



General Features

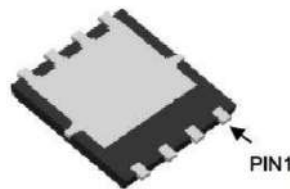
- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Optimized for synchronous rectification Low Input Capacitance

Application

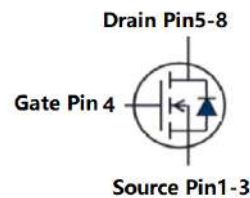
- Automotive applications
- Hard switched and high frequency circuits
- BLDC Motor drive applications
- Battery powered circuits

Product Summary

V_{DS}	100	V
$R_{DS(on), Typ @ V_{GS}=10V}$	3.8	m Ω
I_D	90	A



DFN5*6-8



Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current-Continuous	$T_C=25^\circ\text{C}$	I_D	90	A
	$T_C=100^\circ\text{C}$		48	A
Drain Current-Pulsed ^{Note 1}	$T_C=25^\circ\text{C}$	I_{DM}	360	A
Avalanche Current		I_{AR}	34	A
Single Pulse Avalanche Energy ^{Note 3}		E_{AS}	29	mJ
Maximum Power Dissipation	$T_C=25^\circ\text{C}$	P_{tot}	60	W
Operating Junction Temperature Range		T_J	150	$^\circ\text{C}$

Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Junction-to-Ambient ^{Note 2}	$R_{\theta JA}$	Steady State	-	54.5	-	$^\circ\text{C/W}$
Thermal resistance, Junction-to-Case	$R_{\theta JC}$	Steady State	-	1.7	-	$^\circ\text{C/W}$

Notes:

1. Pulse Test: Pulse Width $\leq 10\text{ms}$, Duty Cycle $\leq 1\%$.
2. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on FR-4 in still air.
3. Starting $T_J=25^\circ\text{C}$, $L=0.1\text{mH}$, $R_g=50\Omega$, $V_{GS}=10\text{V}$.

Electrical Characteristics (T_J=25°C unless otherwise noted)

STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_{DS}=1mA$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V, T_J=25^{\circ}C$	-	-	10	μA
		$V_{DS}=80V, V_{GS}=0V, T_J=125^{\circ}C$	-	-	100	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA

STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.2	-	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_{DS}=50A$	-	3.8	4.4	m Ω
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_{DS}=20A$	-	5.0	6.1	m Ω
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	-	1.0	-	Ω
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_{DS}=20A$	-	43.0	-	S

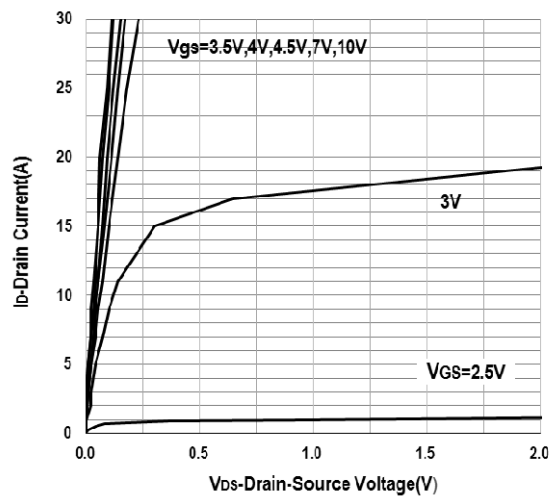
DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	3694	-	pF
Output Capacitance	C_{oss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	617	-	pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	42	-	pF
Turn-On Delay Time	$T_{d(on)}$	$V_{DS}=50V, V_{GS}=10V, I_{DS}=45A, R_{GEN}=3.6\Omega$	-	13.7	-	ns
Rise Time	t_r	$V_{DS}=50V, V_{GS}=10V, I_{DS}=45A, R_{GEN}=3.6\Omega$	-	36.0	-	ns
Turn-Off Delay Time	$T_{d(off)}$	$V_{DS}=50V, V_{GS}=10V, I_{DS}=45A, R_{GEN}=3.6\Omega$	-	54.4	-	ns
Fall Time	t_f	$V_{DS}=50V, V_{GS}=10V, I_{DS}=45A, R_{GEN}=3.6\Omega$	-	40.3	-	ns

GATE CHARGE CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate to Source Gate Charge	Q_{gs}	$V_{DD}=50V, I_D=30A,$	-	14.6	-	nC
Gate charge at threshold	$Q_{g(th)}$	$V_{DD}=50V, I_D=30A,$	-	8.0	-	nC
Gate to Drain Charge	Q_{gd}	$V_{DD}=50V, I_D=30A,$	-	21.4	-	nC
Switching charge	Q_{SW}	$V_{DD}=50V, I_D=30A,$	-	28	-	nC
Gate charge total	Q_g	$V_{DD}=50V, I_D=30A, V_{GS}=0 \text{ to } 10V$	-	78	-	nC
Gate plateau voltage	$V_{plateau}$	$V_{DD}=50V$	-	3.6	-	V
Gate charge total, sync. FET ($Q_g - Q_{gd}$)	$Q_{g(sync)}$	$V_{DS}=0.1V$	-	56.6	-	nC

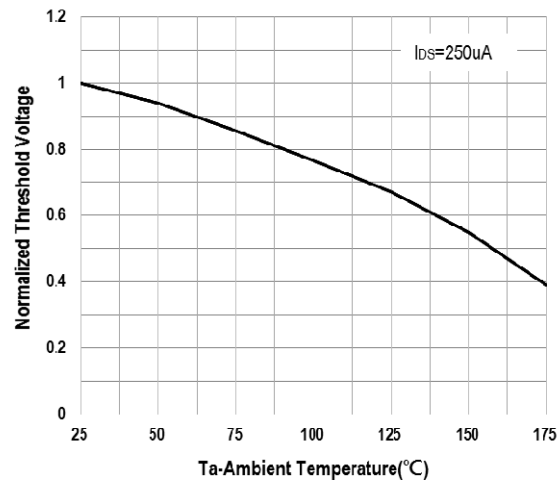
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=20A$	-	0.7	1.3	V
Body Diode Reverse Recovery Time	t_{rr}	$V_{DD}=50V, I_F=20A, di/dt=100A/\mu s$	-	52	-	ns
		$V_{DD}=50V, I_F=20A, di/dt=200A/\mu s$	-	46.4	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$V_{DD}=50V, I_F=20A, di/dt=100A/\mu s$	-	70.6	-	nC
		$V_{DD}=50V, I_F=20A, di/dt=200A/\mu s$	-	131.8	-	nC
Reverse Recovery Current	I_{RRM}	$V_{DD}=50V, I_F=20A, di/dt=100A/\mu s$	-	2.4	-	A
		$V_{DD}=50V, I_F=20A, di/dt=200A/\mu s$	-	4.9	-	A

Typical Operating Characteristics

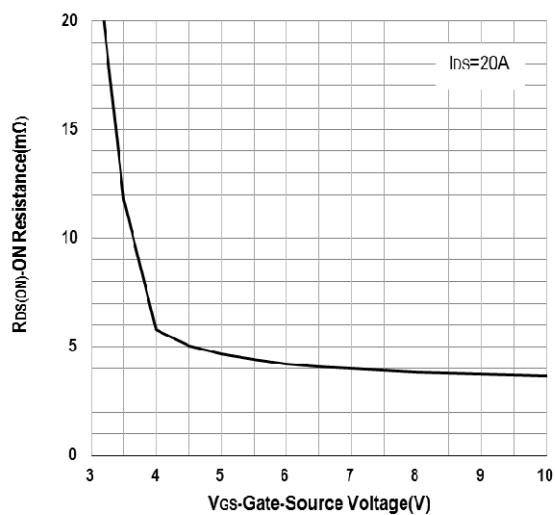
Output Characteristics



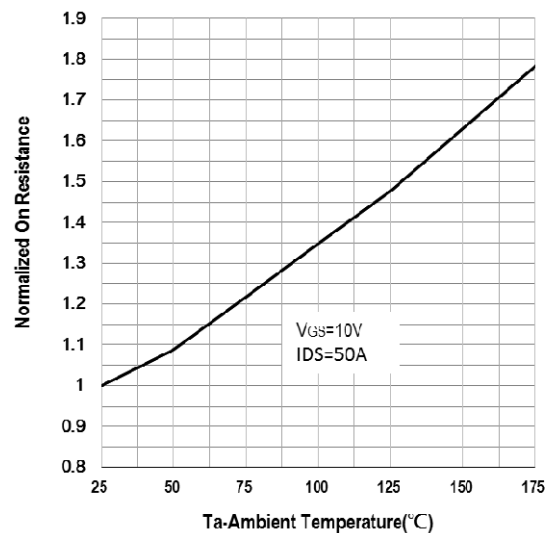
Gate Threshold Voltage



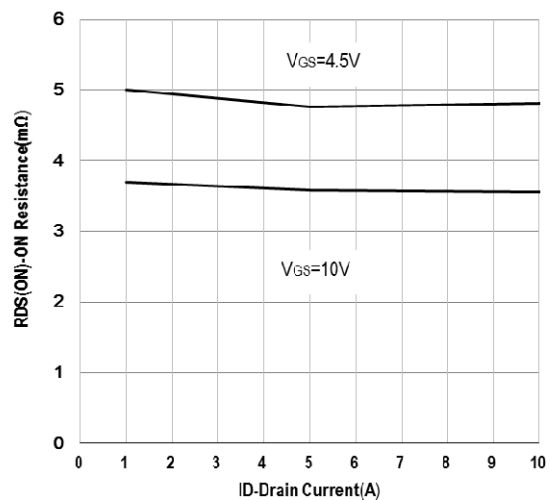
Gate-Source On Resistance



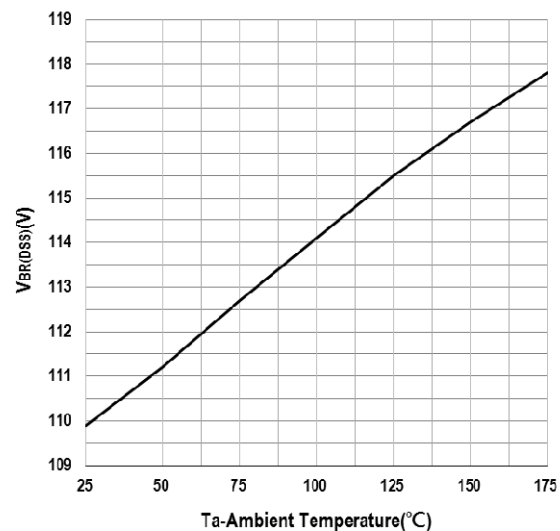
Drain-Source On Resistance

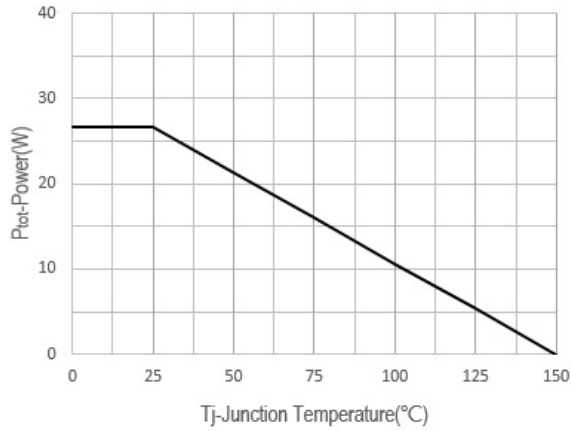
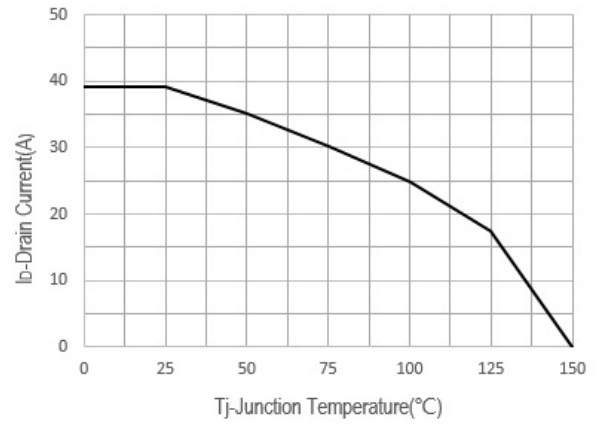
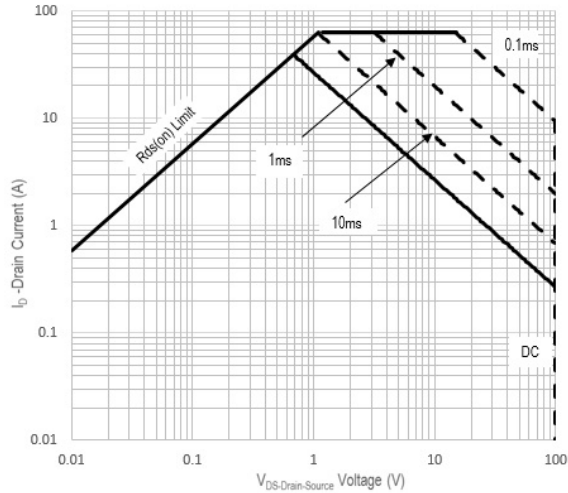
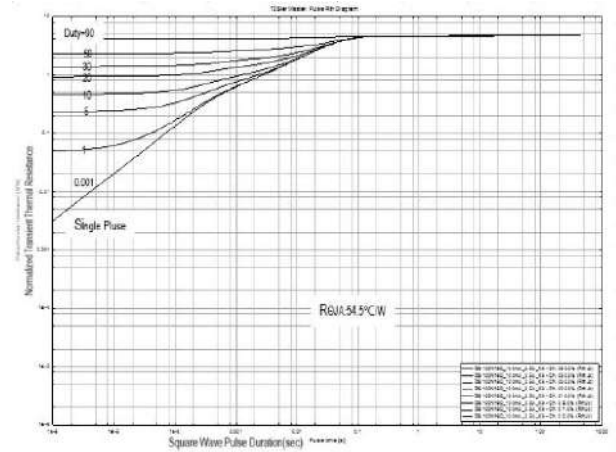
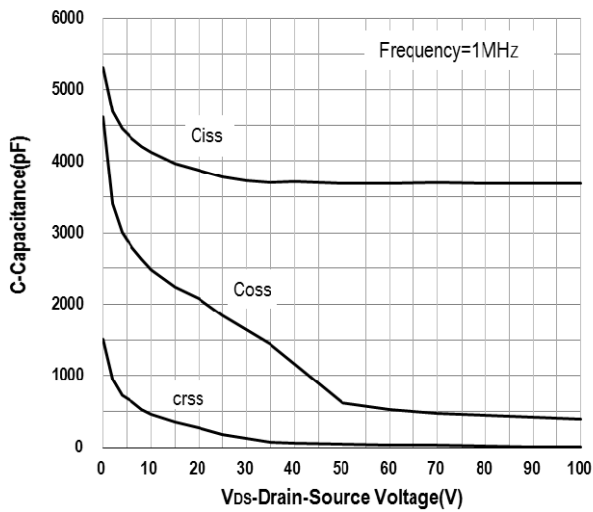
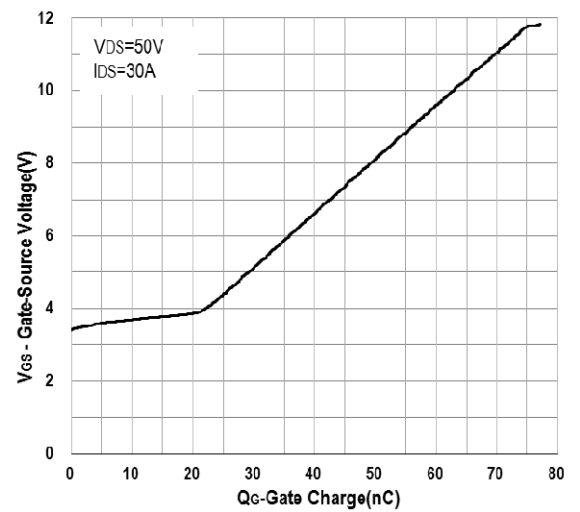


Drain-Source On Resistance



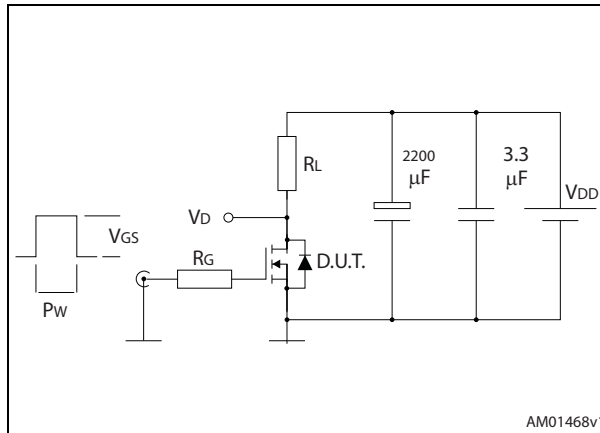
Drain-source Breakdown Voltage



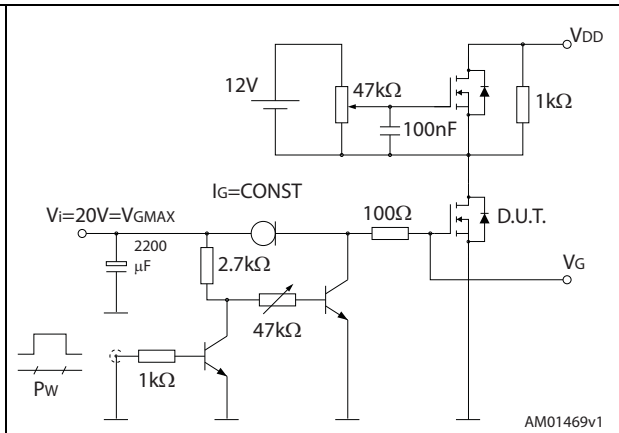
Typical Operating Characteristics (Cont.)
Power Dissipation

Drain Current

Safe Operation Area

Transient Thermal Impedance

Capacitance

Gate Charge


Test circuits

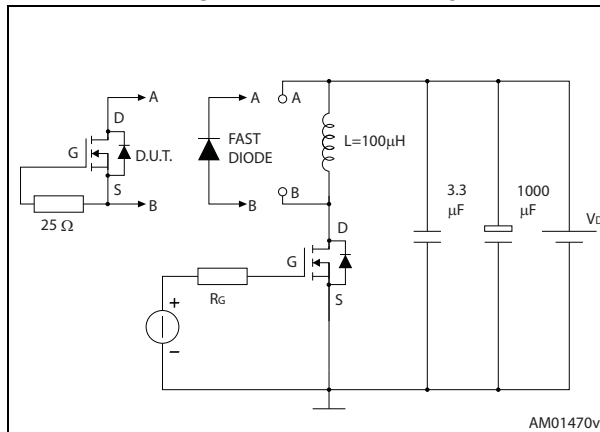
Switching times test circuit for resistive load



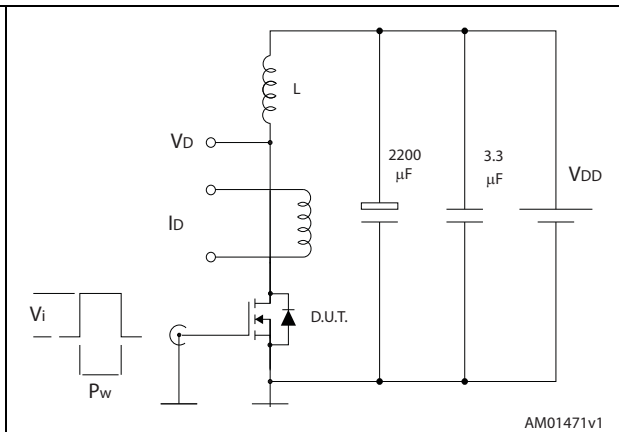
Gate charge test circuit



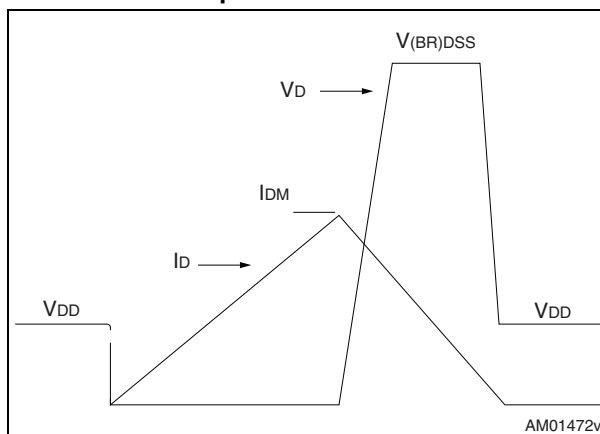
Test circuit for inductive load switching and diode recovery times



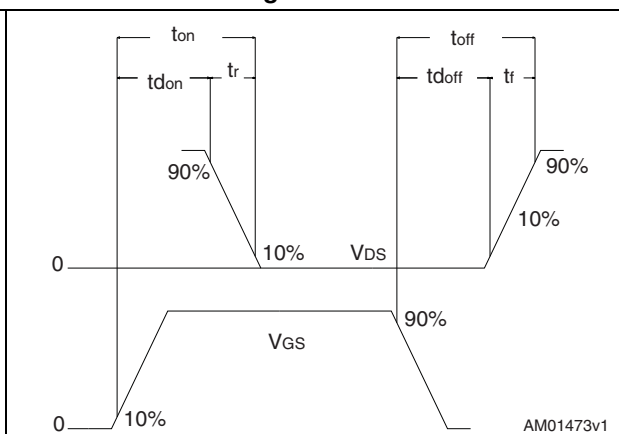
Unclamped inductive load test circuit



Unclamped inductive waveform

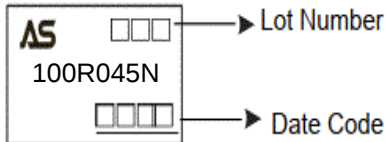


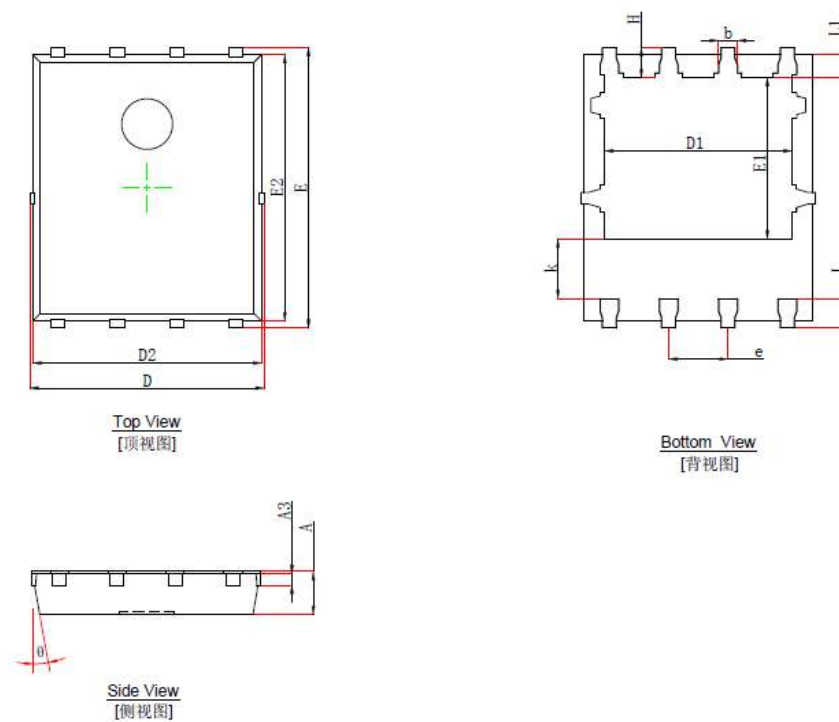
Switching time waveform



Ordering and Marking Information

Ordering Device No	Marking	Package	Packing	Quantity
ASDM100R045NQ-R	100R045N	DFN5*6-8	Tape&Reel	4000/Reel

PACKAGE	MARKING
DFN5*6-8	 AS 100R045N Lot Number Date Code

DFN5*6-8 PACKAGE IN FORMATION


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

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