

Description

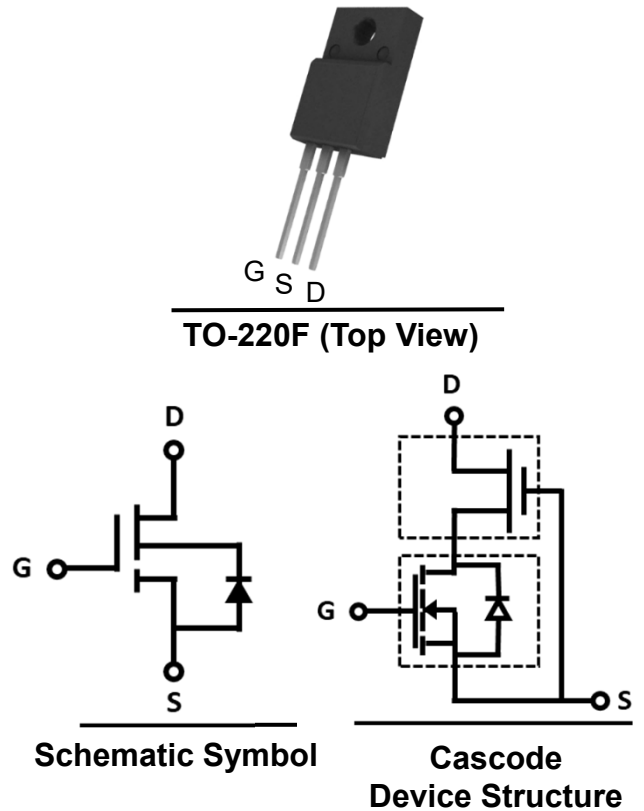
Product Summary		
$V_{DS}(V)$	$R_{DS(on)}(m\Omega)(Typ)$	$I_D(A)$
700	125	11

Feature

- Easy to use, compatible with standard gate drivers
- Excellent $Q_G \times R_{DS(on)}$ figure of merit (FOM)
- Low Q_{RR} , no free-wheeling diode required
- Low switching loss
- RoHS compliant and Halogen-free

Applications

- High efficiency power supplies
- Telecom and datacom
- Automotive
- Servo motors


Absolute maximum rating@25°C

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	700	V
Gate-Source Voltage		V_{GS}	± 20	V
Transient Drain-Source Voltage ¹⁾		V_{TDS}	800	V
Continuous Drain Current	$T_C=25^\circ C$	I_D	11	A
	$T_C=100^\circ C$		7	
Pulsed Drain Current (Pulse Width: 100 μs)	$T_C=25^\circ C$	I_{DM}	49	A
	$T_C=150^\circ C$		37	
Power Dissipation		P_D	28	W
Soldering Peak Temperature		T_{CSOLD}	260	$^\circ C$
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	4.4	-	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient ²⁾	$R_{\theta JA}$	-	50	-	$^\circ C/W$

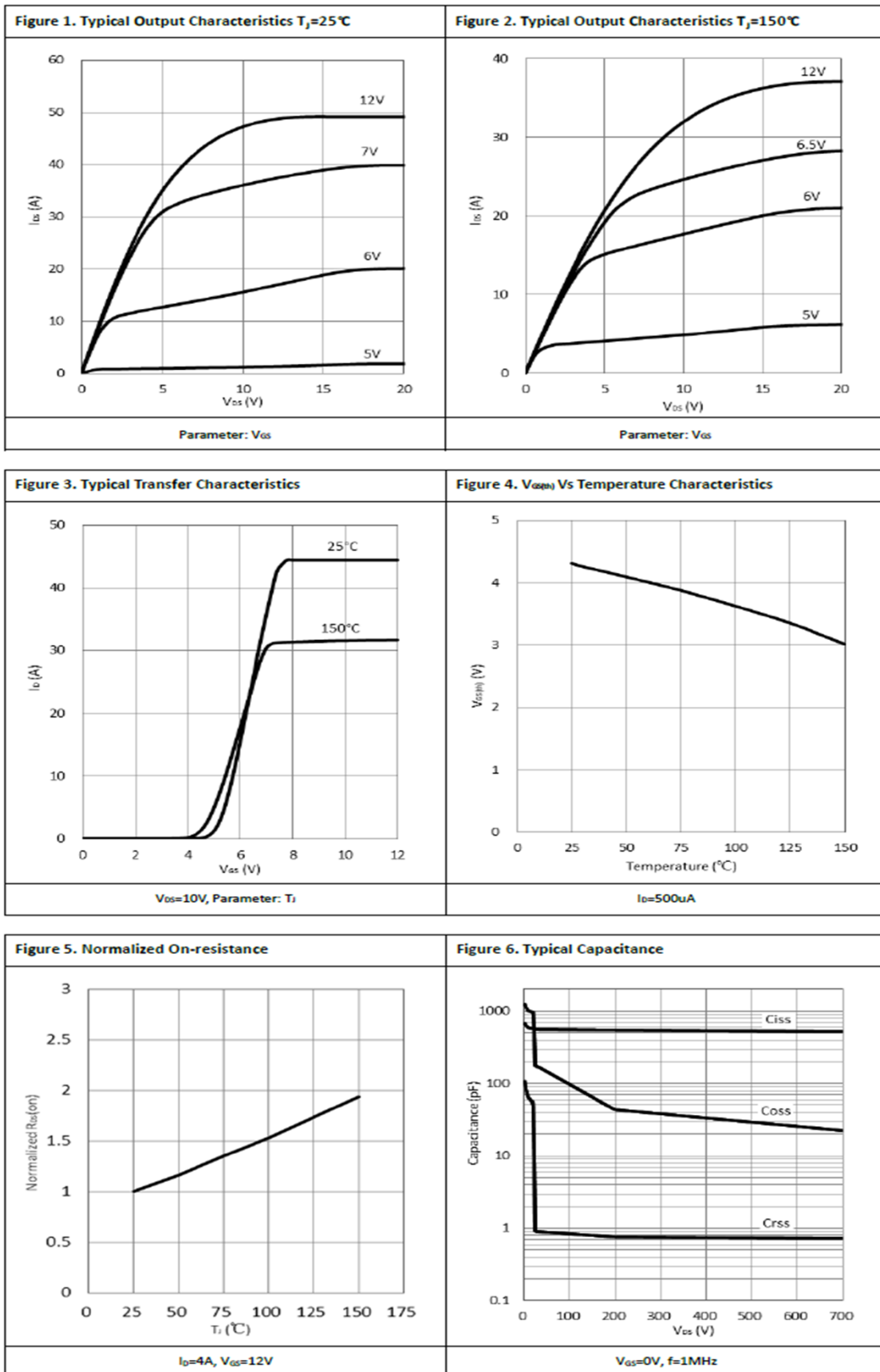
Electrical characteristics per line@25°C (unless otherwise specified)

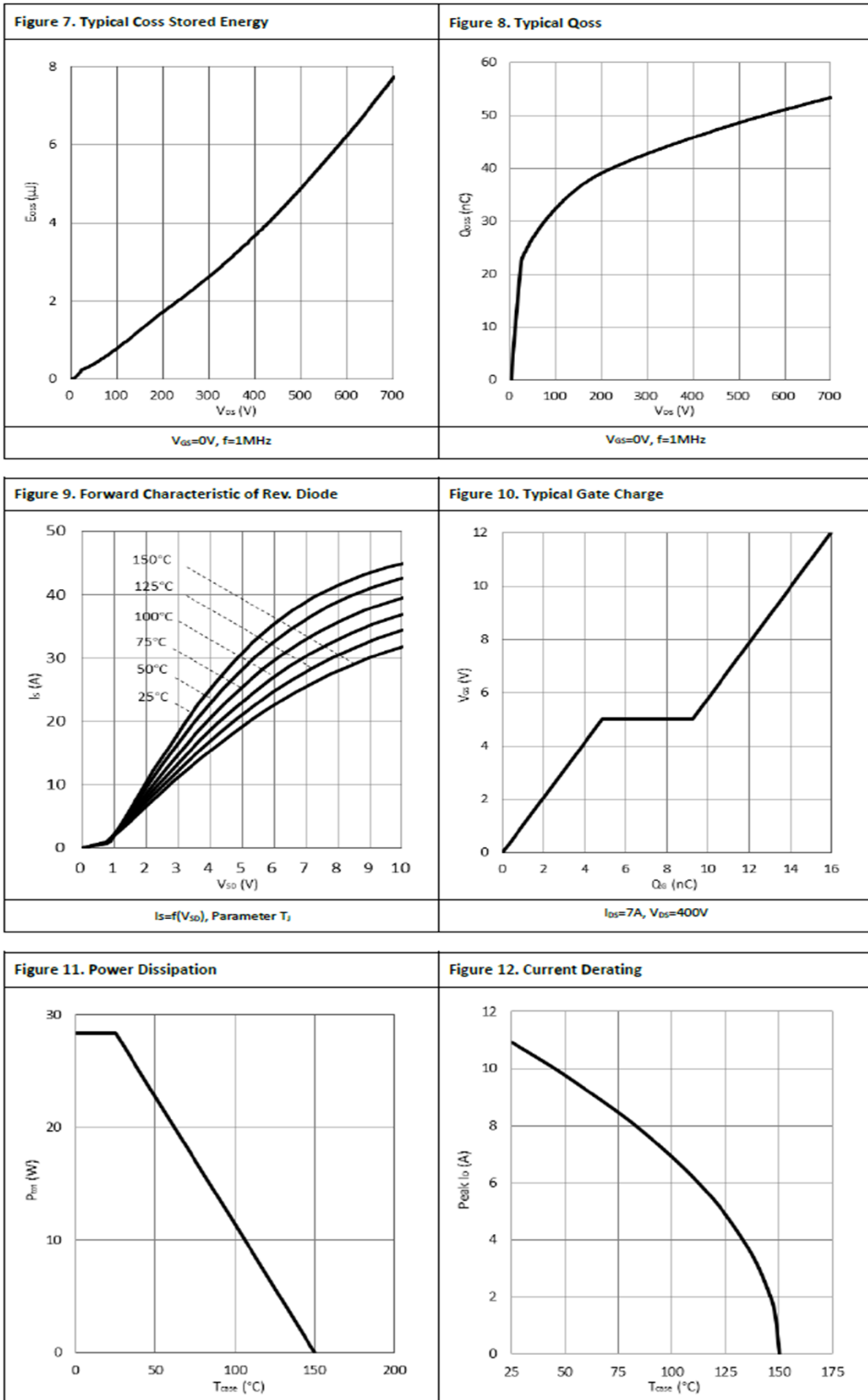
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units	
Statistic Characteristics							
Maximum Drain-Source Voltage	V_{DS-Max}	$V_{GS} = 0V$	700	-	-	V	
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	-	1000	-	V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=700V, V_{GS}=0V$	$T_J=25^\circ C$	-	8	20	μA
			$T_J=150^\circ C$	-	50	-	
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 150	nA	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 500\mu A$	3	4	5	V	
Gate threshold voltage temperature coefficient	$\Delta V_{GS(th)}/T_J$		-	-10.7	-	mV/°C	
Drain-Source On-State Resistance ³⁾	$R_{DS(ON)}$	$V_{GS}=12V, I_D=4A$	$T_J=25^\circ C$	-	125	160	mΩ
			$T_J=150^\circ C$	-	250	-	
Dynamic Characteristics							
Input Capacitance	C_{iss}	$V_{DS} = 400V, V_{GS} = 0V, f = 1MHz$	-	524	-	pF	
Output Capacitance	C_{oss}		-	29	-		
Reverse Transfer Capacitance	C_{rss}		-	0.8	-		
Effective Output Capacitance, Energy Related	$C_{o(er)}$	$V_{GS} = 0V, V_{DS} = 0-400V$	-	46	-	pF	
Effective Output Capacitance, Time Related	$C_{o(tr)}$		-	115	-		
Output Charge	Q_{oss}		-	46	-		nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 400V, I_D = 7A, V_{GS} = 0-12V, R_G = 47\Omega$	-	60	-	ns	
Turn-on Rise Time	t_r		-	18	-		
Turn-Off Delay Time	$t_{d(off)}$		-	80	-		
Turn-Off Fall Time	t_f		-	12	-		
Total Gate Charge	Q_g	$V_{DS} = 400V, I_D = 7A, V_{GS} = 0-12V$	-	16	-	nC	
Gate-Source Charge	Q_{gs}		-	4.8	-		
Gate-Drain Charge	Q_{gd}		-	4.4	-		
Reverse Diode Characteristics							
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=3.5A$	-	1.2	-	V	
			$V_{GS}=0V, I_S=7A$	$T_J=25^\circ C$	-		1.6
		$T_J=150^\circ C$		-	2		-
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=7A, V_{DD}=400V, di/dt=1000A/\mu s$	-	21	-	ns	
Reverse Recovery Charge	Q_{rr}		-	46	-	μC	

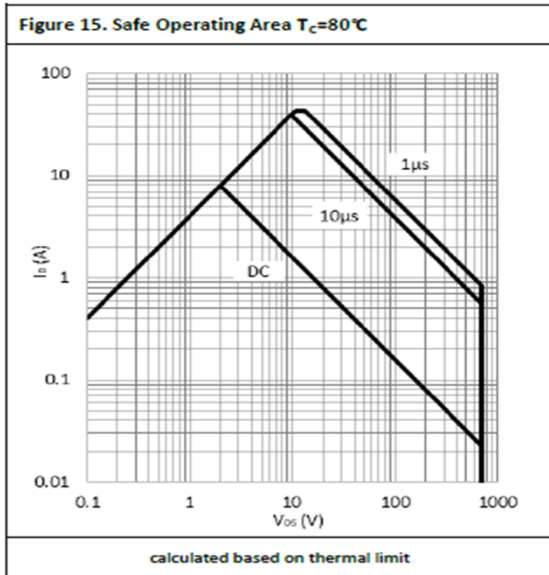
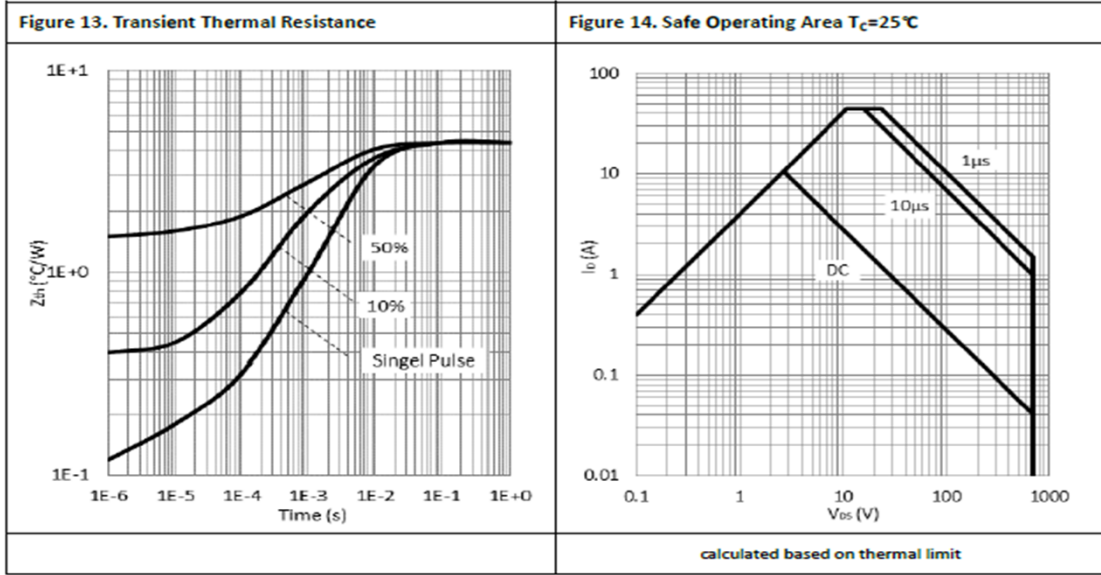
Notes:

- Off-state spike duty cycle < 0.01, spike duration < 2μs
- Device on one layer epoxy PCB for drain connection (vertical and without air stream cooling, with 6cm²copper area and 70μm thickness)
- Dynamic on-resistance; see Figure 19 and 20 for test circuit and configurations

Typical Characteristics







Test Circuits and Waveforms

Figure 16. Switching Time Test Circuit

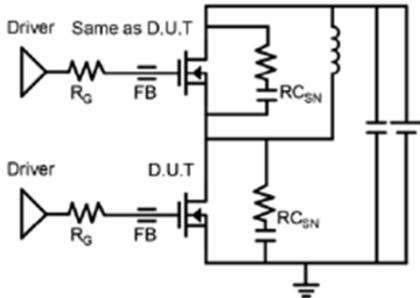


Figure 17. Switching Time Waveform

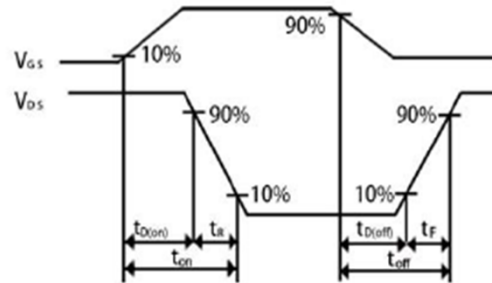


Figure 18. Dynamic $R_{DS(on)}$ Test Circuit

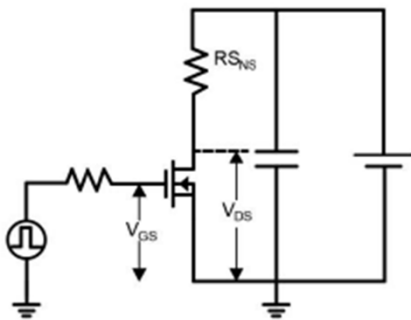


Figure 19. Dynamic $R_{DS(on)}$ Waveform

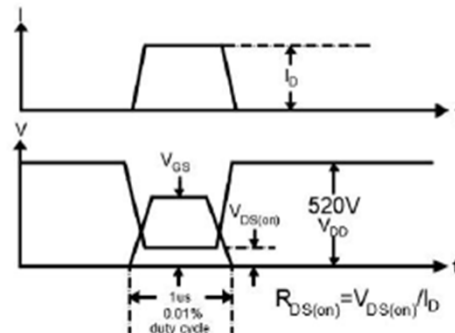


Figure 20. Diode Characteristic Test Circuits

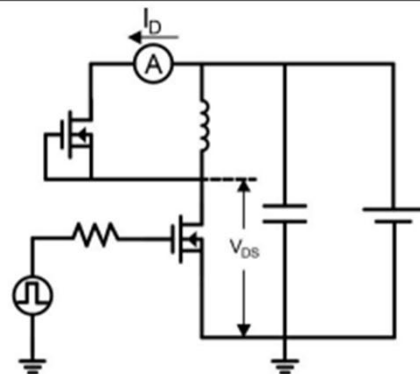
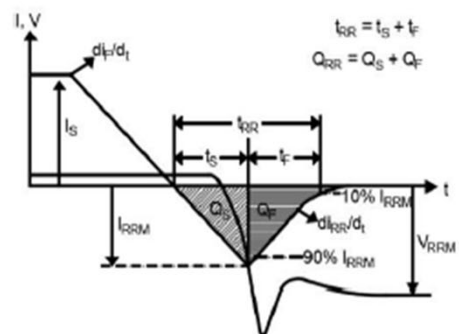
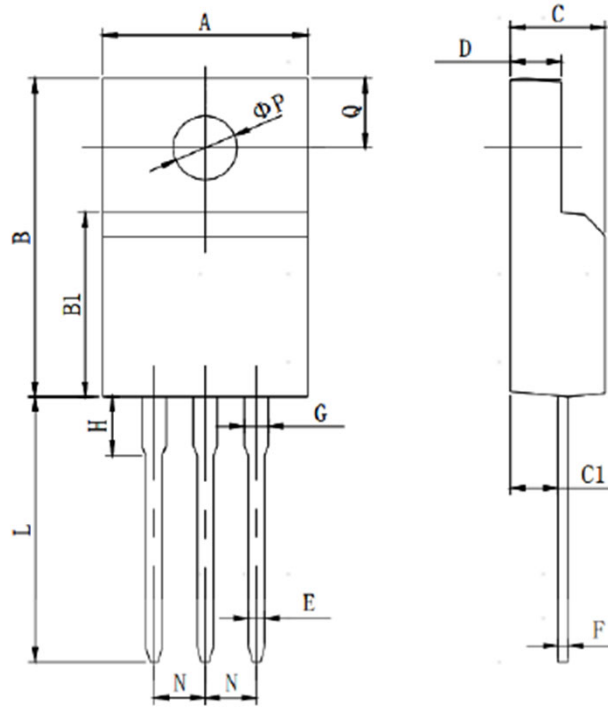


Figure 21. Diode Recovery Waveform




Product Dimension (TO-220F)



SYMBOL	Millimeter		
	Min	Nom	Max
A	9.60	10.00	10.40
B	15.40	15.80	16.20
B1	8.90	9.20	9.50
C	4.30	4.60	4.90
C1	2.10	2.50	3.00
D	2.40	2.70	3.00
E	0.60	0.80	1.00
F	0.30	0.45	0.60
G	1.12	1.30	1.42
H	3.40	3.60	3.80
L	12.00	13.00	14.00
N	2.34	2.54	2.74
Q	3.15	3.35	3.55
P	2.90	3.10	3.30


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