

Enhancement Mode N-Channel Power MOSFET

Features

- ◆ Low $R_{DS(on)}$ & FOM
- ◆ Extremely low switching loss
- ◆ Excellent stability and uniformity
- ◆ Fast switching and soft recovery

Applications

- ◆ Consumer electronic power supply
- ◆ Motor control
- ◆ Synchronous-rectification
- ◆ Isolated DC/DC convertor
- ◆ Invertors

■ **General Description**

■ **Schematic and Package Information**

Schematic Diagram	Pin Assignment Top View			
	<p style="text-align: center;">TO251 SFG10R20AF</p>	<p style="text-align: center;">TO252 SFG10R20DF</p>	<p style="text-align: center;">PDFN5*6 SFG10R20GF</p>	<p style="text-align: center;">TO220 SFG10R20PF</p>

■ **Absolute Maximum Ratings** at $T_j=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	100	V
Gate source voltage	V_{GS}	± 20	V
Continuous drain current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_D	40	A
Pulsed drain current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{D, \text{pulse}}$		

■ Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		19.8		nC	$I_D=8\text{ A}$, $V_{DS}=50\text{ V}$, $V_{GS}=10\text{ V}$
Gate-source charge	Q_{gs}		2.4		nC	
Gate-drain charge	Q_{gd}		5.3		nC	
Gate plateau voltage	V_{plateau}		3.2		V	

■ Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward current	I_S			40	A	$V_{GS}<V_{th}$
Pulsed source current	I_{SP}			120		
Diode forward voltage	V_{SD}			1.3	V	$I_S=8\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		50.2		ns	$I_S=8\text{ A}$, $di/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}		95.1		nC	
Peak reverse recovery current	I_{rrm}		2.5		A	

■ Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a

■ Electrical Characteristics Diagrams

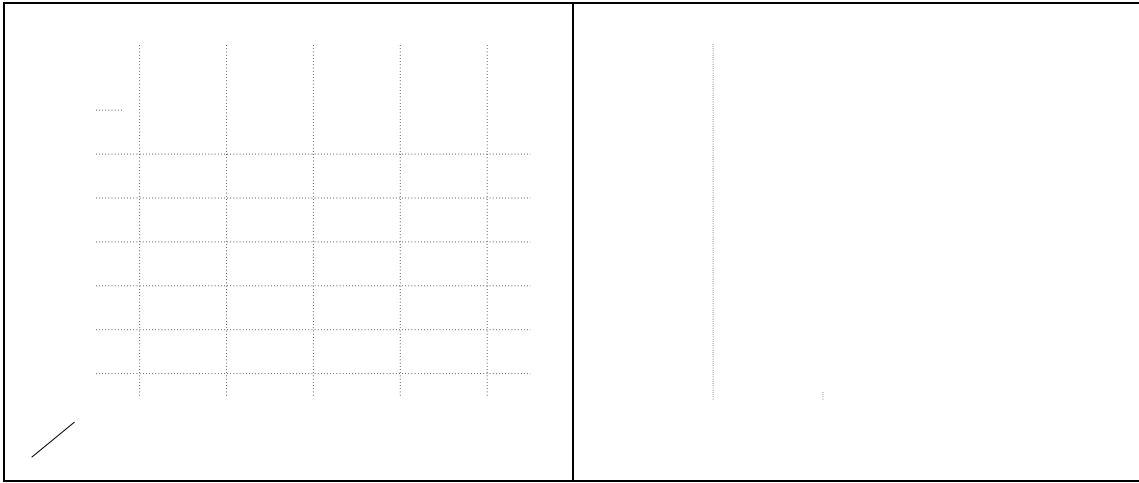


Figure 1, Typ. output characteristics

Figure 2, Typ. transfer characteristics

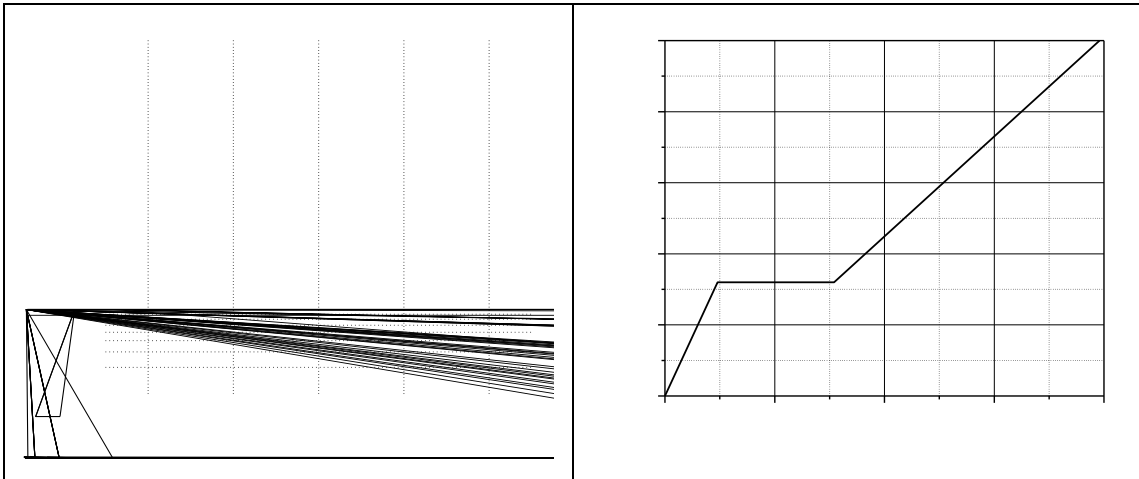


Figure 3, Typ. capacitances

Figure 4, Typ. gate charge

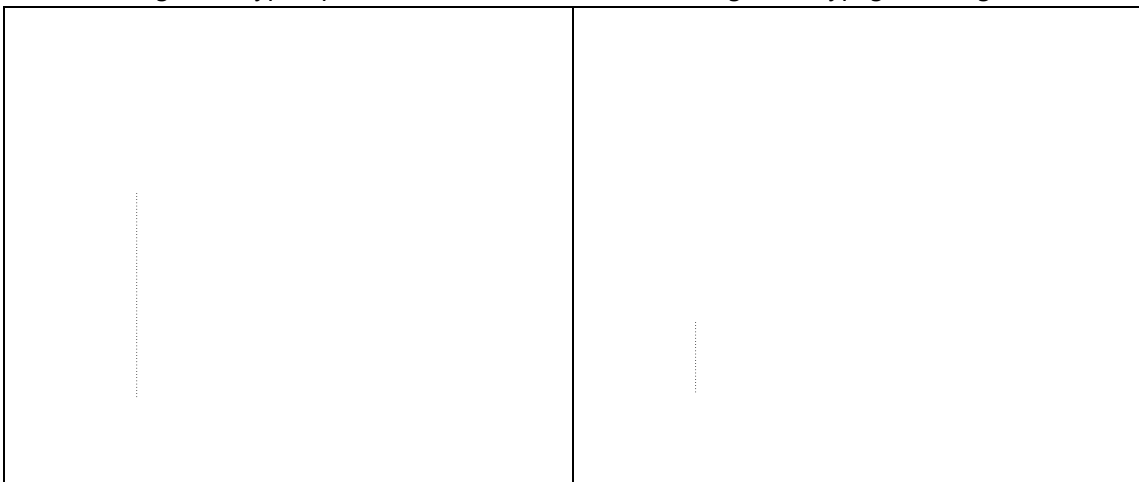


Figure 5, Drain-source breakdown voltage

Figure 6, Drain-source on-state resistance

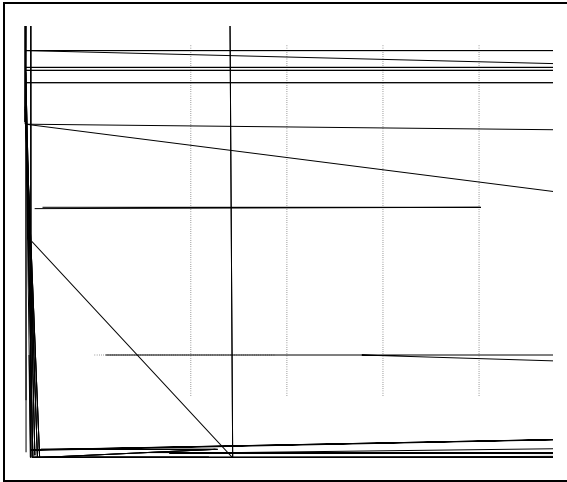


Figure 7, Forward characteristic of body diode

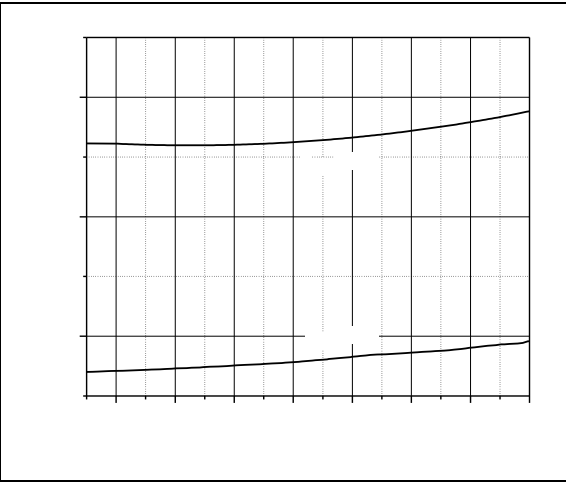


Figure 8, Drain-source on-state resistance

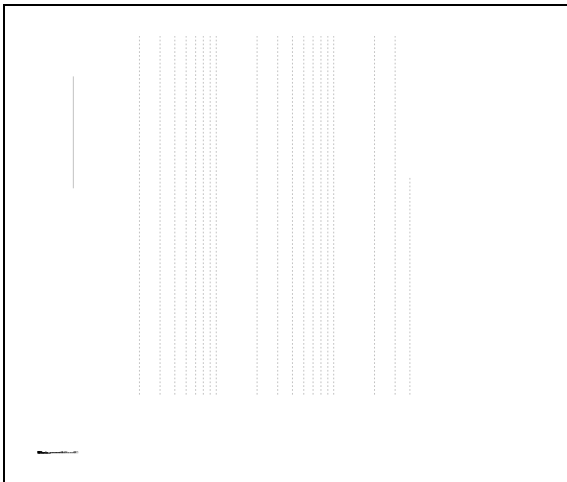


Figure 9, Safe operation area $T_C=25\text{ }^\circ\text{C}$

■ Test circuits and waveforms

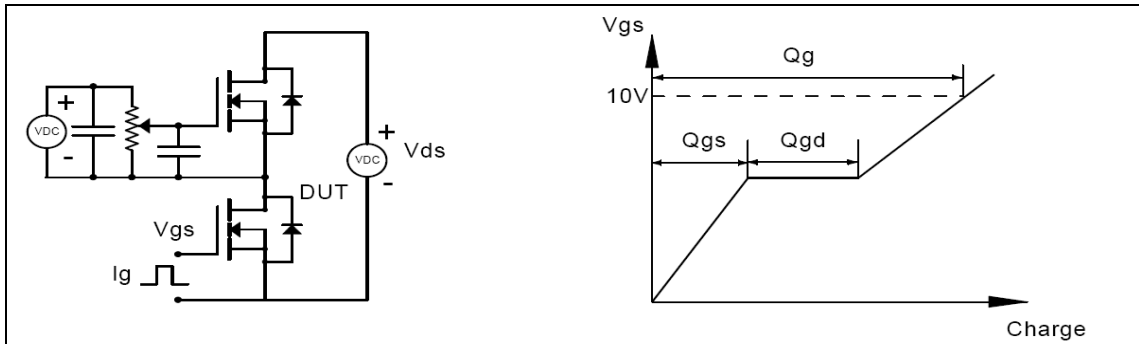


Figure 1, Gate charge test circuit & waveform

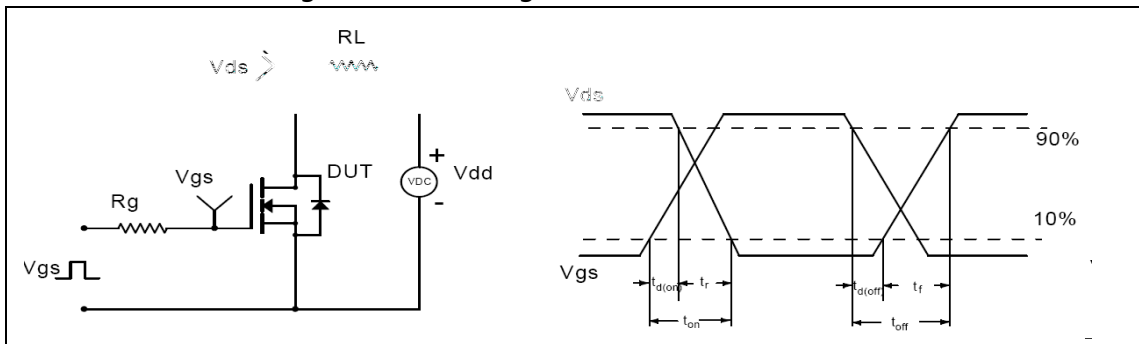


Figure 2, Switching time test circuit & waveforms

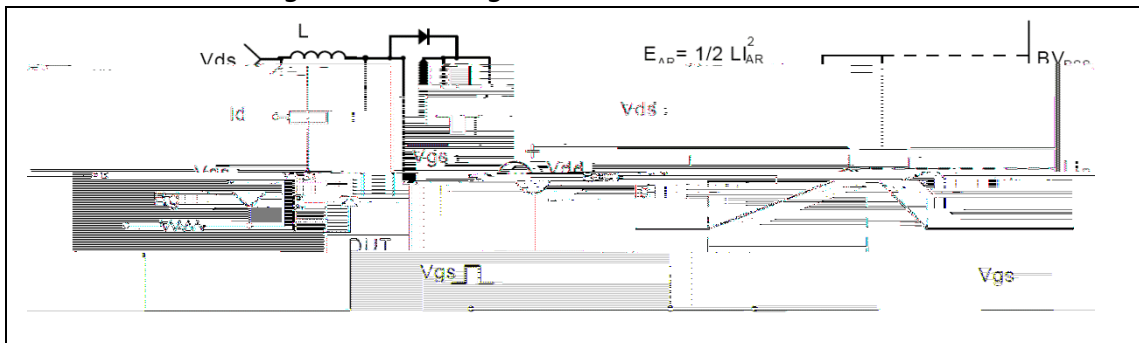


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

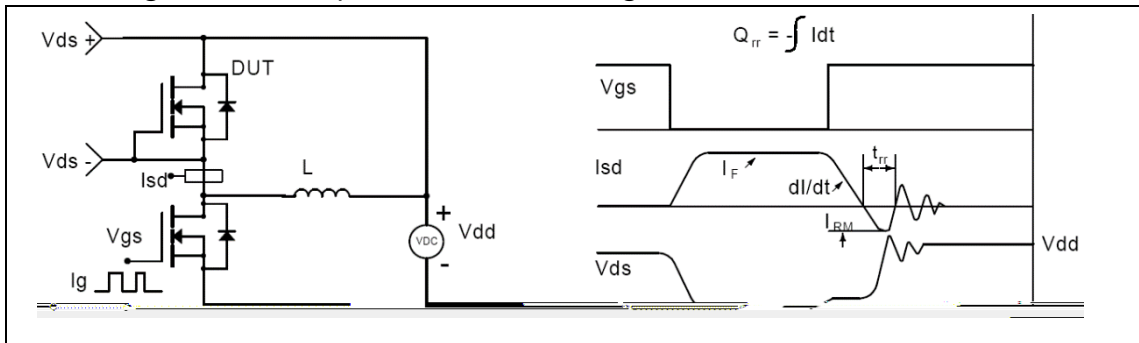
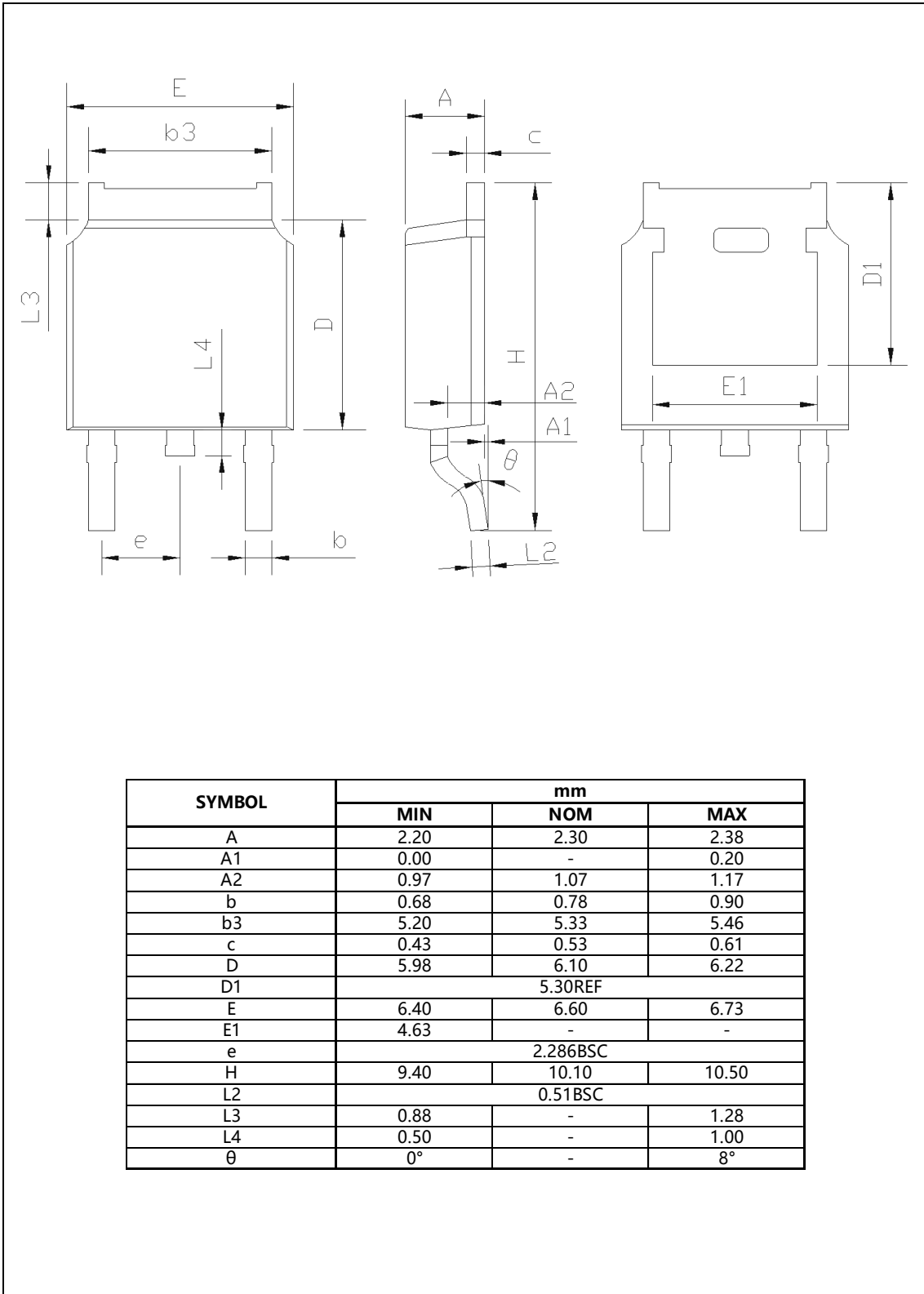


Figure 4, Diode reverse recovery test circuit & waveforms

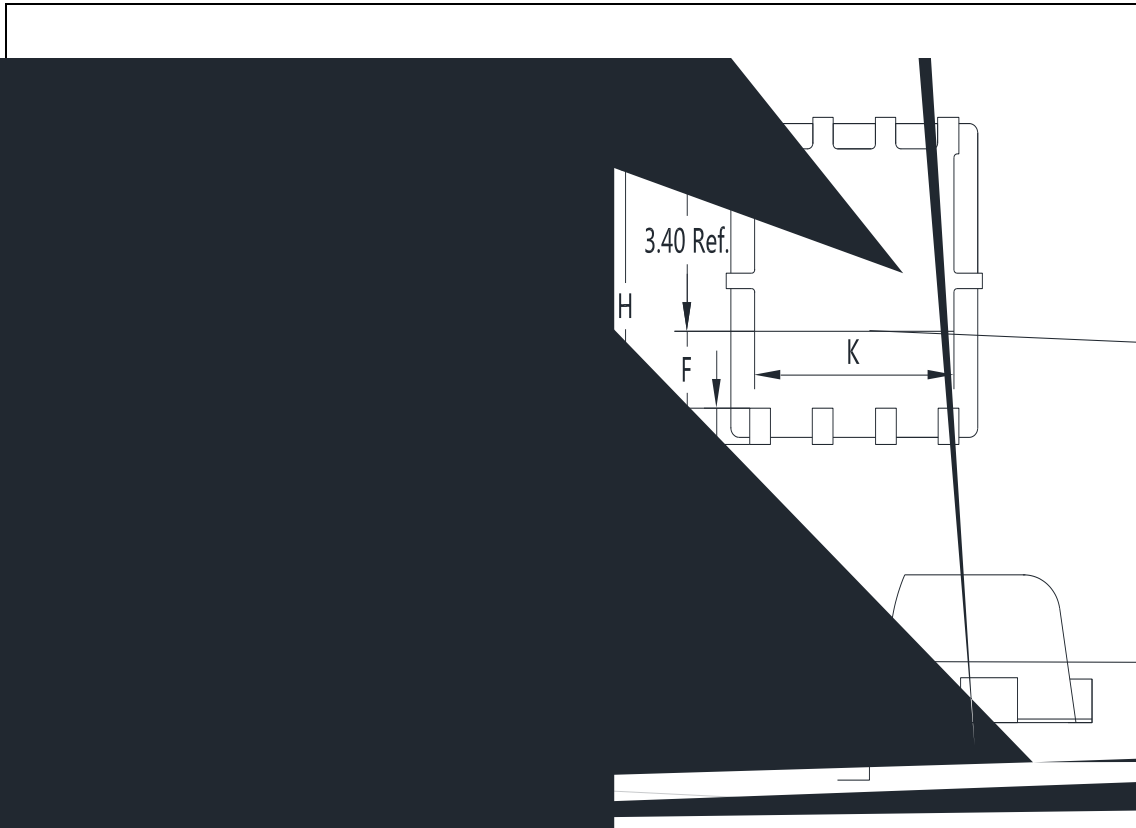
■ Package Information

Figure2, TO252 package outline dimension



■ Package Information

Figure3, PDFN5*6 package outline dimension



SYMBOL	mm		
	MIN	NOM	MAX
A	0.8	0.9	1
A1	0	0.03	0.05
b	0.35	0.42	0.49
c	0.254 REF		
D	4.9	5	5.1
F	1.40 REF		
E	5.7	5.8	5.9
e	1.27 BSC		
H	5.95	6.08	6.2
L1	0.1	0.14	0.18
G	0.60 REF		
K	4.00 REF		

■ Package Information

Figure4, TO220 package outline dimension



SFG10R20AF, SFG10R20DF, SFG10R20GF, SFG10R20PF

Enhancement Mode N-Channel Power MOSFET

■ Ordering Information

Package	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Box/Carton Box	Units/Carton Box
TO251	75	66	4950	6	29700
TO220	50	20	1000	6	6000

Package Units/Reel Reels/Inner Box Units/Inner Box