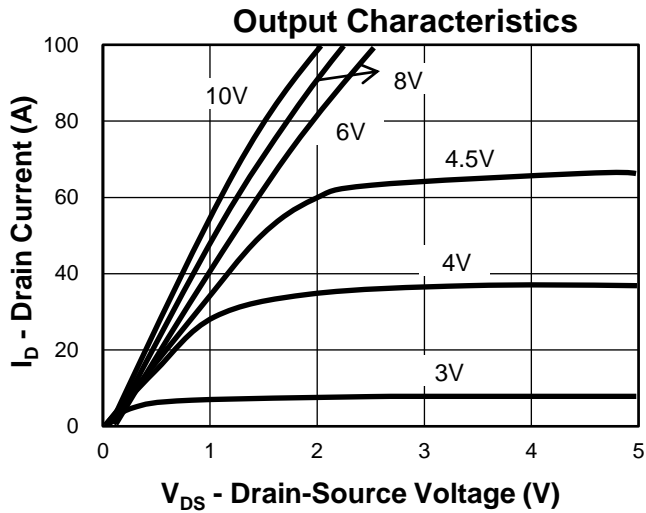
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WW =Week.
XXX =Lot number.

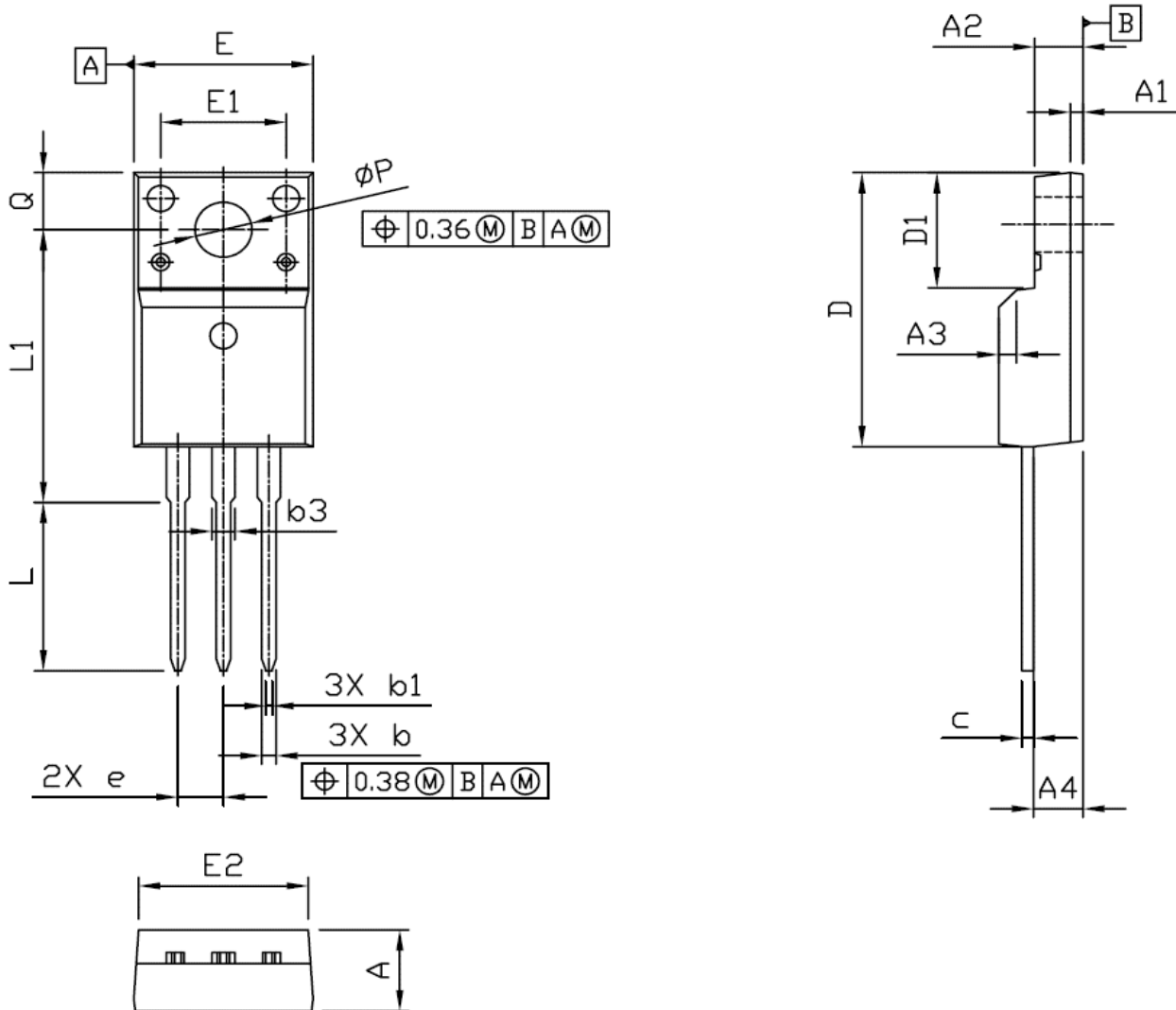
Typical Characteristics



Thermal Transient Impedance

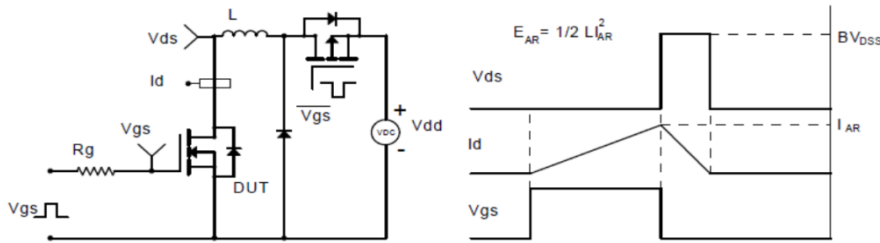


Typical Characteristics


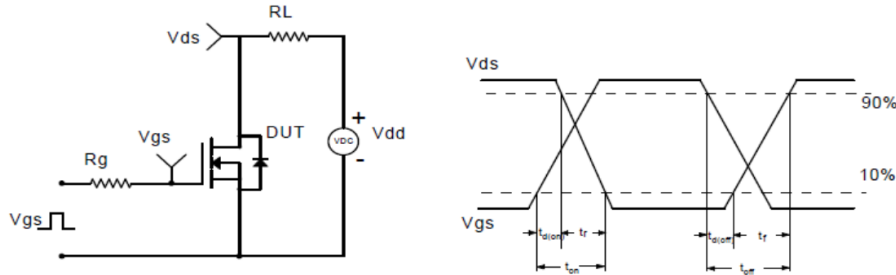
Package Information
TO-220F


SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.50	4.70	4.90	0.177	0.185	0.193	D1	6.48	6.68	6.88	0.255	0.263	0.271
A1	*	0.70	*	*	0.028	*	E	9.96	10.16	10.36	0.392	0.400	0.408
A2	2.34	2.54	2.74	0.092	0.100	0.108	E1	*	7.00	*	*	0.276	*
A3	1X45°			1X45°			E2	9.26	9.46	9.66	0.365	0.372	0.380
A4	2.56	2.76	2.96	0.101	0.109	0.117	e	2.54 BSC			0.10 BSC		
b	0.70	0.80	0.90	0.028	0.031	0.035	L	9.55	9.75	9.95	0.376	0.384	0.392
b1	0.25	0.35	0.45	0.010	0.014	0.018	L1	15.60	15.80	16.00	0.614	0.622	0.630
b3	1.18	1.28	1.47	0.046	0.050	0.058	Q	3.20	3.30	3.40	0.126	0.130	0.134
c	0.45	0.50	0.60	0.018	0.020	0.024	ϕP	3.08	3.18	3.28	0.121	0.125	0.129
D	15.67	15.87	16.07	0.617	0.625	0.633							

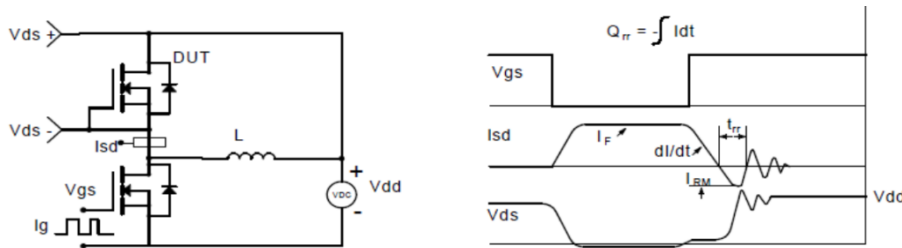
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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