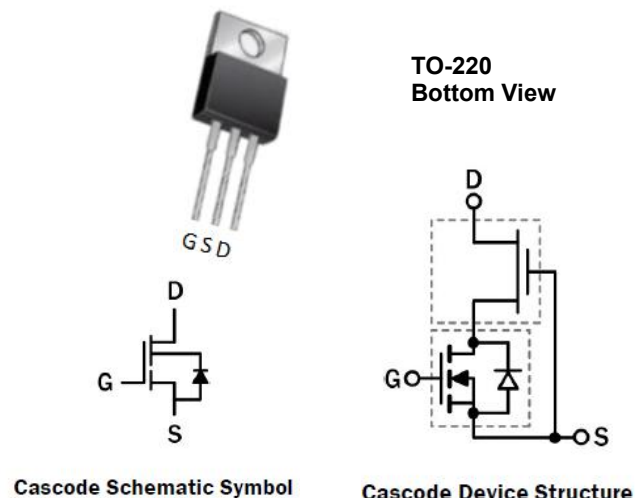


Features

- 900V, 10A, $R_{DS(on)}$ (typ.) = 200mΩ@VGS = 12V.
- Very low Q_{RR}
- Reduced Crossover Loss
- Easy to drive with commonly-used gate drivers
- Excellent $Q_G \times R_{DS(on)}$ figure of merit (FOM)
- RoHS compliant and Halogen-free

Application

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



Absolute Maximum Ratings (T_c = 25° C unless otherwise noted)

Symbol	Parameter		Limit	Unit
V _{DS}	Drain-Source Voltage		900	V
V _{(TR)DSS}	Transient Drain to Source Voltage ^a		1000	V
V _{GSS}	Gate-Source Voltage		± 20	V
I _D	Drain Current-Continuous	T _C = 25°C ^b	10	A
	Drain Current-Continuous	T _C = 100°C ^b	6	A
I _{DM}	Drain Current-Pulsed	Pulse Width = 100μs	48	A
P _D	Maximum power Dissipation @T _C = 25°C		35	W
T _C	Operating Temperature Case		-55 to +150	°C
T _J	Operating Temperature Junction		-55 to +150	°C
T _S	Storage Temperature		-55 to +150	°C
T _{SOLD}	Soldering Peak Temperature ^c		260	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
R _{θJC}	Thermal Resistance Junction-Case	3.6	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient ^d	50	°C/W

Electrical Characteristics ($T_J = 25^\circ \text{C}$ unless otherwise noted)

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{(BL)DSS}$	Reverse Breakdown Voltage	$V_{GS} = 0V$	900	-	-	V
I_{DSS}	Reverse Leakage Current	$V_{GS} = 0V, V_{DS} = 900V$ $T_J = 25^\circ \text{C}$	-	-	20	μA
		$V_{GS} = 0V, V_{DS} = 900V$ $T_J = 150^\circ \text{C}$	-	50	-	μA
I_{GSS}	Gate-to-source Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 150	nA

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 500\mu A$	3.0	4.0	5.0	V
$R_{DS(on)eff}$	On Resistance	$V_{GS} = 8V, I_D = 4A$ $T_J = 25^\circ \text{C}$	-	200	250	m Ω
		$V_{GS} = 8V, I_D = 4A$ $T_J = 150^\circ \text{C}$	-	400	-	

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{ISS}	Input Capacitance	$V_{GS} = 0V,$ $V_{DS} = 600V$ $f = 1MHz$	-	586	-	pF
C_{OSS}	Output Capacitance		-	26	-	
C_{RSS}	Transfer Capacitance		-	1	-	
$C_{o(er)}$	Output Capacitance, energy related	$V_{GS} = 0V,$ $V_{DS} = 0 \sim 600V$	-	36	-	pF
$C_{o(tr)}$	Output Capacitance, time related		-	83	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 0 \sim 12V,$ $V_{DS} = 600V,$ $I_D = 3A,$ $R_g = 30\Omega$	-	21	-	ns
t_r	Turn-On Rise Time		-	8	-	
$t_{d(off)}$	Turn-Off Delay Time		-	81	-	
t_f	Turn-Off Fall Time		-	7	-	
Q_G	Total Gate Charge	$V_{GS} = 0 \sim 12V,$ $V_{DS} = 600V,$ $I_D = 3A$	-	21	-	nC
Q_{GS}	Gate-Source Charge		-	6.7	-	
Q_{GD}	Gate-Drain Charge		-	5	-	

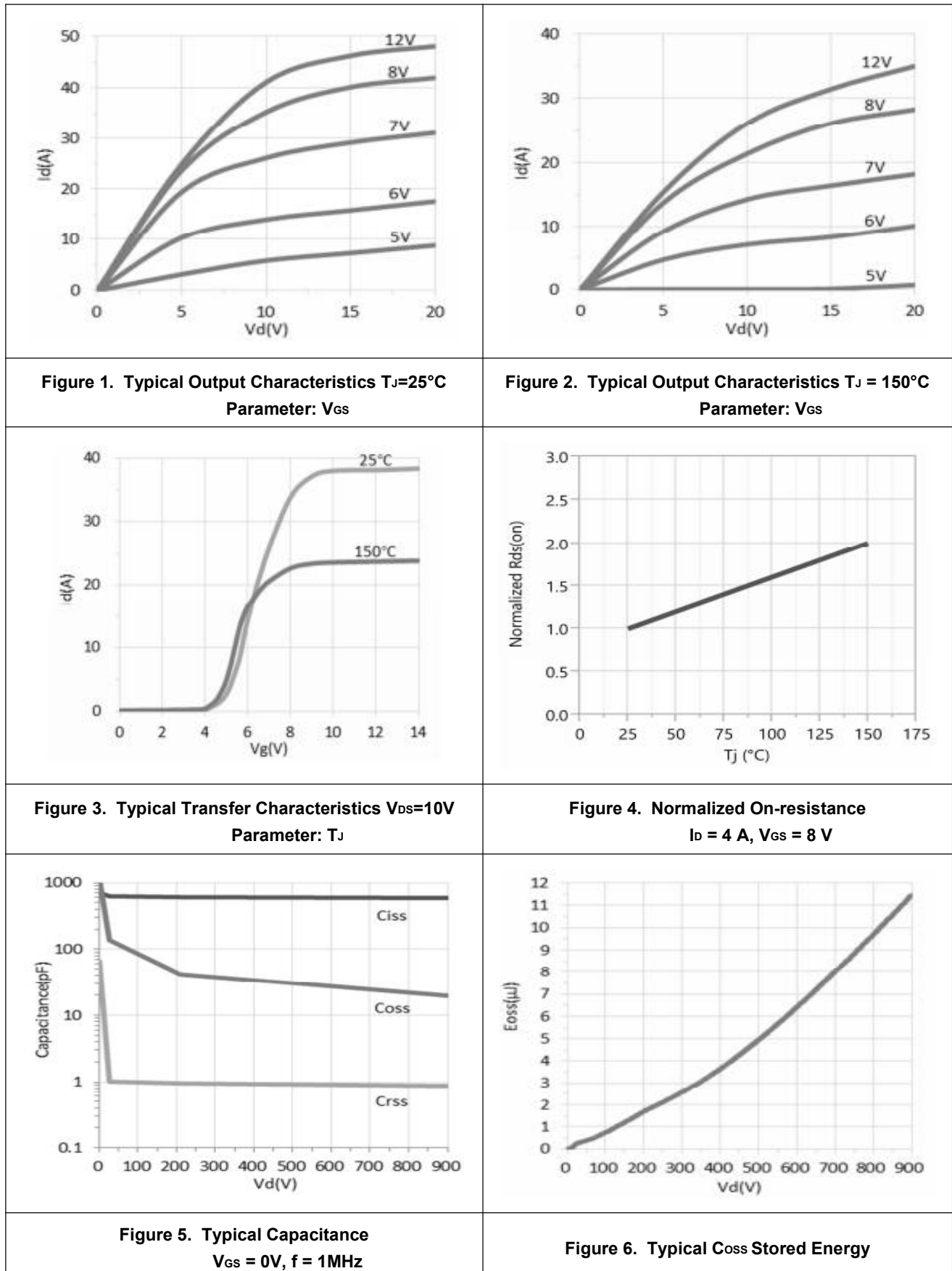
■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{SD}	Reverse Voltage	$V_{GS} = 0V, I_S = 2 A$	-	1.3	-	V
		$V_{GS} = 0V, I_S = 5 A$	-	1.9	-	V
t_{RR}	Reverse Recovery Time	$I_S = 3 A, V_{DS} = 600V,$ $di/dt = 1000 A/\mu s$	-	16	-	ns
Q_{RR}	Reverse Recovery Charge		-	50	-	nC

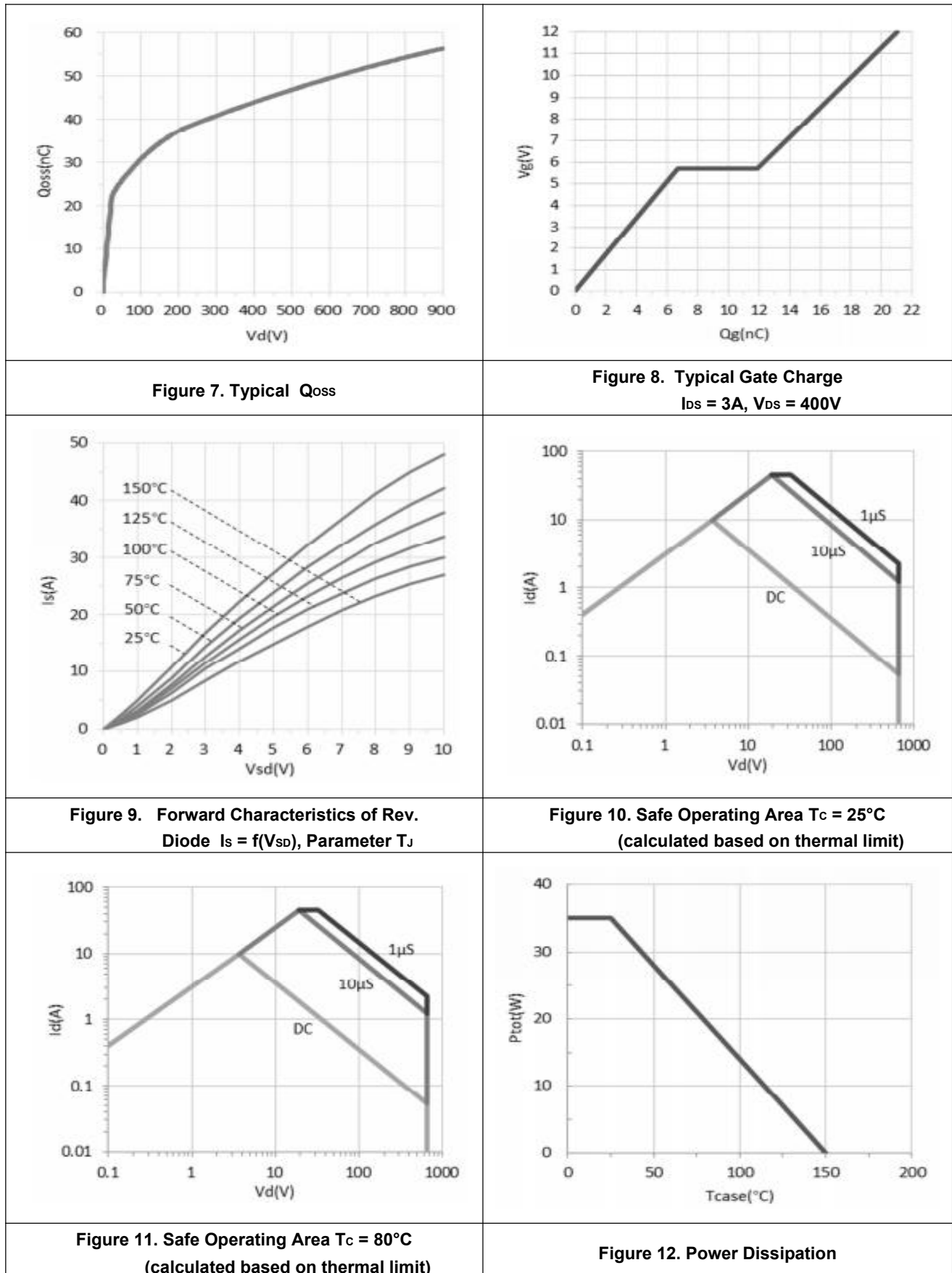
Notes:

- a. In off-state, spike duty cycle $D < 0.01$, spike duration $< 1\mu s$.
- b. For increased stability at high current operation.
- c. Reflow MSL3.
- d. Device on one layer epoxy PCB for drain connection (vertical and without air stream cooling, with $6cm^2$ copper area and $70\mu m$ thickness).

Typical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise noted)



Typical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise noted)



Typical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

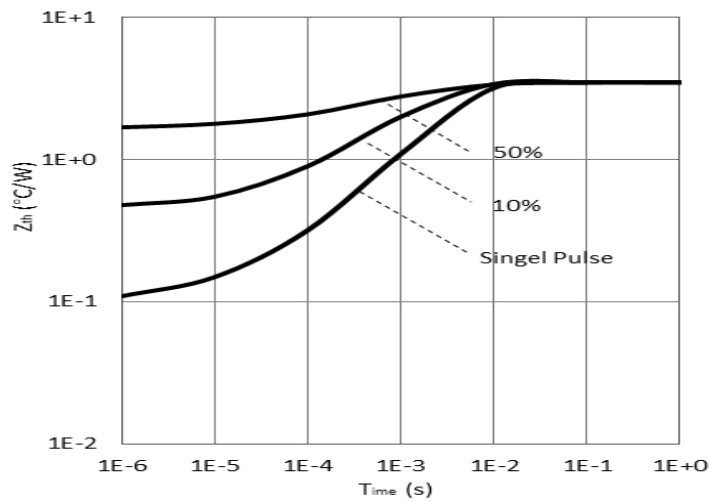


Figure 13. Transient Thermal Resistance

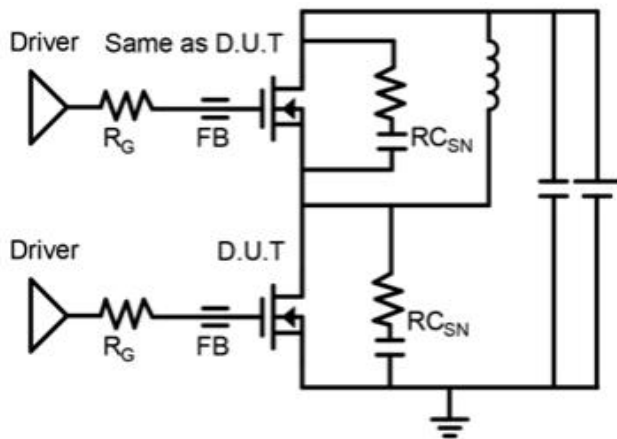


Figure 14. Switching Time Test Circuit

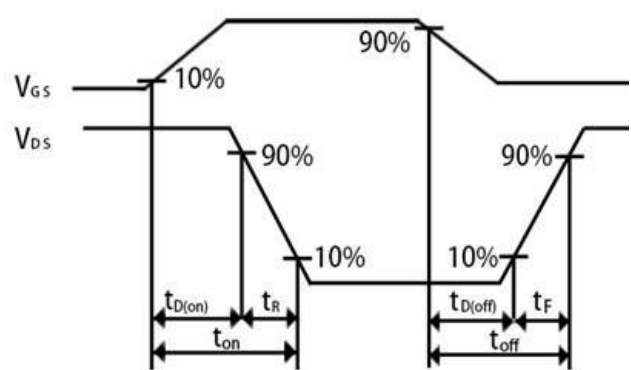


Figure 15. Switching Time Waveform

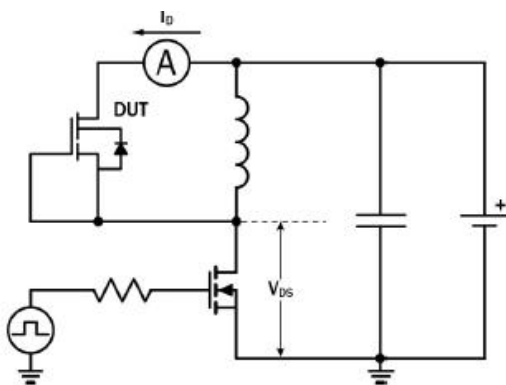


Figure 16. Diode Characteristics Test Circuit

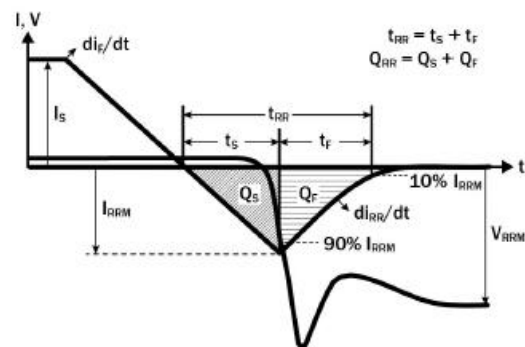
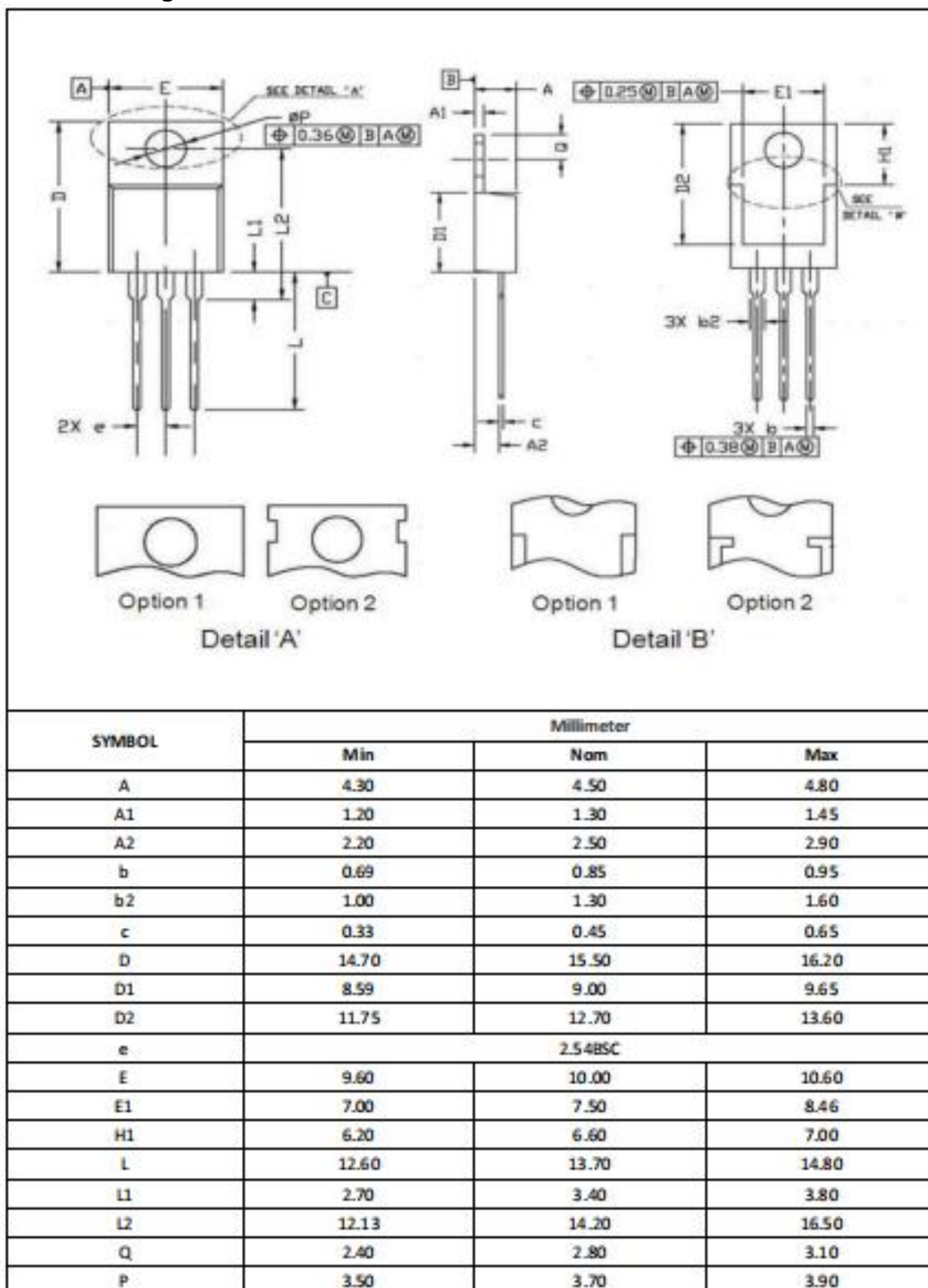


Figure 17. Diode Recovery Waveform

■ TO-220 Package Information



■ Revision History



MGC24N90H

900V GaN Power Transistor (FET)

Version	Date	Subjects (major changes since last revision)
0.1	2023-05-07	Preliminary Version
1.0	2024-10-10	Datasheet Complete