

Description

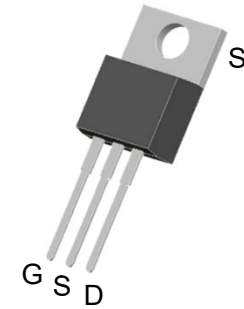
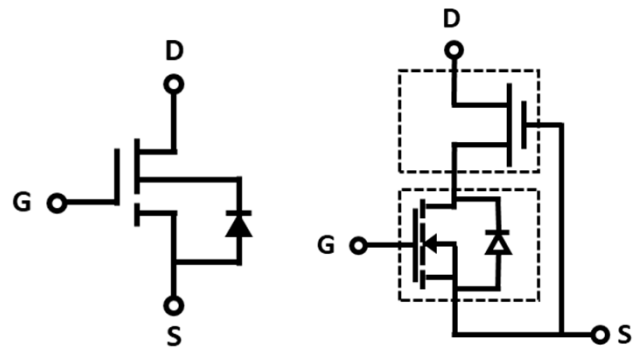
Product Summary		
$V_{DS}(V)$	$R_{DS(on)}(m\Omega)(Typ)$	$I_D(A)$
700	180	13

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


TO-220 (Top View)

Schematic Symbol
Cascode Device Structure
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	I_D	$T_C=25^\circ C$	13
		$T_C=100^\circ C$	8
Pulsed Drain Current (Pulse Width: 100 μs)	I_{DM}	$T_C=25^\circ C$	41
		$T_C=150^\circ C$	30
Power Dissipation	P_D	57	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	$R_{\theta JC}$	-	2.2	-	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient ²⁾	$R_{\theta JA}$	-	50	-	$^\circ C/W$

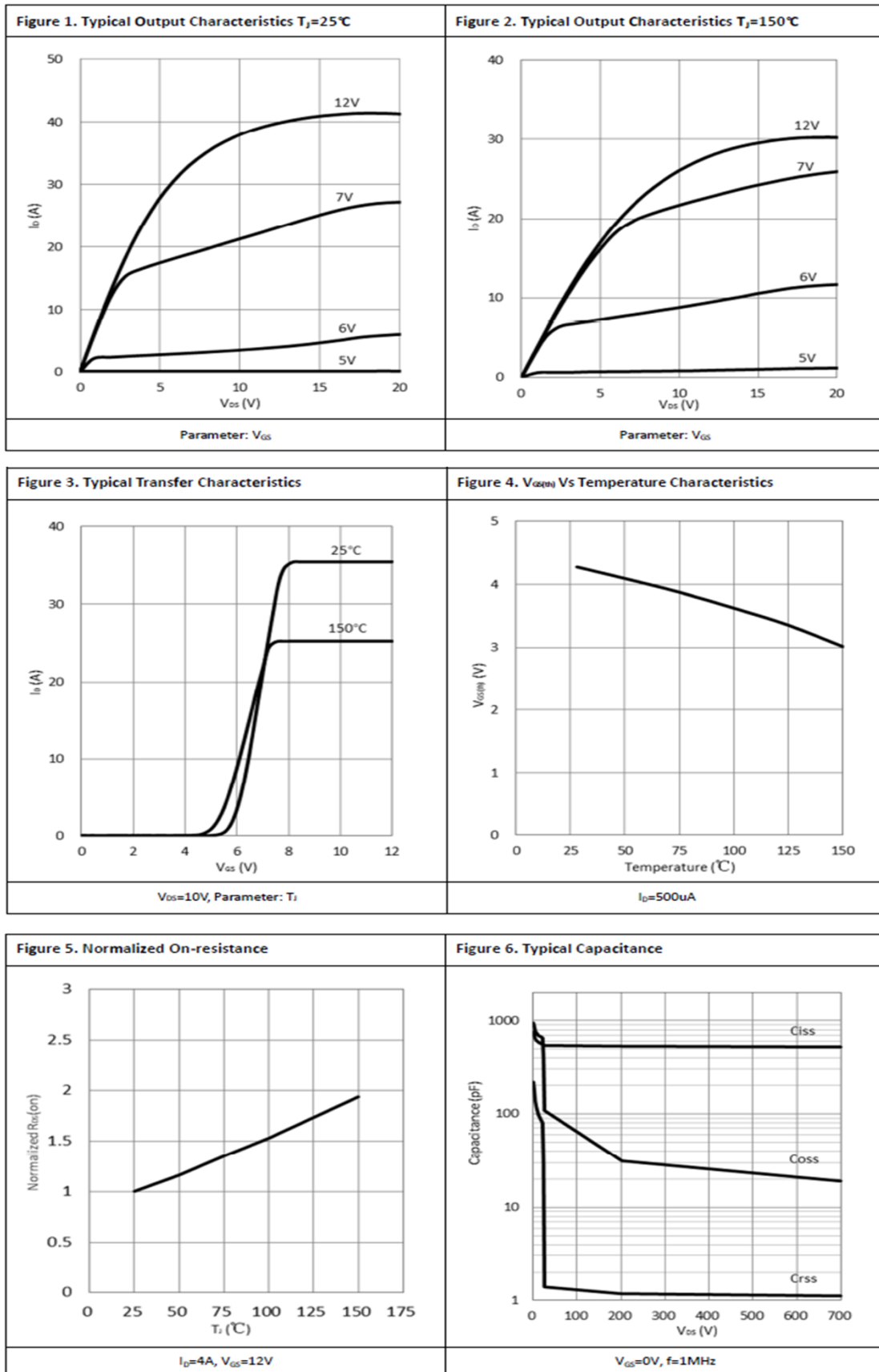
Electrical characteristics per line@25°C (unless otherwise specified)

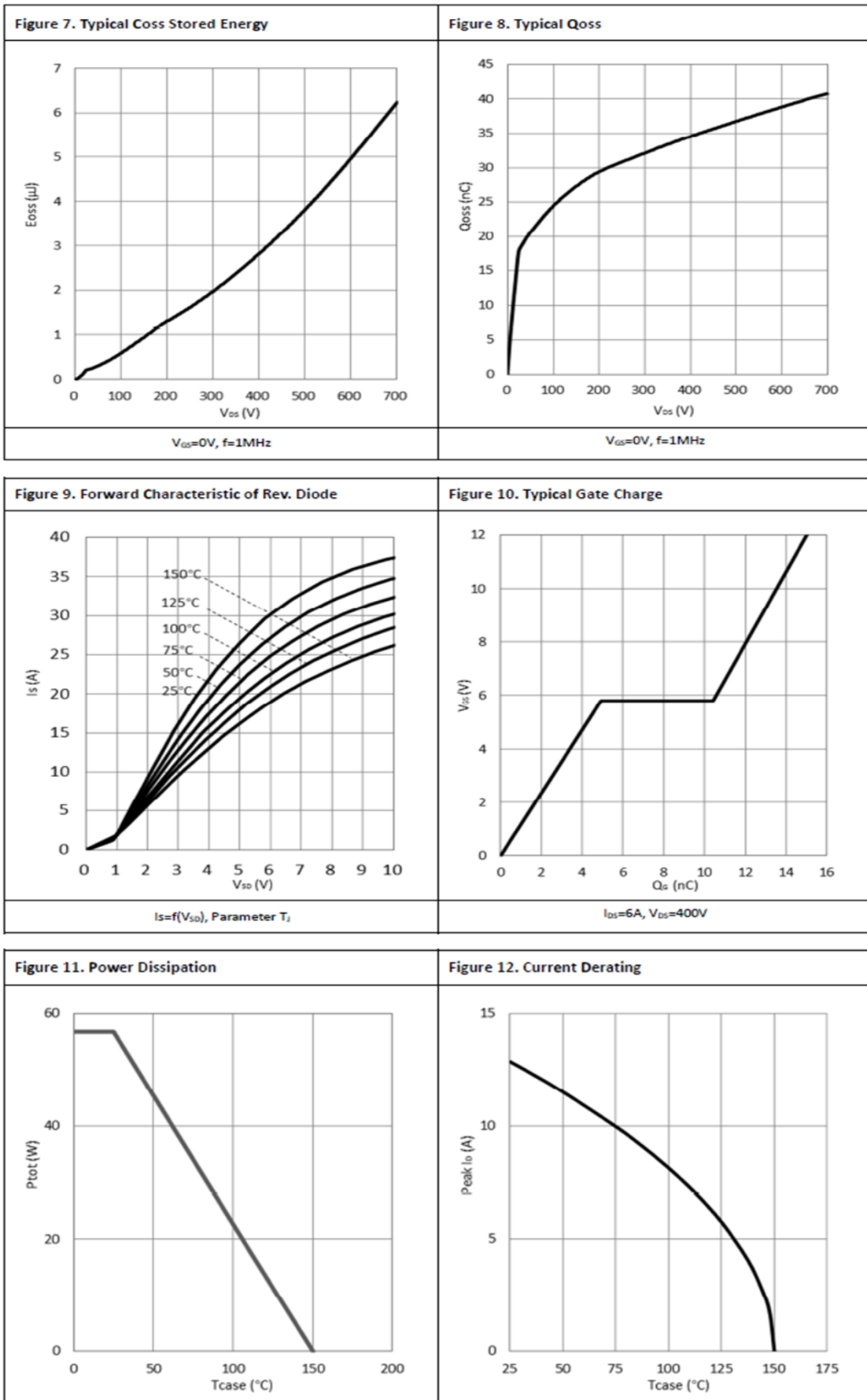
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units	
Statistic Characteristics							
Maximum Drain-Source Voltage	V_{DS-Max}	$V_{GS} = 0V$	700	-	-	V	
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	-	1000	-	V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=700V,$ $V_{GS}=0V$	$T_J=25^\circ C$	-	5	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⁾	$R_{DS(ON)}$	$V_{GS}=12V,$ $I_D=4A$	$T_J=25^\circ C$	-	180	225	mΩ
			$T_J=150^\circ C$	-	360	-	
Dynamic Characteristics							
Input Capacitance	C_{iss}	$V_{DS} = 400V, V_{GS} = 0V,$ $f = 1MHz$	-	515	-	pF	
Output Capacitance	C_{oss}		-	23	-		
Reverse Transfer Capacitance	C_{rss}		-	1.2	-		
Effective Output Capacitance, Energy Related	$C_{o(er)}$	$V_{GS} = 0V,$ $V_{DS} = 0-400V$	-	35	-	pF	
Effective Output Capacitance, Time Related	$C_{o(tr)}$		-	86	-		
Output Charge	Q_{oss}		-	34.5	-		nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 400V, I_D = 3A,$ $V_{GS} = 0-12V, R_G = 47\Omega$	-	43	-	ns	
Turn-on Rise Time	t_r		-	15	-		
Turn-Off Delay Time	$t_{d(off)}$		-	39	-		
Turn-Off Fall Time	t_f		-	11	-		
Total Gate Charge	Q_g	$V_{DS} = 400V, I_D = 6A,$ $V_{GS} = 0-12V$	-	15	-	nC	
Gate-Source Charge	Q_{gs}		-	4.9	-		
Gate-Drain Charge	Q_{gd}		-	5.5	-		
Reverse Diode Characteristics							
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=4A$	-	1.3	-	V	
			$V_{GS}=0V,$ $I_S=8A$	$T_J=25^\circ C$	-		1.8
		$T_J=150^\circ C$		-	3		-
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=8A,$ $V_{DD}=400V,$ $di/dt=1000A/\mu s$	-	18	-	ns	
Reverse Recovery Charge	Q_{rr}		-	34.5	-	μC	

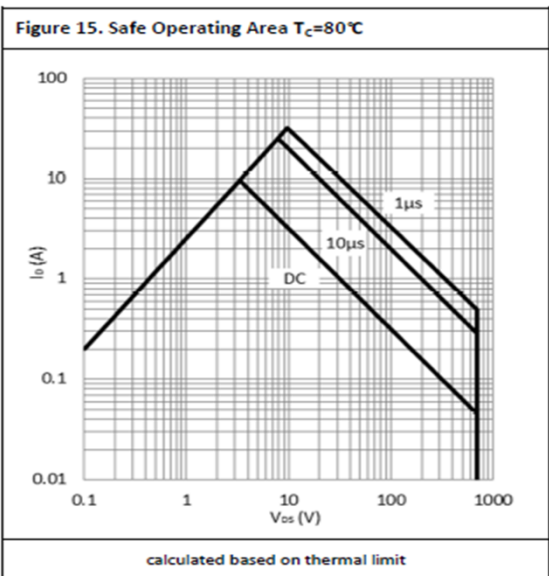
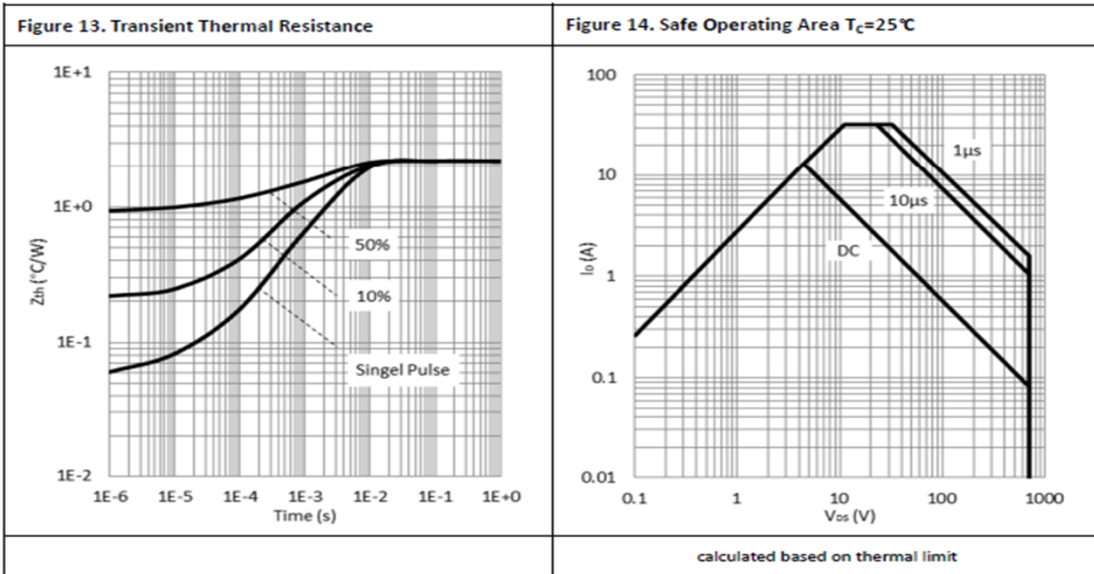
Notes:

- 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

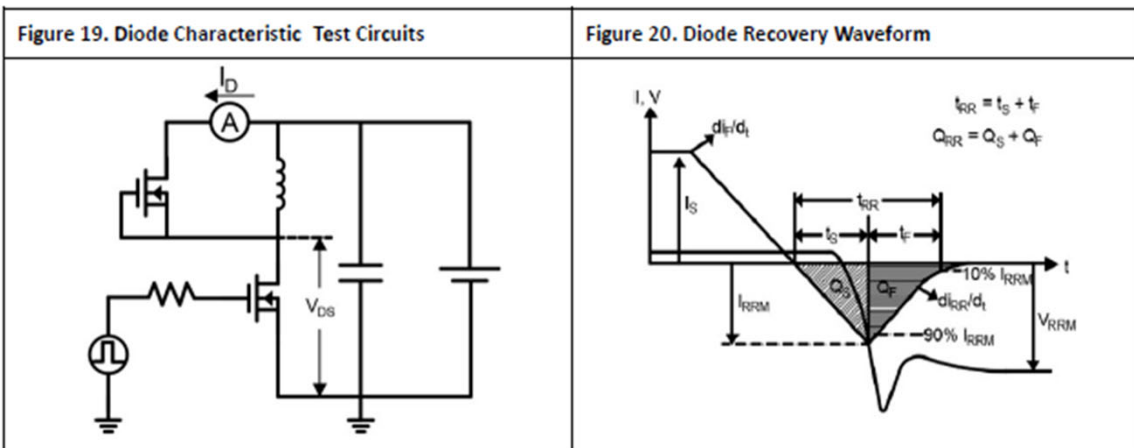
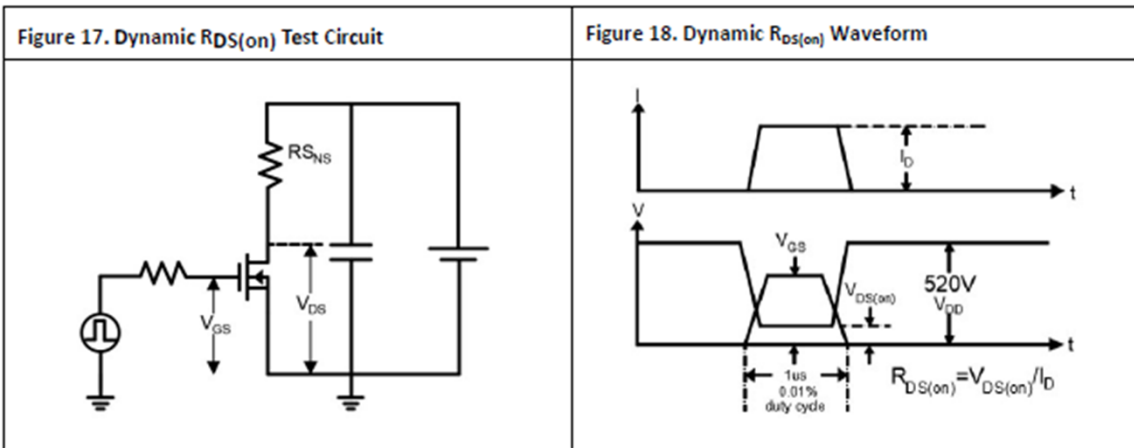
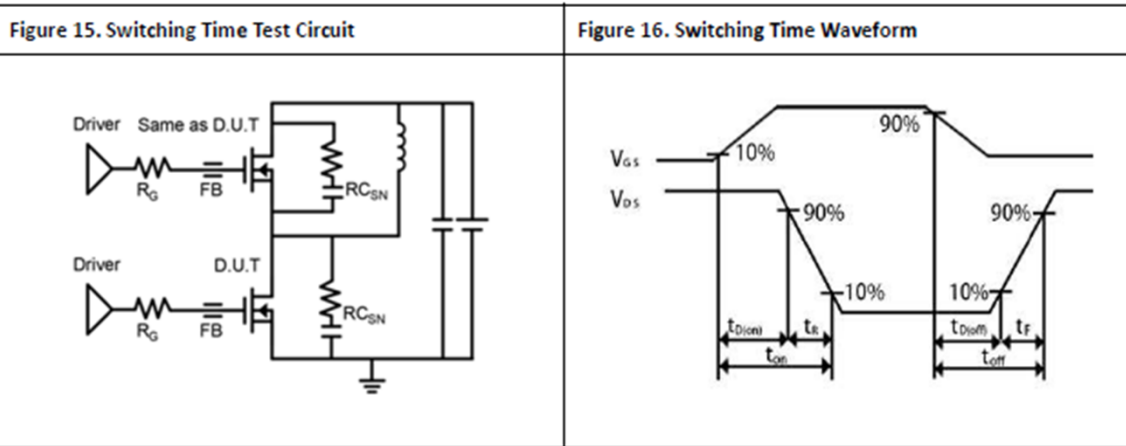
Typical Characteristics



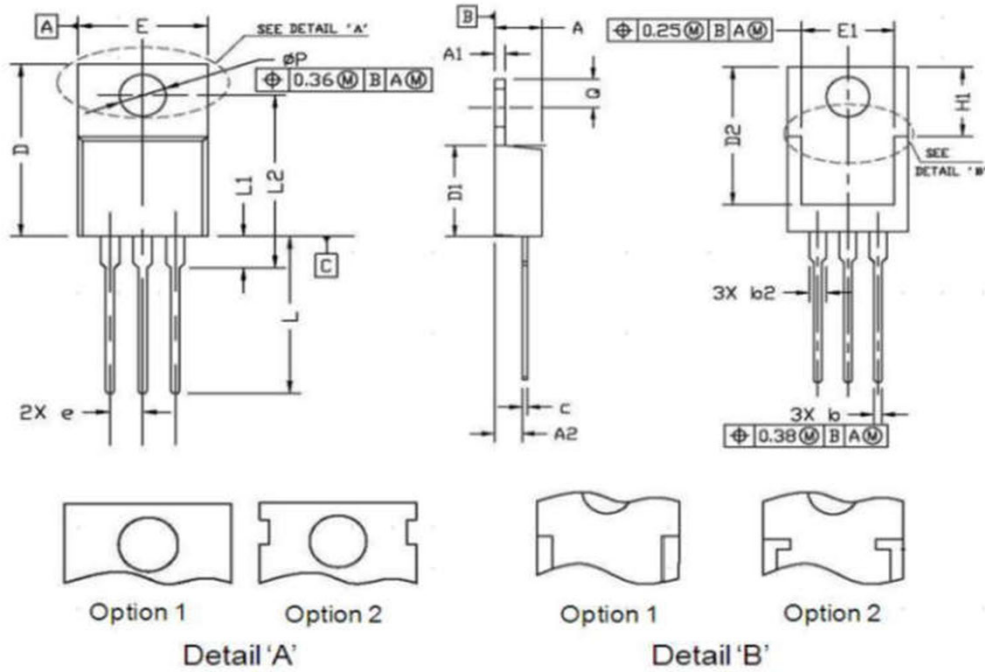




Test Circuits and Waveforms




Product Dimension (TO-220)



SYMBOL	Millimeter	
	Min	Max
A	4.30	4.80
A1	1.20	1.45
A2	2.20	2.90
b	0.69	0.95
b2	1.00	1.60
c	0.33	0.65
D	14.70	16.20
D1	8.59	9.65
D2	11.75	13.60
e	2.54BSC	
E	9.60	10.60
E1	7.00	8.46
H1	6.20	7.00
L	12.60	14.80
L1	2.70	3.80
L2	12.13	16.50
Q	2.40	3.10
P	3.50	3.90


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